Central Florida Implementation of ITS: Development of Public-Public and Public-Private Partnerships

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Wendell C. Lawther
Department of Public Administration
University of Central Florida
Orlando FL 32816
lawther@pegasus.cc.ucf.edu

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Executive Summary

The purpose of the research project was to identify model public-private partnerships and public-public partnerships in the deployment of ITS in United States Metropolitan areas. The analysis was also to discover lessons to be learned from other ITS deployment experiences, keeping in mind that these lessons could guide future ITS deployment efforts in Central Florida and elsewhere. The criteria used to choose research sites included a desire to obtain information regarding a range of experiences, from those areas just beginning ITS deployment efforts to those such as the Metropolitan Model Deployment Initiative sites that reflected advanced ITS efforts that have been evolving for several years.

The research project officially began on May 1, 2000, although some efforts were made before this date. The basis for the research came from several sources. As indicated in Appendix A, workshops and meetings were attended, both in Florida and outside the state; and a number of interviews and discussions were held with various ITS leaders from Florida and from selected cities nationwide. As indicated by the bibliography, government research reports as well as journal articles and books were read and analyzed.

Research Findings

1. ITS deployment must be viewed as evolutionary process. Using the nine infrastructure components of ITS identified by the ITS metropolitan monitoring system, several indicators of success can be identified, including:

1) The importance of each component to the overall success of the ITS deployment;
2) The likelihood that increased public support for ITS will be forthcoming as deployment progresses;
3) The existence of formal or informal partnership agreements that exist as part of legacy systems;
4) The likelihood that sufficient funds will be committed both in terms of start up and operations and maintenance
5) The importance of each in terms of meeting the transportation needs of a metropolitan area

Using these success factors, two evolutionary patterns are likely. The first pattern suggests that public-public partnerships must be built first, with public-private partnerships to follow at a later time. With this pattern, the two most likely public-public partnerships are found in incident management programs and traffic signal coordination programs. The most significant public-private partnerships, those build around the provision of Advanced Traveler Information Systems (ATIS), as there may not be sufficient public support because of a lack of perceived or real congestion, or there may not be sufficient funds or a public "culture" or tradition that is receptive to privatization or outsourcing of government services.

The second evolutionary pattern suggests that ATIS private-public partnerships will be created concurrently with public-public partnerships dealing with incident management and/or traffic signal coordination. This scenario is more likely in those metropolitan areas where traffic congestion is severe, with a high degree of public support for ways to lessen this problem. (pp. 3-9)

2. Public-Private Partnership (PPP) can be defined as an arrangement of roles/relationships by one or more public and private organizations that combine or coordinate resources to achieve separate objectives through the pursuit of common objectives. By implication, if the separate objectives of each partner are not met, the partnership will not be successful.

PPP is a term that is commonly misused. It is often the label placed on a the traditional vendor-customer relationship (VCR) found in roadway construction and other contracting relationships long held by transportation agencies. Characteristics of the VCR include: delivery of a product or service of low complexity and uncertainty; little opportunity for innovation; the private vendor is paid by the public agency; the role of the public agency is that of Contract Manager; the private vendor is often chosen because he has offered the lowest bid; and a short term, project based relationship is expected, rather than a commitment to a higher ideal of a public service goal.

Characteristics of the PPP include: a great deal of uncertainty about how to deliver the service or best "manufacture" the product; a great deal of discretion regarding the choice of service delivery; a high degree of risk for all partners; a high degree of trust; a genuine cost-sharing among all

partners; the expectation of a long-term relationship; and varying amounts of dependency of one partner on another.

