Florida Statewide ITS Strategic Plan

Summary of Survey Results

INTRODUCTION

A survey of ITS activities and programs of other states and agencies is part of Task 1 in the scope of services. A survey questionnaire was produced, reviewed and finalized in July 1998. A copy of the survey questionnaire is in Appendix A.

The questionnaire was mailed to twenty-three (23) state DOTs and ITS operating agencies throughout the U.S. A list of contacts that was used in the mailing is in Appendix B. Also, three of the four ITS Priority Corridors were included from previous surveys and follow-up telephone calls. Fifteen (15) of the twenty-six agencies contacted responded either in a written response to the survey form or by sending relevant documents. These 15 respondents are listed below:

Gary-Chicago-Milwaukee
Priority Corridor
Colorado DOT #1
Colorado DOT #2
I-95 Priority Corridor
Washington State DOT
Virginia DOT
Wisconsin DOT
Houston Priority Corridor
Minnesota DOT
Missouri DOT
Caltrans
Maryland SHA CHART
New Jersey DOT
Texas DOT
Utah DOT

Each response did not necessarily include answers to all questions, therefore statistical analysis of the answers will not be conducted.

SUMMARY OF SURVEY RESULTS

The responses to the questions in the survey are summarized in the following pages. The answers given by each agency are compiled by question in Appendix C.

Section A. General Information

A. 1. How many local districts or geographic regions within your agency are there in your state or organization?

The ten responding DOTs are divided into districts. The number of districts varied from 2 in New Jersey to 12 in California and 25 in Texas. Florida DOT currently has seven geographic districts plus the Turnpike District.

A. 2. How many Metropolitan Planning Organizations (MPOs) exist in your state or organization?

The number of MPOs in the responding states varies from 25 in Texas, 15 in California, 13 in Washington to 2 in Maryland. Florida, with 26 MPOs, has the most of all states in the survey.

A. 3. Describe the ITS staffing plan and hierarchy for your agency headquarters. Also, include districts of your agency, if applicable.

Several states have a statewide ITS division or branch with headquarters staff and district or regional engineers staffing the districts for ITS operations. This model is representative of Colorado, Washington, Virginia, and California. Wisconsin has a small headquarters staff and no district staff. Missouri has district urban ITS coordinators and a statewide rural ITS coordinator. New Jersey has ITS engineers in each of their two districts. Florida DOT has a Central Office of Traffic Operations, with limited ITS-specific responsibilities. Most ITS deployment is handled by the FDOT districts.

A. 4. How do headquarters and district roles relate? (i.e., is your agency centralized or decentralized?)

Seven states described themselves as being decentralized (Colorado, Washington, Virginia, Missouri, California, Texas, and New Jersey). Wisconsin and Maryland were described as being centralized. Colorado and Virginia stated they are in the process of becoming more centralized. Florida DOT has traditionally been de-centralized.

A. 5. Which of the following does your agency have primary responsibility? (check all that apply)

- ***9*** *ITS planning and programming*
- ***9*** *ITS design and specification*
- ***9*** *ITS procurement (contracting agency or authority)*
- ***9*** *ITS operations (with agency staff or contract operators)*
- ***9*** *ITS maintenance (with agency staff or contract operators)*

All the responding states except Missouri and Texas stated that they are responsible for all five ITS activities listed. Missouri stated that DOT is responsible for ITS design, procurement, and operations only. Texas is responsible for planning and programming and design. As an agency, FDOT is involved is all of the listed activities. However, the level of involvement varies considerably by district.

A. 6. What types of ITS projects has your agency been involved with? (check all that apply)

- *ITS strategic planning and architecture development*
- *Advanced Traffic Management Systems (ATMS)*
- *Advanced Traveler Information Systems (ATIS)*
- *Commercial Vehicle Operations (CVO)*
- *Advanced Public Transit Systems (APTS)*
- *Advanced Vehicle Control and Safety Systems (AVCSS)*
- *Advanced Rural Transportation Systems (ARTS)*
- *Other*

All responding states and Priority Corridors stated that they are active in Planning/Architecture, ATIS, and CVO. All agencies except the I-95 Corridor have an ATMS component. Seven agencies (GCM Corridor, Colorado, I-95 Corridor, Wisconsin, Texas, Houston Corridor, Minnesota, and California) are involved in APTS. Nine agencies are active in ARTS (Colorado, Washington, Virginia, Wisconsin, Texas, Minnesota, Missouri, California, and Maryland). Houston and Minnesota added weather and incident management as other activities. Florida DOT has had some experience with all of the listed ITS project types.

General Observations and Implications for Florida

Of the 13 responding agencies, it appears that California and Texas are most similar to Florida in size, complexity (number of MPOs) and organizational structure (strong DOT districts). Both of these states have advanced ITS programs and may offer lessons for Florida.

Section B. ITS Planning and Programming

B.1. Does your state or jurisdiction have an ITS Strategic Plan?

All 14 responding agencies have an ITS Strategic Plan. This project is to develop an ITS Strategic Plan for Florida DOT.

***If yes**, please answer the following:*

A. When was the plan adopted? B. When will the plan be updated?

The earliest plan adopted was the I-95 Corridor Strategic Plan adopted in 1994. Several agencies have adopted their Strategic Plans in 1998 for the first time. The plans are to be updated annually in the I-95 Corridor, Virginia, and California. Others report that updates will be every few years.

B.2. Either in addition to, or instead of, a Strategic Plan, describe what kind of planning and/or programming has been done for ITS at either the statewide or regional level (i.e., comprehensive plan).

Five agencies report that there is no other ITS plan (Houston Corridor, Missouri, California, Maryland, and New Jersey). The other agencies state that they have an ITS Business Plan. All of Florida's major urban areas (Miami, Ft. Lauderdale, Orlando, Tampa/St. Petersburg and Jacksonville have developed ITS plans - either through Early Deployment Plans or on their own local initiative.

B.3. Is ITS planning and programming at the regional level primarily led by the DOT or by MPOs?

All agencies except Caltrans report that the DOTs lead regional planning and programming. In California, the MPOs in many regions take the lead in planning for ITS. Several of the large MPOs (including SANDAG in SanDiego and MTC in the San Francisco Bay Area) are national leaders in ITS activities. In Florida, especially recently, planning has been a cooperative effort between the MPOs and FDOT.

B. 4. How are you funding ITS projects?

- *Local ITS (line-item budget) funds*
- *State ITS funds*
- *Local Traffic Operations funds*
- *State Traffic Operations funds*
- *Local general transportation funds*
- *State general transportation funds*
- *Non-transportation source funds (i.e., communication & information systems, etc.)*
- *Federal ITS funds*
- *Federal general transportation funds (i.e., NHS, transit, CMAQ, etc.)*
- *Other*

All of the 11 responding agencies report using federal ITS funds for ITS activities. Eight agencies use state ITS funds making it the second most used funding source. Both state and federal general transportation funds are being used for ITS activities in five agencies. State traffic operations funds are used in four agencies. Only two agencies report using local ITS funds and one agency is using local traffic operations funds. None of the 11 agencies are using local general transportation funds or non-transportation funds. In summary, federal and state ITS funds are used by almost all agencies. Nearly half the agencies use federal and state general transportation and traffic operations funds for ITS activities. Only a few agencies are using local funds for ITS. This is likely due to the regional nature of ITS projects. Florida does not have a specific ITS funding category, but generally uses funds allocated to traffic operations. Some local agencies have used state and local general transportation funds for ITS related projects. A few Florida transit agencies have used state and local transit funding for APTS projects.

B.5. Do ITS projects in your jurisdiction have to comply with State Transportation Improvement Plan (STIP) and Implementation Plan (SIP) requirements?

***If yes,** please answer the following:*

A. How long has this policy been in effect?

B. What process do you use to ensure STIP and SIP compliance?

***If no,** please answer the following:*

C. Will future projects comply with these requirements?
If no, why not?

D. Is ITS included in any of the regional (MPO or rural) plans, TIPs or other special programs (e.g., transit development plans)?

Eight of the eleven responding agencies report that ITS projects must comply with STIP and SIP requirements. Missouri, California, and Maryland are the states that do not require compliance, although each state will be developing requirements in the future. Five agencies have required compliance for four or five years, while three agencies have instituted requirements this year. The most common response was that ITS projects are mainstreamed, that is they are treated like any

other capital project. California is the only state requiring ITS projects be included in the MPO's TIP. Florida is examining how to include ITS projects in these requirements through a separate project to develop Florida ITS Planning Guidelines.

B. 6. Does your agency monitor ITS performance (LOS, delay, travel time, transit on-time performance) on a routine basis?

Eight of the eleven agencies do not monitor the performance of ITS equipment. Three agencies (Washington, Houston Corridor, and California) are conducting performance monitoring. Washington uses loops to determine speed and travel time, Houston uses toll tag readers to monitor speed, while California conducts studies at specific locations using different equipment and methods. Florida DOT does not have a formal process for monitoring ITS performance, but some districts collect performance data on many individual ITS projects.