It is best to view these characteristics as dimensions, with the VCR at one end (low) and the PPP at the other (high). There is always the risk that a PPP will "slip" back along the continuum along one or more of these dimensions and become a VCR. If this happens, the PPP is likely to be unsuccessful (pp. 12-21)

3. In the case of PPP's that focus on the deployment of ATIS services, the private sector offers benefits such as an additional source of funding and greater more up-to-date technological expertise. In return, the private partner must make a reasonable return on its investment/profit. The "balance" between providing the public with basic traveler information "for free" and the need for private vendors to gain a profit may be achieved if the publicly provided information concerns congestion on freeways and the private partners charge subscribers for more personalized information about congestion on arterial roadways. (pp. 24-30)

4. Models of PPP's centered around delivery of ATIS are differentiated by several criteria, including which partner (public or private) pays for data collection, fusion and dissemination; the choice of dissemination modes; the effectiveness of the public outreach and marketing efforts, and who pays for operations and maintenance. Using these criteria, six models are proposed, with descriptions/analysis of metropolitan area experiences relevant to each model. A literature review of previous analysis of PPP's indicates that other authors have not considered the complexity of all these criteria.

The models—with metropolitan areas offered as examples-- are:

A: Public Controlled: Portland (OR), Buffalo, Cleveland, Atlanta, Houston, San Antonio, Grand Rapids, Orlando
B: Public Stimulates/Funded: Phoenix, Seattle
C: Public Stimulates/Non-Funded: San Francisco (Trav Info I)
D: Private Partnered: San Francisco (Trav Info II)
E: Private Controlled: Cincinnati/N. Kentucky, Washington DC, South Florida
F: Non-Profit Brokered: Los Angeles (pp. 30-100)

5. Models can be viewed along a continuum, as the wide range of examples in A (Public Controlled) suggest some cities, those with more advanced dissemination, may be closer to B (Public Stimulates/Funded) than others. Also, some cities will move from A to the other models, as they favor more private control.

In terms of model assessment, Model A (Public Controlled) will work for those cities that have a tradition of strong public-public cooperation and/or have low congestion. Using criteria such as "saving lives, time and money" as well as the number of ATIS service users, Model C (Public Stimulates/Non Funded) is not favored because it is likely to attract ISP's that will ultimately fail. Even though experiences with Model B (Public Stimulates/Funded) have not proven successful, it is preferred, as long as the lessons to be learned (see below) are adopted. Models D&E (Private Partnered and Private Controlled) are workable if the private partners are given enough incentives to effectively pursue subscription services. There is a higher risk for public partners, though, if the "monopoly" given to the private partners is not sufficient for their long term viability. They also require more public funds. Model F (Non-Profit Brokered) is not appropriate for most urban areas, as few if any other areas have as many potential public agencies that can furnish data as does the greater Los Angeles area. (pp. 34-36)

6. The adoption of a business plan by public agencies provides general guidelines that will convey public philosophy and set parameters for the ATIS PPP. A comparison of the AZTech (Phoenix) and Washington State Business Plans indicates that business plans: 1) can reflect goals and objectives of the public partners, including the priority given to personalized ATIS services; 2) can reflect the degree to which PPP's are encouraged by public agencies; and 3) can specify the extent to which self-sufficiency is expected.(pp. 39-40)

7. An in-depth analysis of the Invitation to Negotiate process used in South Florida to choose SmartRoute Systems as an ATIS partner is provided. After summarizing the main points of the ITN, the responses of the three private partners are analyzed by section. Final concluding comments also discuss the pricing proposal, as well as the implications of the recent revelation that SRS does not feel that self sufficiency is possible. (pp. 68-99)

8. Recommendations concerning future ATIS PPP efforts in Central Florida are offered. There are three options:

1) remain in Model A, build more formal incident management and traffic signal coordination programs, and develop a region-wide real-time traveler information map for a website that encompasses information for all freeways. This option suggests the least involvement with the private sector.

2) adopt Model B or C, and provide "seed money" for smaller operational tests involving PPP's that provide ATIS services—as has been suggested by the I-4 Corridor Coalition study; Model C may not fully meet transportation goals of the area.

3) adopt Model D or E, placing control of ATIS services in the hands of a single system manager. This option contains the greatest risks, as public support may not be strong enough, and it will likely be the most costly. However, if construction plans for I-4 increase safety concerns, then this option would provide the most comprehensive ATIS in the shortest timeframe. (pp. 100-103)

9. Future customer satisfaction surveys regarding ATIS need to provide more detail and consider more factors than has been provided by MDI evaluations. Surveys should elicit feedback regarding the specific content of ATIS services, for example. Also, more study needs to be made of factors such as public perception of traffic congestion and the viability (and reliable information about) alternative routes.(pp. 105-107)

10. Marketing and public outreach are significant efforts in deploying ATIS services, as several studies have indicated low traveler awareness of these services. Examples such as those from AZTech and Partners in Motion indicate that the most effective efforts are those in which there is strong coordination between marketing and outreach. It is important to identify early in the deployment process what services are favored by the traveling public in a given area, and provide incentives to encourage subscription services if possible. Still, the plans need to be implemented, as efforts to attract ISP's may not have been as diligent as possible. The public partners

must make efforts to help market subscriber services or face the risk that private partners will not provide services over the long term. (pp. 107-115)

11.In developing public-public partnerships (PubP), there may be barriers to be overcome, including those caused by constitutional designations such as home rule, as well as by traditional mistrust among public agencies across jurisdictions. In creating the PubP, several issues must be considered, including the problem to be solved, the mechanisms by which the PubP can be created, the roles/expectations of public partners, and the requisite organizational structure. MOU examples are provided (pp. 116-123)

12. In forming the PubP's, the Metropolitan Planning Organization (MPO) can play a significant role in integrating ITS into the transportation planning process and creating the needed PubP. The MPO can play various roles, including helping ITS initiatives to be endorsed by key political leaders, helping to coordinate activities and facilitate communication among transportation agencies across jurisdictions, and helping to increase agency willingness to share information and resources.(pp. 123-126)

13.PubP's can occur across jurisdictions along arterial roadways. In Phoenix and Seattle, the establishment of "smart corridors" and corridor teams consisting of traffic engineers and other representatives of transportation agencies have led to greater coordination of traffic signals. The demonstrated result is that significant amounts of delay can be reduced. In addition, the existence of the teams helps encourage acceptance of ITS deployment among local transportation professionals.(pp. 127-130)

14. Incident Management (IM) programs are another form of PubP's. To be most effective, IM needs to reflect a partnership among law enforcement, transportation, and emergency medical services. There must be effective two way interaction among all partners, built upon the acceptance by law enforcement, for example, of the value of the information furnished by operators at local Traffic Information Centers, for IM partnerships to work well. Service patrols have an increasingly significant role to play in responding to incidents, helping site management, and providing timely information to motorists. (pp. 130-143)

15. Other organizational and institutional issues are discussed. TranStar (Houston) is analyzed as a case study of one organizational structure.

Procurement methods and the need for flexibility is also discussed.(pp. 143-150)

16. Lessons to be learned—Public-Public Partnerships

a) There must be sensitivity to legacy agreements (or the lack of them).
b) The goal in all cases is a formal MOA/MOU.
c) Incentives must be found or demonstrated for those public agencies that do not become partners initially.
d) Public cooperation is more likely if there is an identifiable problem to be solved.
e) Formal organizations are not necessarily required in all cases.(pp. 150-152)

17. Lessons to be learned—IM Programs:

a) Communication among all IM team members must be two way, especially the interaction of law enforcement and EMS personnel with transportation operators.
b) Protocols must be developed so that TMC operators communicate directly with service patrol operators.
c) Incentives must be present to encourage participation by those agencies for which IM is not a high priority.
d) Training in proper response procedures should be standardized among all appropriate agencies in a metropolitan area.
e) Service Patrols should be given maximum route coverage and publicity to build public support for ITS deployment.
f) IM Programs can be built piecemeal.
g) As much as possible, agencies should share resources to the benefit of each other. (pp. 152-153)

18. Lessons to be learned—Public-Private Partnerships

a) The role of the public partners must be more active than that of a contract manager.
b) Trust and flexibility must be continually maintained by all partners.