General Observations and Implications for Florida

DOTs are leading the ITS planning efforts in most areas. The exception is California, which has strong MPOs in the major regions. Florida should integrate the role of both the DOT and the MPOs in planning ITS activities.

Most every agency is using both federal and state funds of various sources to fund ITS activities. The regional nature of ITS activities suggests that local funds will not likely be a significant source for ITS funding. The fact no agency is using non-transportation funds suggests that resource sharing and other methods of public/private partnering have ben tried with limited success.

All reporting agencies require or will be requiring compliance with the state planning process (STIP and SIP). Florida should develop this compliance process for ITS projects.

The recently enacted TEA 21 legislation recommends performance monitoring of the transportation system. ITS equipment is an excellent tool for monitoring. As time passes, more agencies will be conducting performance monitoring using ITS data.

Section C. Systems Management and ITS Integration

C.1. Is your agency currently responsible for the day-to-day, real-time management of a portion of the transportation system (transit, highway, or intermodal)?

All eight responding DOTs are responsible for real-time transportation operations or ITS, except three of the priority corridors. For the three Priority Corridors, their member agencies conduct operations that are planned and coordinated through the Priority Corridor. Except for a few projects, Florida DOT has had limited experience with operation of ITS.

C. 2. Does your agency have a policy and/or mission statement regarding real-time transportation systems management?

Nine agencies reported yes, they have a policy or mission statement regarding ITS. Two agencies (Virginia and Missouri) do not. A mission statement will be developed as part of Florida's strategic plan.

C. 3. Do all ITS projects include a statement of justification for all system features (as opposed to just for the system in general)?

Three states (Colorado, Missouri, and New Jersey) require justification for individual ITS system features rather than the system as a whole. The other eight agencies do not have that requirement. FDOT does not have an explicit requirement.

C. 4. Do you have an ITS architecture for projects in your jurisdiction?

Eleven of the twelve reporting agencies have an architecture that was developed consistent with the National ITS Architecture. New Jersey does not have an ITS architecture currently. The South Florida Intelligent Corridor System (ICS) was developed before the National architecture was developed. Orlando and Jacksonville have completed EDPs that include the use of the National ITS architecture for the recommended regional framework. Tampa-St. Petersburg is currently developing a regional architecture compatible with the National architecture.

C. 5. Have you applied the National ITS architecture to any state or corridor ITS projects?

All agencies, except New Jersey, have applied the National ITS Architecture to ITS projects. Earlier ITS projects in Florida (e.g., TravTek, and ICS) were developed prior to the National ITS architecture. FDOT is developing one project in St. Petersburg that will be consistent with national requirements.

C. 6. Do you require that all new ITS projects in your jurisdiction comply with local or national ITS standards?

All twelve responding agencies require that new ITS projects comply with either local or national ITS standards.

C. 7. Please check which of the following ITS standards are used for new ITS projects in your jurisdiction:

- *State or local equipment standards (e.g., signal controllers, VMS, etc.)*
- *State or local communication protocols*
- *National Electrical Manufacturers Association (NEMA) standards*
- *National Transportation Communications for ITS Protocol (NTCIP)*
- *Other*

All eleven agencies use NTCIP standards, six use NEMA and state equipment standards and five use state communications protocols. Four states (Colorado, Washington, Wisconsin, and New Jersey) use all four types of standards. Florida has used all four standards on projects within the state.

C. 8. Do you have a policy or migration plan for incorporating or upgrading older (legacy) systems into the regional or statewide ITS architecture?

Three agencies (Minnesota, Maryland and New Jersey) have policies or plans to update legacy systems into the statewide/regional ITS architecture. The other eight reporting agencies do not. Florida DOT is currently developing a migration strategy.

General Observations and Implications for Florida

The responding eight DOTs are currently responsible for operating ITS, as is Florida. Nine of those agencies have developed policy and/or a mission statement regarding ITS operations and must believe that they derive benefit from that policy. Florida is developing an ITS operating policy or mission statement.

Three of the agencies require justification for individual system features, not just the system as whole. This policy may lead to a more tailored design and possibly a lower system cost.

Almost all agencies have an ITS architecture that is consistent with the National ITS Architecture and they have applied that architecture in specific projects. All agencies require ITS projects to be developed using federal or state standards, and all these agencies are using NTCIP standards. Most agencies use other standards also. Some of the agencies have developed plans for bringing legacy ITS systems into compliance with state ITS standards. These findings suggest that Florida consider developing a statewide architecture consistent with the National ITS Architecture and adopt ITS statewide standards, particularly the NTCIP standards.

Section D. Procurement Process

*D.1. Using the contract types and definitions in the table below check which type of procurement method you **usually use** to procure the ITS products and services shown in each column (check only one row for each column).*

Procurement Type	*Furnish and Install ITS Field Devices*	*Furnish and Install ITS-Software*	*ITS Operations*	*ITS Maint-enance*
***Engineer-Contractor** – Plans and (prescriptive) specs. are developed by an engineer. Selection of a contractor is by low bid only.*				
***System Manager** – Plans, specs, and system software are developed by an engineer. Selection of equipment and installation contractor is by low bid. Engineer provides system integration.*				

System Integrator *– Similar to System Manager, but the contractor has the ability to procure hardware and services (by low bid) on behalf of the agency and then acts as integrator*				

Procurement Type	*Furnish and Install ITS Field Devices*	*Furnish and Install ITS-Software*	*ITS Operations*	*ITS Maint-enance*
Best Value Contracting *– Used where the contractor must provide some technical designs or configurations. The selection of a contractor is based on a combined technical score and price.*				
Design-Build *– A set of (performance) specs. are let for bid by teams of engineers and contractors. Selection is usually based on combined technical and price factors.*				
Design-Build-Operate-Maintain *– The same as Design-Build, but with a requirement that the contractor operate and maintain the system for some time.*				
Franchise or Lease *– Also known as Design-Build-Own-Transfer. The contractor provides initial financing as well as engineering and construction in exchange for a lease payment over a period of time and eventual transfer to the agency.*				
Other *:*				

To furnish and install ITS field devices, all agencies reported using the Engineer/Contractor procurement method. California uses other contracting methods also. Florida DOT has also used a combination of System Manager with low-bid for a freeway management system with software.

The System Integrator method is used by seven agencies to furnish and install ITS software. Three agencies reported using the System Manager method for software. California also uses other contracting methods. New Jersey reported using other methods, but did not define them. Florida has had no recent experience with System Integrator for ITS procurement.

Three agencies conduct ITS Operations with in house staff (Colorado, Washington and Maryland). Wisconsin and Missouri report using a system integrator for ITS operations. California uses all types of contracts and New Jersey reported other but did not define. Florida DOT uses in-house staff exclusively for operations.

Colorado and Washington conduct ITS Maintenance with in house staff. Virginia and Maryland use the engineer/contractor method for maintenance. Wisconsin uses the best value contract method.

Again California uses all types of contracts and New Jersey reported other but did not define. Florida DOT uses both in-house and contract maintenance for ITS.

D. 2. Describe special procurement problems you have encountered with the above (e.g., legal).

Only a few comments were noted, including:

The GCM and I-95 Corridors reported that some agencies have procurements methods better suited for certain contract types. They will designate those agencies for those contracts.

Colorado and the Houston Corridor reported that a lack of staff knowledge was a procurement problem.

California stated that their state procurement process was time consuming and inflexible for ITS projects.

Maryland noted that system integrators work on a services contact, while ITS equipment is purchased as capital procurements. This makes scheduling difficult.

New Jersey stated that system integrators need input as the project is being designed since they often encounter difficulty installing the project as designed.

D. 3. Do you have a uniform statewide (corridor wide) procurement procedure?

Five agencies reported yes and six reported no on a uniform statewide procurement procedure. Other than the use of approved state practices, FDOT does not have a specific ITS procurement procedure.

D. 4. What are your major procurement issues? (please rank with 1 = most problem for ITS)

___ *Regional / National Architecture consistency*
___ *NTCIP*
___ *Technology Risk*
___ *Cost Concerns*
___ *Operations & Maintenance*
___ *Statutory limitations*
___ *Other (describe)*

Cost concerns were easily the highest ranked procurement issue. Technology risk and operations & maintenance were also highly ranked. Other issues mentioned were federal regulations (Virginia), state contract procedures (California), and bidding regulations that allow highway contractors to win ITS bids (New Jersey).

D. 5. Does your agency participate in public / private partnerships to procure ITS goods and/or services?

***If yes**, please answer the following questions.*

A. How many partnerships do you currently participate in?
B. Explain how these partnerships have been beneficial:

C. In your opinion, which types of ITS projects are the best suited for public/private partnerships?

All agencies, except New Jersey, reported participating in public/private partnerships. Several agencies report having more than one current partnership including Washington, which has four. Sharing or leveraging resources was mentioned most often as a benefit of the partnerships. Cost sharing and expertise were also mentioned as benefits. ATIS was mentioned most often as the best suited project type for partnership. Communications (shared resources) were also mentioned as being well suited for partnerships. Florida DOT has had several experiences with public/private partnerships for ITS procurement and operations. In most cases, the partnerships have proved mutually beneficial. Problems have arisen with state procurement regulations and the Florida public records law.