c) Marketing efforts need to be expanded, with all parties agreeing to their roles early in the PPP existence. There needs to be close coordination between what may be viewed as outreach by the public agencies and market strategies to generate revenue by the private partners.
d) Public partners should develop a business plan, recognizing that it is an evolving, changing document.
e) Long-term commitments have to be made.
f) Expectations in terms of time frame have to be lowered, or be more realistic.
g) Traveling public needs and wants need to be identified early in the deployment process
h) The ease of data fusion from all public data sources should be assessed early in the deployment process. (pp. 153-160)

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1.0 Introduction

Public-private partnerships and public-public partnerships (also known as Interjurisdictional Agreements) are key to successful Intelligent Transportation Systems (ITS) deployment in metropolitan areas. Almost by definition, the integration of ITS infrastructure components or subsystems requires agreements among transportation officials and agencies throughout a metropolitan area. The private-public partnerships have been part of the TEA-21 legislation and official policy pronouncements, stressed even more so than under ISTEA (ITS FAQ's, 2000).

Initial evaluations of the Model Metropolitan Demonstration Initiative (MMDI) projects and other metro areas (e.g. TranStar) have indicated mixed success of both types of partnerships. Memoranda of Agreements (MOA's) have been developed in Seattle, for example, that involves 17 suburban city agencies as well as those in WSDOT and Seattle. Houston's MOA for example, involving the City of Houston, Houston METRO, TxDOT and Harris County reflects an apparent high degree of cooperation and coordination among these agencies. In these and other similar cases in metropolitan areas, ITS leaders have been successful in building upon existing institutional relationships to solve specific problems related to traffic safety and congestion (DeBlasio, et. al., 1999, Briggs, 1999)

The private public partnerships under the jurisdiction of AZTech, however, indicate a different result. During Phase I, the two-year implementation phase (1996-98), none of the four commercial ATIS ventures were successful. Etak's plan to provide information by fax was abandoned, while initial efforts to use a pager service were not implemented. The Etak commercial website, providing much the same information as the AzTech Trailmaster website, was still in the development stage by spring of 1999. (Zimmerman, et. al., 2000)[1].

Although overall private sector involvement has significantly contributed to the success of the Seattle MMDI experience, Fastline's attempts to provide personalized traveler information services in Seattle has produced very low market penetration. Similarly, customer responses indicated that they found

the Traffic TV station only through "channel flipping", indicating low public awareness of this service (Jensen, et. al., 2000).

It is ironic that the success of the public-public partnerships may have contributed to the lack of success of the public-private ventures. Customer surveys indicated a relatively high degree of satisfaction with WSDOT's ATIS website, with similar results reported for AZTech's Trailmaster website. These free websites are attracting increasing interest from travelers, who may find that the information currently provided is sufficient for commuting decisions. Even though there is some indication that customers may desire the additional, "value-added" services that private vendors can provide (Lappin, 2000a), commercial ATIS success has not yet occurred.

To validly evaluate both types of partnerships in light of their contribute to ITS deployment efforts, several criteria must be developed. First, there must be some understanding of what constitutes ITS deployment success. "Saving time, lives and money", is a phrase that indicates three crucial criteria already identified and analyzed by national ITS officials. The degree and nature of the integration among different ITS infrastructure components is also another measure of success, although the criteria used by the ITS Metropolitan Monitoring Project is more descriptive than evaluative. What is lacking is a more detailed assessment of ITS deployment as it evolves over time. Also, the combination of and/or interaction between the development of the various infrastructure components and their contribution to ITS success needs to be assessed to a greater degree that is currently present in the literature.

Second, there has been little identification of what constitutes effective partnerships. There is the implication that the more cities that are involved in contributing to a metropolitan ATMS, the more successful the public-public partnership. If six of the eight potentially participating public agencies are active in an incident management program, then the program is deemed more successful than if only four agencies participated. Depending on the roles each public partners play, the amount of resources contributed, the protocols and procedures contributed, and the resulting MOA, however, greater numbers of participating agencies may not mean greater success. Even though institutional barriers may have been successfully overcome to some extent, there is little indication of how effective the resulting relationships have and can become.