General Observations and Implications for Florida

All the responding agencies use low-bi, a variety of responding agencies have used other procurement methods. For ITS software installation, the system integrator and system manager methods are both commonly used. No consensus was observed from responding agencies regarding the use of in-house staff versus contracting for operations and maintenance services.

The procurement issues mentioned seem to vary by state and are not national issues. There is also no consensus on having a uniform statewide procurement procedure.

Cost concerns, technology risk and O&M were ranked as the most important procurement issues.

The reporting agencies use public/private partnerships and find them to be beneficial. ATIS and communications projects are reported to be the best-suited projects for partnering.

Section E. Operations and Maintenance Issues

E.1. How do you provide for the Operation and Maintenance (O&M) of ITS systems in your jurisdiction?: (check all that apply)

- *State transportation agency personnel*
- *State police personnel*
- *Local transportation agency personnel*
- *Local police personnel*
- *Joint state, local, police operations center(s)*
- *Private contract operations*
- *Other*

The use of state transportation agency personnel for ITS O&M was the most common response (6). Private contracts are being used by four agencies. Except for local police staff all other methods are being used at two or three agencies. Florida has used DOT and local agency staff, state police (jointly and separately) and private contracts for ITS operations.

E. 2.How do you document inter-agency agreements regarding ITS O&M? (check all that apply)

- *State or local statute*
- *Joint Project Agreements (JPA)*

- *Memoranda of Understanding (MOU)*
- *Formal resolutions by governing bodies*
- *Informal handshake agreements*
- *No agreements are currently in place*

Six agencies report using a Memoranda of Understanding, while three agencies do not have an agreement. California and Colorado also use joint project agreements. Florida typically uses joint project agreements with other agencies.

E. 3.How is funding for ITS O&M in your jurisdiction provided? (check all that apply)

- *State highway maintenance (and/or transit operations) funds*
- *Local highway (and/or transit operations) funds*
- *Public/Private Partnership agreements*
- *No O&M funds are identified for ITS*

Six report using state maintenance funds while two agencies use local funds (Colorado and California) and two use public/private partnership funds (Missouri and Maryland). Florida uses state maintenance funds for ITS maintenance on the interstate system and for (a limited number of) signals on state highways, but only under an approved JPA.

E. 4. Does your agency have a specific person or group responsible for ITS O&M?

Three agencies (Washington, Virginia and Maryland) report having a specific group responsible for O&M. All other agencies do not have a specific O&M staff. Florida does not have a specific ITS O&M group.

E. 5. Do you regularly upgrade ITS equipment as part of routine maintenance?

Three states (Washington, Wisconsin and Missouri) reported that they do upgrade equipment as part of maintenance. All other agencies do not. Florida upgrades equipment on an as needed basis.

*E. 6. What is the current fiscal year budget for ITS **operations** (only) in your jurisdiction?*

Only two states reported their operations budgets. Washington has an annual combined O&M budget of $1,900,000 for 800 signals and 120 miles of freeway surveillance. Maryland has an operations budget of $3,500,000 for 375 miles of freeway surveillance.

*E. 7. What is the current fiscal year budget for **maintenance** (only) of ITS installations in your jurisdiction?*

Maryland reported a maintenance budget of $1,000,000 for its 375 miles of freeway surveillance.

E. 8. Please indicate the number of people that typically staff each type of ITS operations center that you may have in your jurisdiction. Also indicate the number of hours the centers are staffed (for example, under the column for "weekdays" the numbers "2/24" would indicate 2 operators on duty for 24 hours per day).

Colorado reports 3 operating staff for 12 hours each weekday. Washington has 2 operating staff for 12 hours. Maryland has 2 staff for 24 hours and 4 staff for 16 hours.

General Observations and Implications for Florida

A majority of agencies are using state transportation staff for O&M. Several agencies are now using private contractors for ITS O&M. Most agencies fund O&M with state funds, although two agencies are using public/private partnerships.

Three states upgrade ITS equipment as part of routine maintenance. Due to the rapid changes in advanced technology, Florida should, on a regular basis, plan for upgrades to equipment based on their service life.

Section F. Economic Impact of ITS

F.1. How does ITS relate to economic development and vitality in your jurisdiction? (check one)

- ***9*** *In my opinion, ITS provides a benefit, but it has not been quantified*
- ***9*** *In my opinion, ITS cannot provide any direct benefit for economic development*
- ***9*** *We are currently studying the impact of ITS on economic development*
- ***9*** *We have found the following direct (or indirect) economic impacts of ITS.*

Five states indicate that they believe that ITS is beneficial but those are not quantifiable. Four states indicate that they are currently studying the impacts of ITS (Virginia, Wisconsin, Missouri and California). Florida will be documenting economic benefits through this project.

F. 2. Has your agency prepared a Business Plan (i.e., a plan outlining roles, investments and expected benefits/returns) to guide implementation of ITS?

Nine agencies do have a Business Plan and are currently using it. Three agencies (GCM Corridor, Houston Corridor and Missouri) do not have business plans. Florida will be developing a business plan through this project.

F. 3. Have any market research surveys been conducted regarding ITS deployment or services in your jurisdiction?

Four agencies (I-95 Corridor, Wisconsin, Missouri, and New Jersey) report having conducted market research for ITS. The other agencies have not conducted any market research. Florida DOT participated in extensive market research conducted for the TravTek project. Additional research was done in Orlando for a VMS project and for the Orlando EDP project.

F. 4. Have any steps been taken to involve local businesses or other stakeholders in ITS deployment or operation?

Six agencies have stakeholder involvement programs (Colorado, Washington, Virginia, Wisconsin, Missouri, and California). Several states use the ITS America state chapter for this involvement. All major urban areas in Florida that have developed ITS plans, Miami, Ft. Lauderdale, Orlando, Jacksonville, and Tampa-St. Petersburg have used (or are using) public involvement programs.

General Observations and Implications for Florida

The lack of quantifiable benefits of ITS is a national issue and Florida should monitor benefits research. Most agencies report having an ITS Business Plan and are currently using it. Florida should consider developing a statewide ITS Business Plan. There has not been much market research for ITS. It may be considered for specific products or services. Stakeholder involvement through ITS Florida may be a good method to include more participants in ITS development.

Section G. Inter-Urban and Rural ITS Applications

G.1. Has your agency deployed any ITS projects in inter-urban or rural areas?

Nine agencies have deployed rural ITS projects, three (GCM Corridor, Houston Corridor and New Jersey) have not. Florida is currently developing a rural ITS project to address transit for the disadvantaged.

G. 2. Does your agency have a formal (i.e., separate) planning process for inter-urban and rural ITS projects?

Four states have a separate process for rural or inter-urban ITS projects (Wisconsin, Minnesota, California and New Jersey-inter-urban only). Florida does not have a separate rural process.

G.3. What are your priority ITS needs for inter-urban and rural applications? (please rank, with 1 = highest priority)

___ *Communications*
___ *Traveler information*
___ *Transit related services*
___ *Incident response*
___ *Mayday response*
___ *Emergency related services*
___ *Other*

Traveler information and communications were highest ranked. Incident response and weather were also mentioned.

G. 4. Is there any plan in your agency for the integration of ITS services across (or between) inter-urban / rural areas and urban areas?

All respondents except Houston and New Jersey indicate that they are planning to integrate ITS services regionally or statewide. Florida plans to integrate ITS statewide for such services as hurricane evacuation and inter-urban travel.

General Observations and Implications for Florida

Rural and inter-urban projects are being implemented in most areas. With the number of urban areas and the importance of standards it would seem that Florida should consider a rural and inter-urban development process.

Section H. Implementation Authority

*H.1. Which agency has the **primary** responsibility and authority for the following stages of ITS deployment in your jurisdiction? (Please differentiate between district/region level and headquarters offices.)*

Strategic ITS Policies and Planning
ITS Project Planning
ITS Project Design
ITS Operation
ITS Maintenance

All agencies except the Houston Priority Corridor report that DOTs have authority for implementing the various stages of ITS. DOT headquarters in all cases conducts strategic planning. Headquarters conduct ITS project planning in most cases, districts or regions participate in ITS project planning in Colorado, Virginia and Missouri. ITS project design is also conducted at headquarters in most cases, districts participate in Colorado and Missouri. ITS operations and maintenance is usually conducted at the district level in most states. Florida DOT districts have the primary responsibility for these stages, except for operations and maintenance, which has historically been the responsibility of the local agency. This area of responsibility is being examined in this project.

H. 2. Does your agency have an formal (i.e., separate) organizational entity to plan for and implement ITS projects?

Eight of the responding agencies have a separate entity to implement ITS. The three that do not are GCM Corridor, Houston Corridor and California. Florida does not have any separate entity for ITS implementation. This aspect is being examined as part of this project.

H. 3. Does your agency have any special policy or directive specific to the planning and implementation of ITS?

Four agencies including the GCM Corridor, Washington, Wisconsin and California have ITS implementation policies. The other agencies do not have an implementation policy. Florida is developing the procedures for this phase through this and other projects.

H. 4. Is ITS specifically included in your agency's long range plans (i.e., 2020 transportation plan)?

Nine of the ten responding agencies have ITS as part of their long-range plan. Virginia is the exception. ITS is not specifically mentioned in the Florida 2020 Transportation Plan. An update to this plan will address ITS.

H.5. Rank the following challenges facing ITS implementation in your jurisdiction? (with 1 = most challenging)

1. Lack of knowledge on ITS/training
2. Lack of supporting policies for ITS

3. Inadequate funding
4. Lack of an ITS plan
5. Lack of coalition/consensus on ITS activities
6. Higher priorities for other transportation improvements
7. Other

GCM Priority Corridor	3	
Colorado DOT #1	6,1,4,2,5,3	
Colorado DOT #2	5,6,4	
I-95 Priority Corridor	3	
Washington State DOT	6,3,5,1,2	
Virginia DOT	7, 2	7=not traditional DOT function, organizational structure, staff shortage
Wisconsin DOT	7,2,6,1,3	7=lack of staff
Houston Priority Corridor	3	
Minnesota DOT		
Missouri DOT	6,3,5,2,4,1	
Caltrans	7,5,6,2,3,1	7=too many agencies
Maryland SHA CHART	3,2,6,5,1,4	
New Jersey DOT	6,3,1,5,2,4	
Texas DOT	6,3,1,5,2,4	
Utah DOT	2,5,1,3,4,6	

Inadequate funding and higher priorities for other transportation improvements are the highest ranked challenges by most agencies.

General Observations and Implications for Florida

Most responding agencies conduct ITS planning and design at headquarters, while O&M is conducted at the district level. Florida may consider this approach although several districts in Florida already have ITS expertise in ITS planning and design. Most responding agencies are including ITS in their long-range plan as should Florida.

Section I. ITS Technology Cost

I.1. In your experience, what factors have the most impact on the costs of an ITS project? (rank the following with 1= highest impact)
___ Urban vs. rural conditions
___ System functionality
___ System design standards
___ Labor costs (union vs.non-union)
___ Technology risk (new vs. proven)
___ Other

There is no consensus among the reporting agencies. System functionality and system design standards were the highest ranked. Technology risk was also ranked.

I.2. What controls do you use in the basis of payment for ITS equipment purchase (e.g., retainage, extended warrantees, etc.) to control costs?

Three states (Colorado, California and New Jersey) use retainage. Wisconsin, Maryland and New Jersey use extended warranties. Virginia uses the low bid process to control costs. Maryland uses bonding and liquidated damages for cost controls also. Florida uses minimum requirements to pre-qualify ITS contractors. State contract prices are used in some cases for ITS equipment.

I.3. Do you require extended warranties (longer than one year) for equipment and systems?

Five states require extended warranties including Colorado, Washington, Wisconsin, Maryland and New Jersey. The other states do not require warranties longer than one year. Florida DOT has required extended warrantees for ITS equipment and complete systems.

I.4. Have you procured ITS system software?

***If yes**, which do you find is more cost effective?*

- ***9*** *Commercial, off the shelf (COTS) software (also known as single entity, "third party" software)*
- ***9*** *Multiple vendor supplied software, with systems integration provided by others*
- ***9*** *Custom designed software*

All reporting agencies have procured ITS software. Colorado, Washington, Virginia and Maryland have custom designed software. I-95 and Wisconsin have COTS software. Wisconsin and New Jersey have multiple vendor-supplied software. The other states did not specify the software type. Florida has used all three methods for software procurement.

I. 5. How do you pay for software support and maintenance for COTS and vendor supplied software?

I-95, Virginia and Maryland use maintenance contracts. Wisconsin and Houston use O&M funds. New Jersey has maintenance as a bid item in the software contract. Washington uses state staff to maintain software. Florida uses contract maintenance (vendor supplied and third party) and in-house maintenance for software.

I. 6. In the table below, please provide typical ITS deployment (unit) costs, used for planning purposes by your agency, for as many of the following components as possible:

ITS Component	Unit Cost Range
Vehicle Detection Station (VDS) (loop or in-pavement)	$500-$45,000
Vehicle Detection Station (VDS) (radar or ultrasonic)	$2,500-$30,000
Vehicle Detection Station (VDS) (video-based)	$25,000-$40000
CCTV Installation	$7,000-$100,000
Dynamic / Variable / Changeable Message Sign (DMS/VMS/CMS)	$100,000-$250,000

Kiosk Installation	$15,000
Ramp Metering Installation	$20,000-$250,000
AVL (Cost per Bus)	$10,000
AVI (Cost per Toll Lane)	
Motorist Aid Call Box	$5,000-$10,000
Highway Advisory Radio (HAR) Station	$2,500-$250,000
Highway Advisory Telephone (HAT) System	$40,000
Fiber Optic Cable Installation (per unit of length)	$3/lf-$23/lf
Microwave/Cellular Communications Link	$15,000-$80,000
SONET Hub Site Installation	$50,000
Internet Web Site (development cost)	$15,000-$140,000
Internet Web Site (monthly maintenance cost)	$5,000
Roadway Weather Information Station	$100,000

General Observations and Implications for Florida

As evidenced above, there is a wide range of unit costs for typical ITS components. A more detailed analysis is provided in the Cost Analysis Issue Paper. Several states use retainage and extended warranties to control ITS costs. The type of software purchased seems to be dependent on the application, which is appropriate. There is also no consensus on the type of software maintenance contract, options are a maintenance contract, O&M funds, or developing a state software staff.

Section A. General Information

A.1. How many local districts or geographic regions within your agency are there in your state or organization?

GCM Priority Corridor	3 states
Colorado DOT #1	6 districts
Colorado DOT #2	6 districts
I-95 Priority Corridor	12 states
Washington State DOT	6 districts
Virginia DOT	9 districts
Wisconsin DOT	8 districts
Houston Priority Corridor	4 agencies
Minnesota DOT	
Missouri DOT	10 districts
Caltrans	12 districts
Maryland SHA CHART	7 districts
New Jersey DOT	2 districts for ITS
Texas DOT	25 districts
Utah DOT	4 districts

A.2. How many Metropolitan Planning Organizations (MPOs) exist in your state or organization?

GCM Priority Corridor	3
Colorado DOT #1	4
Colorado DOT #2	5
I-95 Priority Corridor	many
Washington State DOT	13
Virginia DOT	3
Wisconsin DOT	8
Houston Priority Corridor	1
Minnesota DOT	
Missouri DOT	3
Caltrans	15
Maryland SHA CHART	2
New Jersey DOT	3
Texas DOT	25
Utah DOT	4

A.3. Describe the ITS staffing plan and hierarchy for your agency headquarters. Also, include districts of your agency, if applicable.

GCM Priority Corridor	Consultant
Colorado DOT #1	District traffic engineers comprise an ITS Steering Comm.
Colorado DOT #2	ITS Office reports to Chief Engineer
I-95 Priority Corridor	5 Corridor staff
Washington State DOT	Statewide Advanced Technical Branch with Regional Engineers
Virginia DOT	Statewide ITS Office with Regional Engineers on a Steering Comm.
Wisconsin DOT	Statewide ITS is part of Division of Investment Management/Planning, no regional/district staff
Houston Priority Corridor	TRANSTAR has 5 staff, agencies supply additional
Minnesota DOT	
Missouri DOT	ITS in Traffic Division, urban district coordinators and rural coordinator
Caltrans	Statewide R&D staff, district ITS staff
Maryland SHA CHART	
New Jersey DOT	Traffic Ops North and South have ITS engineers
Texas DOT	Traffic Ops Division has ITS Branch
Utah DOT	ITS staff within Traffic & Safety Division

A. 4. How do headquarters and district roles relate? (i.e., is your agency centralized or decentralized?)

GCM Priority Corridor	n/a
Colorado DOT #1	Decentralized moving toward centralized
Colorado DOT #2	Decentralized
I-95 Priority Corridor	n/a
Washington State DOT	Decentralized
Virginia DOT	Decentralized moving toward centralized
Wisconsin DOT	Centralized
Houston Priority Corridor	n/a
Minnesota DOT	
Missouri DOT	Decentralized

Caltrans	Decentralized
Maryland SHA CHART	Centralized
New Jersey DOT	Decentralized
Texas DOT	Decentralized
Utah DOT	Decentralized