Third, once a private sector partner is sought by public agencies, the success of the resulting partnership depends upon a great number of factors. Simplistically, success can be measured by degree of market penetration, numbers of subscribers to an ATIS service, degree of traveler satisfaction, or percentage of profit made by the private vendor. This analysis, though, would suggest that private sector goals are more important than public sector ones, reflected more by providing a service to the traveling public that lessens travel time by reducing congestion. A more valid evaluation would assess partnerships as they exist at various "stages" or points in time during a metro ITS deployment, indicating, in part the extent to which success at one time period contributes to success at a later time period. The adoption of one or more of the private public partnership types, e.g. as identified by Hallenbeck (1998), must be identified as well. The roles, contribution of financial support, and characteristics of travel activities in a given metropolitan area may also contribute to partnership success.

There must also be the recognition that current or legacy infrastructure must be compared with planned or future efforts. This is important for at least two reasons. Since ITS deployment is occurring rapidly, data collected at one time point may be out of date a year later. More important, any data collected must recognize that ITS deployment in a given metropolitan area will likely continue into the future. Plans for future deployment, then, have an impact on present activities and the assessment of their success.

1.2 The Relationship Between ITS Deployment Success and Effective Partnerships

To gain more insight into partnership effectiveness, the relationship between any measures of effectiveness and any measure of ITS deployment success must be ascertained. In this manner the degree to which a partnership is effective can be correlated to the degree of deployment success. If there are potentially ten public agencies that could cooperate in an incident management program, for example, and only eight are participating, would traffic congestion on area freeways caused by incidents be significantly lessened if the other two agencies were involved? The answer would depend upon such factors as the number of incidents on the freeways for which law enforcement personnel from those agencies were responsible, as

well as the degree to which they would respond more quickly if they participated in the IM program.

Similarly, if only .5% of the traveling public in a given metropolitan area subscribes to personalized ATIS services, would there be fewer fatal traffic accidents on area freeways than if 3% of the public subscribed? Factors such as the frequency of travel by the subscribers, the time of day they would travel, and whether they receive the information en-route or before traveling would influence the answer.

This analysis would undoubtedly assist policy makers in determining where to focus efforts in strengthening existing partnerships and creating new ones. Specific studies could identify the "tipping point" at which additional "degrees" of partnership effectiveness could result in significant increases in deployment success.

Even in the absence of such studies, efforts to increase deployment success will undoubtedly impact partnership effectiveness as well. In every instance indicators are identifiable that are helpful in predicting deployment success and partnership effectiveness.

2.0 Indicators of ITS Deployment Success

Before success can be measured in a given metropolitan area, a common understanding of the factors contributing to ITS deployment must be identified. One set of descriptors includes the nine ITS infrastructure components identified as part of the ITS metro monitoring system (Gordon and Trombley, 2000):

Freeway Management
Incident Management
Emergency Management
Traffic Signal Control
Transit Management
Electronic Toll Collection
Electronic Fare Payment
Highway/Rail Intersections
Regional Multi Modal Traveler Information/Advanced Traveler Information Systems (ATIS)

Another set of descriptors is furnished by the ITS National Architecture (Odetics ITS Division, 1999). Thirty One User Services were grouped into seven User Services Bundles:

1) Travel and Transportation Management:

- En-Route Driver Information
- Route Guidance
- Traveler Services Information
- Traffic Control
- Incident Management
- Emissions Testing and Mitigation
- Demand Management and Operations
- Pre-trip Travel Information
- Ride Matching and Reservation
- Highway Rail Intersections

2) Public Transportation Operations:

- Public Transportation Management
- En-Route Transit Information
- Personalized Public Transit
- Public Travel Security

3) Electronic Payment:

- Electronic Payment Services

4) Commercial Vehicle Operations:

- Commercial Vehicle Electronic Clearance
- Automated Roadside Safety Inspection
- On-board Safety Monitoring
- Commercial Vehicle Administration Processes
- Hazardous Materials Incident Response
- Freight Mobility

5) Emergency Management:

- Emergency Notification and Personal Security

Emergency Vehicle Management

6) Advanced Vehicle Control and Safety Systems:

Longitudinal Collision Avoidance
Lateral Collision Avoidance
Intersection Collision Avoidance
Vision Enhancement for Crash Avoidance
Safety Readiness
Pre-Crash Restraint Deployment
Automated Highway System

7) Information Management:

Archived Data

The importance of the nine ITS infrastructure components or any of the User Services Bundles to the success of ITS deployment can be prioritized by factors such as:

2.1 The Importance of Each to the Overall Success of the Deployment

Using saving time, lives and money as overall indicators, each of the nine components will contribute to varying degrees. At the minimum, there may be an absence of present and planned deployment. If there are no toll roads, for example, this component will have no bearing on ITS success. Similarly, if there are few highway/rail intersections, few lives and little time will be saved.

Other factors contribute to prioritization. If there are more freeway miles traveled than arterial roads, then the former is of higher priority than the latter. If transit ridership in a small metropolitan area, for example, is relatively low compared to the number of travelers driving automobiles, then clearly it will be of a lower priority. If few traffic signal controls are under centralized or closed loop control or under electronic surveillance, then these will have minimal impact.

Other factors would seem to be of higher priority. The existence of incident management programs would probably lead to faster response time and faster clearance of accidents from highways. ATIS services could lead to

travelers changing departure and/or return travel times or choosing alternative routes, thereby lessening congestion.

2.2 The Likelihood That Increased Public Support for ITS Will be Forthcoming as Deployment Progresses

Much of the same analysis provided above would be relevant here. Public support would be greatest for those aspects of ITS that are the most visible. Incident management, including service patrols as well as RRMTI services would most likely engender the most public support.

2.3 The Existence of Formal or Informal Partnership Agreements That Exist as Part of Legacy Systems

One of the key institutional lessons of the MMDI national evaluation effort is that successful ITS deployment should build upon existing relationships (DeBlasio, et. al., 1999). These relationships can be created from a number of different sources. Agreements to coordinate changes to traffic signal timing plans may be part of legacy infrastructure that predates ISTEA. Agreements to coordinate incident management plans are common in metropolitan IST deployment[2]. Agreements to share data between state DOT TMC's and local transportation agencies may also exist.

To some extent, the effort involved in creating an EDP for a given metropolitan area may have brought together transportation officials from a variety of agencies that had not worked together previously (DeBlasio, et. al., 1996). In other instances, the role of the Metropolitan Planning Organization has been key, e.g. in Phoenix (Jensen, et. al., 2000). For some areas, the effort to respond to the MMDI RFP created working relationships that have helped continue ITS deployment (Pederson, 1998)

Those ITS infrastructure components for which agreements exist would likely be rated higher than those for which there is no agreement. The mere existence of agreements, however, may not mean that interaction among the individuals involved is extensive, or would likely to contribute heavily to ITS integration and deployment. Traffic signal coordination agreements may never be used. EDP creation may be heavily influenced by state DOT's without much involvement from local officials (DeBlasio, et. al., 1996).

2.4 The Likelihood That Sufficient Funds Will Be Committed Both in Terms of Start up and Operations and Maintenance

The prioritization of infrastructure components and indeed the effectiveness of partnership agreements depends largely on the availability of funds to support ITS deployment, both in terms of start up costs for both hardware and software, and for O&M costs in terms of staffing and maintenance. Support from state DOT's will be a crucial factor in determining which ITS projects are funded. Since many state DOT's are planning extensive electronic surveillance and/or loop detectors for freeway miles in metropolitan areas, along with the building/establishment of regional TMC's, support for start up costs seems available for these components. Funding for arterial roads, especially those for which state funding may be limited, may be a lower priority.

The role of the metropolitan planning organization (MPO) may be crucial in identifying funds and committing them to ITS projects. The role of MPO's varies extensively, with some MPO's taking the role of the lead agency in ITS deployment [3]. In other areas, MPO staff are still learning about ITS, and rely heavily on state DOT staff for direction in prioritizing these funding. Success in ITS deployment may be contingent upon state DOT's and MPO's interacting more effectively (DeBlasio, et. al., 1997). In any case, the role of the MPO may be crucial in identifying sources of O&M funds. With these available, local agencies may be more likely to commit to ITS deployment.