A. 5. Which of the following does your agency have primary responsibility? (check all that apply)
1 ITS planning and programming
2 ITS design and specification
3 ITS procurement (contracting agency or authority)
4 ITS operations (with agency staff or contract operators)
5 ITS maintenance (with agency staff or contract operators)

GCM Priority Corridor	none
Colorado DOT #1	all
Colorado DOT #2	1,4
I-95 Priority Corridor	none
Washington State DOT	all
Virginia DOT	all
Wisconsin DOT	all
Houston Priority Corridor	none
Minnesota DOT	all
Missouri DOT	2,3,4
Caltrans	all
Maryland SHA CHART	all
New Jersey DOT	all
Texas DOT	1,2
Utah DOT	2,3,4,5

A. 6. What types of ITS projects has your agency been involved with? (check all that apply)
1 ITS strategic planning and architecture development
2 Advanced Traffic Management Systems (ATMS)
3 Advanced Traveler Information Systems (ATIS)
4 Commercial Vehicle Operations (CVO)
5 Advanced Public Transit Systems (APTS)
6 Advanced Vehicle Control and Safety Systems (AVCSS)
7 Advanced Rural Transportation Systems (ARTS)

GCM Priority Corridor	Planning/Arch, ATMS, ATIS, CVO, APTS

Colorado DOT #1	Planning/Arch, ATMS, ATIS, CVO, APTS, ARTS
Colorado DOT #2	Planning/Arch, ATMS, ATIS, CVO, APTS, ARTS
I-95 Priority Corridor	Planning/Arch, ATIS, CVO, APTS, incident mgt., ETTM
Washington State DOT	Planning/Arch, ATMS, ATIS, CVO, ARTS
Virginia DOT	Planning/Arch, ATMS, ATIS, CVO, ARTS
Wisconsin DOT	Planning/Arch, ATMS, ATIS, CVO, APTS, ARTS
Houston Priority Corridor	Planning/Arch, ATMS, ATIS, APTS, incident mgt., EMS coordination, weather
Minnesota DOT	Planning/Arch, ATMS, ATIS, CVO, APTS, incident mgt., weather, ARTS
Missouri DOT	Planning/Arch, ATMS, ATIS, CVO, ARTS
Caltrans	all
Maryland SHA CHART	Planning/Arch, ATMS, ATIS, CVO, ARTS
New Jersey DOT	Planning/Arch, ATMS, ATIS, CVO
Texas DOT	Planning/Arch, ATMS, ATIS, APTS, ARTS
Utah DOT	Planning/Arch, ATMS

Section B. ITS Planning and Programming

B. 1. Does your state or jurisdiction have an ITS Strategic Plan?

		Yes, when adopted?	Yes, when updated?	No, when developed?
GCM Priority Corridor	yes	95	97	
Colorado DOT #1	yes	98	2002	
Colorado DOT #2	yes	98		
I-95 Priority Corridor	yes	94	97(annually)	
Washington State DOT	yes	guidance only	2000	
Virginia DOT	yes	98	99(annually)	
Wisconsin DOT	yes	94	98	
Houston Priority Corridor	yes	97	unknown	
Minnesota DOT	yes	96		
Missouri DOT	yes	98	unknown	
Caltrans	yes	93	99(annually)	
Maryland SHA CHART	yes	96	98	
New Jersey DOT	yes	98	99	
Texas DOT	yes	May-96	unknown	
Utah DOT	yes	96	unknown	

B. 2. Either in addition to, or instead of, a Strategic Plan, describe what kind of planning and/or programming has been done for ITS at either the statewide or regional level (i.e., comprehensive plan).

GCM Priority Corridor	project planning, business plan
Colorado DOT #1	business plan
Colorado DOT #2	Smart Path projects
I-95 Priority Corridor	business plan
Washington State DOT	business plan
Virginia DOT	business plan
Wisconsin DOT	business plan
Houston Priority Corridor	no
Minnesota DOT	business plan
Missouri DOT	no
Caltrans	no
Maryland SHA CHART	no
New Jersey DOT	no
Texas DOT	regional plans
Utah DOT	no

B. 3. Is ITS planning and programming at the regional level primarily led by the DOT or by MPOs?

GCM Priority Corridor	DOT
Colorado DOT #1	DOT
Colorado DOT #2	DOT
I-95 Priority Corridor	DOT
Washington State DOT	DOT
Virginia DOT	DOT
Wisconsin DOT	DOT
Houston Priority Corridor	DOT
Minnesota DOT	DOT
Missouri DOT	DOT
Caltrans	MPO
Maryland SHA CHART	DOT
New Jersey DOT	DOT
Texas DOT	MPO
Utah DOT	DOT

B. 4. How are you funding ITS projects?
1 Local ITS (line-item budget) funds
2 State ITS funds
3 Local Traffic Operations funds
4 State Traffic Operations funds
5 Local general transportation funds
6 State general transportation funds
7 Non-transportation source funds (i.e., communication & information systems, etc.)
8 Federal ITS funds
9 Federal general transportation funds (i.e., NHS, transit, CMAQ, etc.)

GCM Priority Corridor	2,8
Colorado DOT #1	2,4,6,8,9
Colorado DOT #2	2,4,6,9
I-95 Priority Corridor	2,8
Washington State DOT	2,3,4,8
Virginia DOT	6,8,9
Wisconsin DOT	2,4,6,8,9
Houston Priority Corridor	1,2,8
Minnesota DOT	
Missouri DOT	4,8
Caltrans	6,8,9,other

Maryland SHA CHART	2,6,8
New Jersey DOT	1,2,8,9
Texas DOT	4,8,9
Utah DOT	6,8,9

B. 5. Do ITS projects in your jurisdiction have to comply with State Transportation Improvement Plan (STIP) and Implementation Plan (SIP) requirements?

		Yes, how long?	Yes, process for compliance	No, future?	No, in MPO TIP?
GCM Priority Corridor	yes	95	ITS is mainstreamed		
Colorado DOT #1	yes		ITS is mainstreamed		
Colorado DOT #2	yes	98	not yet developed		
I-95 Priority Corridor	yes	95	Up to each state		
Washington State DOT	yes	94	ITS is mainstreamed		
Virginia DOT	yes	98	not yet developed		
Wisconsin DOT	yes	98	ITS is mainstreamed		
Houston Priority Corridor	yes	95	Up to each agency		
Minnesota DOT					
Missouri DOT	No			to be developed	
Caltrans	No			to be developed	yes
Maryland SHA CHART	No			to be developed	no
New Jersey DOT	yes	always	ITS is mainstreamed		
Texas DOT	yes	93	ITS is mainstreamed		
Utah DOT	yes	93	ITS is mainstreamed		

B. 6. Does your agency monitor ITS performance (LOS, delay, travel time, transit on-time performance) on a routine basis?

GCM Priority Corridor	no
Colorado DOT #1	no
Colorado DOT #2	no
I-95 Priority Corridor	no
Washington State DOT	yes, loop data, travel time, speed
Virginia DOT	no
Wisconsin DOT	no
Houston Priority Corridor	yes, speed from toll tag readers
Minnesota DOT	
Missouri DOT	no

Caltrans	yes, specific studies
Maryland SHA CHART	no
New Jersey DOT	no
Texas DOT	yes
Utah DOT	no

C. Systems Management and ITS Integration

C.1. Is your agency currently responsible for the day-to-day, real-time management of a portion of the transportation system (transit, highway, or intermodal)?

GCM Priority Corridor	no
Colorado DOT #1	yes
Colorado DOT #2	yes
I-95 Priority Corridor	no
Washington State DOT	yes
Virginia DOT	yes
Wisconsin DOT	yes
Houston Priority Corridor	no
Minnesota DOT	yes
Missouri DOT	yes
Caltrans	no, districts are
Maryland SHA CHART	yes
New Jersey DOT	yes
Texas DOT	yes
Utah DOT	yes

C. 2. Does your agency have a policy and/or mission statement regarding real-time transportation systems management?

GCM Priority Corridor	yes
Colorado DOT #1	yes
Colorado DOT #2	no
I-95 Priority Corridor	yes
Washington State DOT	yes
Virginia DOT	no
Wisconsin DOT	yes
Houston Priority Corridor	yes
Minnesota DOT	
Missouri DOT	no
Caltrans	yes
Maryland SHA CHART	yes
New Jersey DOT	yes
Texas DOT	no
Utah DOT	no

C. 3. Do all ITS projects include a statement of justification for all system features (as opposed to just for the system in general)?

GCM Priority Corridor	no
Colorado DOT #1	yes
Colorado DOT #2	no
I-95 Priority Corridor	no
Washington State DOT	no
Virginia DOT	no
Wisconsin DOT	no
Houston Priority Corridor	no
Minnesota DOT	
Missouri DOT	yes
Caltrans	no
Maryland SHA CHART	no
New Jersey DOT	yes
Texas DOT	no
Utah DOT	no

C. 4. Do you have an ITS architecture for projects in your jurisdiction?
1. Yes, but it was developed before the National ITS Architecture
2. Yes, it was developed "consistent with" the National ITS Architecture
3. No
4. Don't know

GCM Priority Corridor	2
Colorado DOT #1	4
Colorado DOT #2	2
I-95 Priority Corridor	2
Washington State DOT	2
Virginia DOT	2
Wisconsin DOT	1,2
Houston Priority Corridor	2
Minnesota DOT	1,2
Missouri DOT	2
Caltrans	2
Maryland SHA CHART	1,2
New Jersey DOT	3
Texas DOT	1

Utah DOT	1

C. 5. Have you applied the National ITS architecture to any state or corridor ITS projects?

GCM Priority Corridor	yes
Colorado DOT #1	yes
Colorado DOT #2	yes
I-95 Priority Corridor	yes
Washington State DOT	yes
Virginia DOT	yes
Wisconsin DOT	yes
Houston Priority Corridor	yes
Minnesota DOT	yes
Missouri DOT	yes
Caltrans	yes
Maryland SHA CHART	yes
New Jersey DOT	no
Texas DOT	no
Utah DOT	no

C. 6. Do you require that all new ITS projects in your jurisdiction comply with local or national ITS standards?

GCM Priority Corridor	yes
Colorado DOT #1	yes
Colorado DOT #2	yes
I-95 Priority Corridor	yes
Washington State DOT	yes
Virginia DOT	yes
Wisconsin DOT	yes
Houston Priority Corridor	yes
Minnesota DOT	yes
Missouri DOT	yes
Caltrans	yes
Maryland SHA CHART	yes
New Jersey DOT	yes
Texas DOT	yes
Utah DOT	yes

C. 7. Please check which of the following ITS standards are used for new ITS projects in your jurisdiction:
1. State or local equipment standards (e.g., signal controllers, VMS, etc.)
2. State or local communication protocols

3. National Electrical Manufacturers Association (NEMA) standards
4. National Transportation Communications for ITS Protocol (NTCIP)
5. Other (describe)

GCM Priority Corridor	4
Colorado DOT #1	all
Colorado DOT #2	1,2,3,4
I-95 Priority Corridor	4
Washington State DOT	1,2,3,4
Virginia DOT	4
Wisconsin DOT	all
Houston Priority Corridor	4
Minnesota DOT	
Missouri DOT	4
Caltrans	5
Maryland SHA CHART	1,3,4
New Jersey DOT	1,2,3,4
Texas DOT	1,2,3,4
Utah DOT	1,3,4

C8. Do you have a policy or migration plan for incorporating or upgrading older (legacy) systems into the regional or statewide ITS architecture?

GCM Priority Corridor	
Colorado DOT #1	no
Colorado DOT #2	no
I-95 Priority Corridor	no
Washington State DOT	no
Virginia DOT	no
Wisconsin DOT	no
Houston Priority Corridor	
Minnesota DOT	yes
Missouri DOT	no
Caltrans	no
Maryland SHA CHART	yes
New Jersey DOT	yes
Texas DOT	no
Utah DOT	yes

D. Procurement Process

D. 1. Using the contract types and definitions in the table below check which type of procurement method you usually use to procure the ITS products and services shown in each column

	Furnish and Install ITS Field Devices	Furnish and Install ITS-Software	ITS Operations	ITS Maintenance
GCM Priority Corridor	Engr/Contr.	Sys. Integrator	n/a	n/a
Colorado DOT #1	Engr/Contr.	Sys. Integrator	in house	in house
Colorado DOT #2	Engr/Contr.	Engr/Contr.		
I-95 Priority Corridor	Engr/Contr.	Sys. Mgr.	n/a	n/a
Washington State DOT	Engr/Contr.	Sys. Integrator	in house	in house
Virginia DOT	Engr/Contr.	Sys. Mgr.	Engr/Contr.	Engr/Contr.
Wisconsin DOT	Engr/Contr.	Sys. Integrator	Sys. Integrator	best value
Houston Priority Corridor	Engr/Contr.	Sys. Mgr.	n/a	n/a
Minnesota DOT				
Missouri DOT	Engr/Contr.	Sys. Integrator	Sys. Integrator	
Caltrans	all types	all types	all types	all types
Maryland SHA CHART	Engr/Contr.	Sys. Integrator	in house	Engr/Contr.
New Jersey DOT	Engr/Contr.	other	other	other
Texas DOT	Sys. Integrator	Sys. Integrator	Design/build	Engr/Contr.
Utah DOT	Engr/Contr.	Sys. Integrator	in house	in house

D. 2. Describe special procurement problems you have encountered with the above (e.g., legal):

GCM Priority Corridor	Some agencies have better procurements process and they are selected for Corridor projects.
Colorado DOT #1	
Colorado DOT #2	Lack of knowledge in approving agencies
I-95 Priority Corridor	Some agencies have better procurements process and they are selected for Corridor projects.
Washington State DOT	
Virginia DOT	
Wisconsin DOT	
Houston Priority Corridor	Staff knowledge, lack of funding
Minnesota DOT	
Missouri DOT	

Caltrans	Federal labs difficult to contract with, State process is time consuming and inflexible.
Maryland SHA CHART	System integrators work in A/E services contract, equipment is a capital procurement. This makes scheduling difficult.
New Jersey DOT	System integrators need input in design phase.
Texas DOT	
Utah DOT	Not same as hwy cst., process is confusing

D. 3. Do you have a uniform statewide (corridor wide) procurement procedure?

GCM Priority Corridor	no
Colorado DOT #1	yes
Colorado DOT #2	no
I-95 Priority Corridor	yes
Washington State DOT	yes
Virginia DOT	no
Wisconsin DOT	yes
Houston Priority Corridor	no
Minnesota DOT	
Missouri DOT	no
Caltrans	no
Maryland SHA CHART	yes
New Jersey DOT	no
Texas DOT	yes
Utah DOT	no

D. 4. What are your major procurement issues? (please rank with 1 = most problem for ITS)
1. Regional / National Architecture consistency
2. NTCIP
3. Technology Risk
4. Cost Concerns
5. Operations & Maintenance
6. Statutory limitations
7. Other (describe

GCM Priority Corridor	4,3,5
Colorado DOT #1	4,5,3,2,1
Colorado DOT #2	5,1,4
I-95 Priority Corridor	4,3,2
Washington State DOT	4,5,3,1,2

Virginia DOT	7	7=federal regs., VDOT can't do design/build
Wisconsin DOT	6,7,5,2,4,1,3	7=process development
Houston Priority Corridor	4,3,5	
Minnesota DOT		
Missouri DOT	4,5,3,6,1,2	
Caltrans	7	7=contract procedures
Maryland SHA CHART	4,5,2,6,3,1	
New Jersey DOT	7,3,5,4,6,2,1	7=bidding regs that allow hwy contractors to win bids
Texas DOT	6,4,3,5,1,2	
Utah DOT	1,3,4,2,5	

D. 5. Does your agency participate in public / private partnerships to procure ITS goods and/or services?

		How many?	**How Beneficial?**	**Best Suited Projects**
GCM Priority Corridor	yes	2		ATIS, comm
Colorado DOT #1	yes		resources, expertise	
Colorado DOT #2	yes	1	expertise	all
I-95 Priority Corridor	yes	2		
Washington State DOT	yes	4	cost sharing	projects with salable products
Virginia DOT	yes	3	resources, cost sharing	ATIS, shared resources
Wisconsin DOT	yes	3	resources, expertise	systems, comm, software
Houston Priority Corridor	yes	1		all
Minnesota DOT	yes			
Missouri DOT	yes	3	leverage resources	regional
Caltrans	yes	1	resources	ATIS
Maryland SHA CHART	yes	2	resources	ATIS, comm, CVO
New Jersey DOT	no			
Texas DOT	yes	2	leverage resources	regional ATMS
Utah DOT	no			traveler information

E. Operation and Maintenance Issues

E. 1. How do you provide for the Operation and Maintenance (O&M) of ITS systems in your jurisdiction?:
1. State transportation agency personnel
2. State police personnel
3. Local transportation agency personnel
4. Local police personnel
5. Joint state, local, police operations center(s)
6. Private contract operations
7. Public / Private Partnership operations
8. Other (describe)

GCM Priority Corridor	
Colorado DOT #1	1,2,6
Colorado DOT #2	1,2
I-95 Priority Corridor	
Washington State DOT	1,3
Virginia DOT	1,6
Wisconsin DOT	1,2,3,5,6,8
Houston Priority Corridor	
Minnesota DOT	
Missouri DOT	5,7,8
Caltrans	8
Maryland SHA CHART	1,2,5,6,7
New Jersey DOT	1
Texas DOT	1
Utah DOT	1

E. 2. How do you document inter-agency agreements regarding ITS O&M?
1. State or local statute
2. Joint Project Agreements (JPA)
3. Memoranda of Understanding (MOU)
4. Formal resolutions by governing bodies
5. Informal handshake agreements
6. No agreements are currently in place

GCM Priority Corridor	
Colorado DOT #1	3
Colorado DOT #2	2,3
I-95 Priority Corridor	
Washington State DOT	3
Virginia DOT	6
Wisconsin DOT	6
Houston Priority Corridor	
Minnesota DOT	
Missouri DOT	6
Caltrans	2,3

Maryland SHA CHART	3
New Jersey DOT	3
Texas DOT	2,4
Utah DOT	3,4,5

E. 3. How is funding for ITS O&M in your jurisdiction provided?
1. State highway maintenance (and/or transit operations) funds
2. Local highway (and/or transit operations) funds
3. Public/Private Partnership agreements
4. No O&M funds are identified for ITS

GCM Priority Corridor	
Colorado DOT #1	4
Colorado DOT #2	1,2
I-95 Priority Corridor	
Washington State DOT	1
Virginia DOT	1
Wisconsin DOT	1
Houston Priority Corridor	
Minnesota DOT	
Missouri DOT	3
Caltrans	2
Maryland SHA CHART	1,3
New Jersey DOT	1
Texas DOT	1,3
Utah DOT	1

E. 4. Does your agency have a specific person or group responsible for ITS O&M?

GCM Priority Corridor	
Colorado DOT #1	no
Colorado DOT #2	no
I-95 Priority Corridor	
Washington State DOT	yes
Virginia DOT	yes
Wisconsin DOT	no
Houston Priority Corridor	
Minnesota DOT	
Missouri DOT	no
Caltrans	no
Maryland SHA CHART	yes
New Jersey DOT	no
Texas DOT	yes
Utah DOT	no

E. 5. Do you regularly upgrade ITS equipment as part of routine maintenance?

GCM Priority Corridor	

Colorado DOT #1	no
Colorado DOT #2	no
I-95 Priority Corridor	
Washington State DOT	yes
Virginia DOT	no
Wisconsin DOT	yes
Houston Priority Corridor	
Minnesota DOT	
Missouri DOT	yes
Caltrans	no
Maryland SHA CHART	no
New Jersey DOT	no
Texas DOT	no
Utah DOT	no

E. 6. What is the current fiscal year budget for ITS operations (only) in your jurisdiction?

	$/yr in house	$/yr contract	# signals	miles freeway	transit pass.	
GCM Priority Corridor						
Colorado DOT #1				5		
Colorado DOT #2						
I-95 Priority Corridor						
Washington State DOT	1.9m		800	120		O&M combined
Virginia DOT						
Wisconsin DOT						
Houston Priority Corridor						
Minnesota DOT						
Missouri DOT						
Caltrans						
Maryland SHA CHART	3.5m			375		
New Jersey DOT						
Texas DOT	10-15m			210		O&M combined
Utah DOT	200k	200k	600	70		

E. 7. What is the current fiscal year budget for maintenance (only) of ITS installations in your jurisdiction?

	$/yr in house	$/yr contract	# signals	miles freeway	transit pass.
GCM Priority Corridor					
Colorado DOT #1				5	
Colorado DOT #2					
I-95 Priority Corridor					
Washington State DOT					
Virginia DOT					
Wisconsin DOT					
Houston Priority Corridor					
Minnesota DOT					
Missouri DOT					

Caltrans					
Maryland SHA CHART	1.0m			375	
New Jersey DOT					
Texas DOT					
Utah DOT	500k		600		

E. 8. In the table below, please indicate the number of people that typically staff each type of ITS operations center that you may have in your jurisdiction. Also indicate the number of hours the centers are staffed.

	Signal Control	Fwy. Ops.
GCM Priority Corridor		
Colorado DOT #1		3-12
Colorado DOT #2		
I-95 Priority Corridor		
Washington State DOT		2-12
Virginia DOT		
Wisconsin DOT		
Houston Priority Corridor		
Minnesota DOT		
Missouri DOT		
Caltrans		
Maryland SHA CHART		2-24, 4-16
New Jersey DOT		
Texas DOT		12-24
Utah DOT		2-14

F. Economic Impact of ITS

F. 1. How does ITS relate to economic development and vitality in your jurisdiction?

1. In my opinion, ITS provides a benefit, but it has not been quantified
2. In my opinion, ITS cannot provide any direct benefit for economic development
3. We are currently studying the impact of ITS on economic development
4. We have found the following direct (or indirect) economic impacts of ITS:

GCM Priority Corridor	
Colorado DOT #1	1
Colorado DOT #2	1
I-95 Priority Corridor	
Washington State DOT	1
Virginia DOT	1,3
Wisconsin DOT	3
Houston Priority Corridor	
Minnesota DOT	
Missouri DOT	3
Caltrans	3
Maryland SHA CHART	1
New Jersey DOT	1
Texas DOT	1
Utah DOT	

F. 2. Has your agency prepared a Business Plan (i.e., a plan outlining roles, investments and expected benefits/returns) to guide implementation of ITS?

GCM Priority Corridor	no
Colorado DOT #1	yes
Colorado DOT #2	yes
I-95 Priority Corridor	yes
Washington State DOT	yes
Virginia DOT	yes
Wisconsin DOT	yes
Houston Priority Corridor	no
Minnesota DOT	yes
Missouri DOT	no
Caltrans	yes
Maryland SHA CHART	yes
New Jersey DOT	yes

Texas DOT	no
Utah DOT	no

F. 3. Have any market research surveys been conducted regarding ITS deployment or services in your jurisdiction?

GCM Priority Corridor	no
Colorado DOT #1	no
Colorado DOT #2	no
I-95 Priority Corridor	yes
Washington State DOT	no
Virginia DOT	no
Wisconsin DOT	yes
Houston Priority Corridor	no
Minnesota DOT	
Missouri DOT	yes
Caltrans	no
Maryland SHA CHART	no
New Jersey DOT	yes
Texas DOT	no
Utah DOT	no

F. 4. Have any steps been taken to involve local businesses or other stakeholders in ITS deployment or operation?

GCM Priority Corridor	
Colorado DOT #1	yes
Colorado DOT #2	yes
I-95 Priority Corridor	
Washington State DOT	yes
Virginia DOT	yes
Wisconsin DOT	yes
Houston Priority Corridor	
Minnesota DOT	
Missouri DOT	yes
Caltrans	yes
Maryland SHA CHART	no
New Jersey DOT	no
Texas DOT	yes
Utah DOT	yes

G. Inter-Urban and Rural ITS Applications

G. 1. Has your agency deployed any ITS projects in inter-urban or rural areas?

GCM Priority Corridor	no
Colorado DOT #1	yes
Colorado DOT #2	yes
I-95 Priority Corridor	yes
Washington State DOT	yes
Virginia DOT	yes
Wisconsin DOT	yes
Houston Priority Corridor	no
Minnesota DOT	yes
Missouri DOT	yes
Caltrans	yes
Maryland SHA CHART	yes
New Jersey DOT	no
Texas DOT	no
Utah DOT	no

G. 2. Does your agency have a formal (i.e., separate) planning process for inter-urban and rural ITS projects?

GCM Priority Corridor	no
Colorado DOT #1	no
Colorado DOT #2	no
I-95 Priority Corridor	no
Washington State DOT	no
Virginia DOT	no
Wisconsin DOT	yes
Houston Priority Corridor	no
Minnesota DOT	yes
Missouri DOT	no
Caltrans	yes
Maryland SHA CHART	no
New Jersey DOT	yes
Texas DOT	no
Utah DOT	no

G. 3. What are your priority ITS needs for inter-urban and rural applications?

1. Communications

2. Traveler information

3. Transit related services
4. Incident response
5. Mayday response
6. Emergency related services
7. Other _

GCM Priority Corridor		
Colorado DOT #1	2,1	
Colorado DOT #2	2,1,4,5	
I-95 Priority Corridor		
Washington State DOT	1,2	
Virginia DOT	2,4,6,1	
Wisconsin DOT	4,2,1,7,5,6	7=CVO
Houston Priority Corridor		
Minnesota DOT		
Missouri DOT	1,2,4,6,5,3	
Caltrans	7	7=COATS
Maryland SHA CHART	7,5,1,2,6,4,3	7=weather
New Jersey DOT	7,2,1,3,4,5,6	7=traffic mgt.
Texas DOT	1,2,5,4,6,3	
Utah DOT	1,2,6,4	

G. 4. Is there any plan in your agency for the integration of ITS services across (or between) inter-urban / rural areas and urban areas?

GCM Priority Corridor	
Colorado DOT #1	yes
Colorado DOT #2	yes
I-95 Priority Corridor	yes
Washington State DOT	yes
Virginia DOT	yes
Wisconsin DOT	yes
Houston Priority Corridor	no
Minnesota DOT	yes
Missouri DOT	yes
Caltrans	yes
Maryland SHA CHART	yes
New Jersey DOT	no
Texas DOT	no
Utah DOT	no

H. ITS Implementation Authority

H. 1. Which agency has the primary responsibility and authority for the following stages of ITS deployment in your jurisdiction? (Please differentiate between district/region level and headquarters offices.)

	1. Strategic ITS Policies and Planning	2. ITS Project Planning	3. ITS Project Design	4. ITS Operation	5. ITS Maintenance
GCM Priority Corridor	DOTs	DOTs	DOTs	DOTs	DOTs
Colorado DOT #1	HQ	region	region	varies	varies
Colorado DOT #2	HQ	HQ	region	HQ,region	region
I-95 Priority Corridor	DOTs	DOTs	DOTs	DOTs	DOTs
Washington State DOT	DOT	DOT	DOT	DOT	DOT
Virginia DOT	HQ	HQ,districts	HQ	district	district
Wisconsin DOT	DOT	DOT	DOT	DOT	DOT
Houston Priority Corridor	varies	varies	varies	varies	varies
Minnesota DOT					
Missouri DOT	HQ, district	HQ, district	HQ, district	district	district
Caltrans	HQ	HQ	HQ	district	district
Maryland SHA CHART	SHA	SHA	SHA	SHA	SHA
New Jersey DOT	HQ	HQ	HQ	region	region
Texas DOT	district	district	district	district	district
Utah DOT	HQ	HQ	HQ	HQ	HQ

H. 2. Does your agency have an formal (i.e., separate) organizational entity to plan for and implement ITS projects?

GCM Priority Corridor	no
Colorado DOT #1	yes
Colorado DOT #2	yes
I-95 Priority Corridor	yes
Washington State DOT	yes
Virginia DOT	yes
Wisconsin DOT	yes
Houston Priority Corridor	no
Minnesota DOT	
Missouri DOT	yes
Caltrans	no
Maryland SHA CHART	yes
New Jersey DOT	yes
Texas DOT	yes

Utah DOT	no

H. 3. Does your agency have any special policy or directive specific to the planning and implementation of ITS?

GCM Priority Corridor	yes
Colorado DOT #1	no
Colorado DOT #2	no
I-95 Priority Corridor	no
Washington State DOT	yes
Virginia DOT	no
Wisconsin DOT	yes
Houston Priority Corridor	no
Minnesota DOT	
Missouri DOT	no
Caltrans	yes
Maryland SHA CHART	no
New Jersey DOT	no
Texas DOT	yes
Utah DOT	no

H. 4. Is ITS specifically included in your agency's long range plans (i.e., 2020 transportation plan)?

GCM Priority Corridor	yes
Colorado DOT #1	yes
Colorado DOT #2	no
I-95 Priority Corridor	
Washington State DOT	yes
Virginia DOT	no
Wisconsin DOT	yes
Houston Priority Corridor	yes
Minnesota DOT	
Missouri DOT	yes
Caltrans	yes
Maryland SHA CHART	yes
New Jersey DOT	yes
Texas DOT	yes
Utah DOT	no

H. 5. Rank the following challenges facing ITS implementation in your jurisdiction? (with 1 = most challenging)

1. Lack of knowledge on ITS/training

2. Lack of supporting policies for ITS

3. Inadequate funding
4. Lack of an ITS plan
5. Lack of coalition/consensus on ITS activities
6. Higher priorities for other transportation improvements
7. Other

GCM Priority Corridor	3	
Colorado DOT #1	6,1,4,2,5,3	
Colorado DOT #2	5,6,4	
I-95 Priority Corridor	3	
Washington State DOT	6,3,5,1,2	
Virginia DOT	7, 2	7=not traditional DOT function, organizational structure, staff shortage
Wisconsin DOT	7,2,6,1,3	7=lack of staff
Houston Priority Corridor	3	
Minnesota DOT		
Missouri DOT	6,3,5,2,4,1	
Caltrans	7,5,6,2,3,1	7=too many agencies
Maryland SHA CHART	3,2,6,5,1,4	
New Jersey DOT	6,3,1,5,2,4	
Texas DOT	6,3,1,5,2,4	
Utah DOT	2,5,1,3,4,6	

I. ITS Technology Cost

I. 1. In your experience, what factors have the most impact on the costs of an ITS project? (rank the following with 1= highest impact)
1. Urban vs. rural conditions
2. System functionality
3. System design standards
4. Labor costs (union vs.non-union)
5. Technology risk (new vs. proven)
6. Other

GCM Priority Corridor		
Colorado DOT #1	3,6,1,2,5,4	6=O&M
Colorado DOT #2	2,3	
I-95 Priority Corridor		
Washington State DOT	2,3,5	
Virginia DOT	2	
Wisconsin DOT	5,2,4,1,3	
Houston Priority Corridor	3	
Minnesota DOT		
Missouri DOT		
Caltrans	6	6=not a problem
Maryland SHA CHART	1,2,3,4,5	
New Jersey DOT	2,5,4,3,1	
Texas DOT	5,4,2,3,1	
Utah DOT	5,4,2,3,1	

I. 2. What controls do you use in the basis of payment for ITS equipment purchase (e.g., retainage, extended warrantees, etc.) to control costs?

GCM Priority Corridor	
Colorado DOT #1	retainage
Colorado DOT #2	retainage
I-95 Priority Corridor	
Washington State DOT	
Virginia DOT	low bid
Wisconsin DOT	2 yr. maintenance warranty
Houston Priority Corridor	
Minnesota DOT	

Missouri DOT	
Caltrans	retainage, require deliverable for payment
Maryland SHA CHART	extended warranty, bonding, liquidated damages
New Jersey DOT	retainage, extended warranty, pay when operational
Texas DOT	purchase from pre-qualified vendors
Utah DOT	warranty, inspection, testing

I. 3. Do you require extended warranties (longer than one year) for equipment and systems?

GCM Priority Corridor	
Colorado DOT #1	yes
Colorado DOT #2	no
I-95 Priority Corridor	no
Washington State DOT	yes
Virginia DOT	no
Wisconsin DOT	yes
Houston Priority Corridor	no
Minnesota DOT	
Missouri DOT	no
Caltrans	no
Maryland SHA CHART	yes
New Jersey DOT	yes
Texas DOT	yes
Utah DOT	yes

I. 4. Have you procured ITS system software?
If yes, which do you find is more cost effective?
1.Commercial, off the shelf (COTS) software (also known as single entity, "third party" software)
2. Multiple vendor supplied software, with systems integration provided by others
3. Custom designed software

GCM Priority Corridor	
Colorado DOT #1	yes
Colorado DOT #2	yes - 3
I-95 Priority Corridor	yes - 1
Washington State DOT	yes - all
Virginia DOT	yes - 3

Wisconsin DOT	yes - 1,2
Houston Priority Corridor	yes
Minnesota DOT	
Missouri DOT	yes
Caltrans	yes
Maryland SHA CHART	yes - 3
New Jersey DOT	yes - 2
Texas DOT	yes - 1
Utah DOT	yes - 1

I. 5. How do you pay for software support and maintenance for COTS and vendor supplied software?

GCM Priority Corridor	
Colorado DOT #1	
Colorado DOT #2	
I-95 Priority Corridor	maintenance contract
Washington State DOT	state forces
Virginia DOT	contract
Wisconsin DOT	CMAQ, O&M funds
Houston Priority Corridor	O&M funds
Minnesota DOT	
Missouri DOT	
Caltrans	
Maryland SHA CHART	maintenance contract
New Jersey DOT	bid item
Texas DOT	O&M funds
Utah DOT	federal ITS funds

I. 6. In the table below, please provide typical ITS deployment (unit) costs, used for planning purposes by your agency, for as many of the following components as possible

ITS Component	Unit Cost
Vehicle Detection Station (VDS) (loop or in-pavement)	$1000, $500, $20000, $45000,$2000, $500
Vehicle Detection Station (VDS) (radar or ultrasonic)	$2500,$10000, $30000, $25000, $5000, $7000, $3000
Vehicle Detection Station (VDS) (video-based)	$25000, $40000, $35000, $40000, $25000, $20000

CCTV Installation	$70000, $20000, $40000, $7000, $100000, $45000, $9000, $25000
Dynamic / Variable / Changeable Message Sign (DMS/VMS/CMS)	$100000, $75-250000, $225000, $225000, $225000, $100000, $250000
Kiosk Installation	$15,000
Ramp Metering Installation	$250000, $20-500000, $50000, $25000, $200000
AVL (Cost per Bus)	$10,000
AVI (Cost per Toll Lane)	
Motorist Aid Call Box	$10000, $5000, $5000
Highway Advisory Radio (HAR) Station	$15000, $80000, $2500, $30000, $250000, $40000
Highway Advisory Telephone (HAT) System	$40,000
Fiber Optic Cable Installation (per unit of length)	$3/lf, $23/lf, $11/lf
Microwave/Cellular Communications Link	$15000, $80000
SONET Hub Site Installation	$50,000
Internet Web Site (development cost)	$15000, $140000, $40000
Internet Web Site (monthly maintenance cost)	$5,000
Roadway Weather Information Station	$100,000