2.5 The Importance of Each in Terms of Meeting the Transportation Needs of a Metropolitan Area

To the extent that there are identifiable, pressing transportation problems that need to be solved, transportation officials are more likely to partner in efforts to solve them (Briggs, 1999). In many metropolitan areas, these problems are likely to include increasing traffic congestion due to increasing population and limited resources to expand existing highway capacity. As indicated by Lappin (2000a), this scenario lends itself well to customer acceptance and usage of ATIS services.

Other factors include the availability of viable arterial alternatives. In Phoenix, for example, the existence of a large network of arterial roads has dampened interest in commercial ATIS services (Jensen, et. al., 2000). Other cities, such as Orlando, have few alternatives other than freeways.

2.6 Overall ITS Metropolitan Deployment Analysis

The complexity in developing successful or effective ITS deployment criteria results from a variety of combinations of factors and conditions that are given different priorities across metropolitan areas. In addition to the discussion above, each of the nine infrastructure components contains an initial stage of deployment and a more complex, later stage. ITS projects that are deployed in one metropolitan area may reflect a different set of efforts in different component areas.

Given the above analysis, the highest priorities for the nine components are incident management, RRMTI for freeways, and traffic signal control coordination. In these areas, there is a high likelihood of providing the most visible services, gaining the most public support, building on existing agreements, and providing the greatest benefits. The challenges and resulting priorities faced by small to medium sized communities that may not have as much legacy hardware, equipment and agreements, may be different from those of larger cities.

MMDI's objectives were to show high degrees of integration among various transportation subsystems: freeway management, arterial management, incident management, and transit management. In Phoenix, public-private partnerships were expected to strongly support this integration. What must be recognized, for the remaining metro areas that have not benefited from MMDI designation and funds, is that integration must occur in steps or phases, with some building on others. The challenge is to discover which should occur or can occur in what order of priority.

The various systems that comprise ITS Deployment are best understood as evolving ones, systems that are likely to begin with less expensive, more easily implemented aspects that may affect a smaller traveler base, e.g. all those who listen to HAR. In later stages of deployment, more accurate, reliable and successful aspects of ITS may be deployed that may be more expensive to install and maintain, as well as require greater degrees of commitment and cooperation.

During the initial stages of metropolitan ITS deployment, there are two types of public-public partnerships (PubP's) that are likely to be formed: 1) incident management partnerships that likely involve only public law

enforcement and transportation agencies; 2)"Smart Corridor" or traffic signal coordination partnerships, involving only municipalities and their transportation agencies. In addition, in the process of building these two PubP types, partnerships are often created involving state and local transportation agencies that focus on traffic management systems.

A third type of partnership follows: public-private partnerships (PPP's) evolving around the collection and dissemination of advanced traveler information systems. The viability of the partnerships relevant to ATIS depends upon several factors such as the metropolitan population, usage of freeways compared with travel on arterial alternatives, and the potential for subscriber services. Much of the data and information collected is relevant to ATIS.

Key to the success of these partnerships is the amount and degree of public support for ITS. This is based upon a variety of factors, including the collection of "before" data, so that comparisons can be made with conditions after the deployment of ITS. With this information, increased support for ITS from the public and from local political leaders can be generated.

Two evolutionary patterns are likely. First, public-public partnerships will be formed first, with ATIS PPP's occurring at a later timeperiod. This is due to several reasons, including 1) the likelihood public support for ITS will be built much more quickly with incident management and signal coordination partnerships; 2) public officials will likely conclude that public transportation policy goals of saving lives and reducing congestion will be met more effectively with the public-public partnerships; 3) the embryonic market for privately provided ATIS services; and 4) the additional higher public funds that may be necessary for start up costs to create ATIS services.

Second, public-public partnerships are formed concurrently with efforts to establish ATIS PPP's. This is likely in metropolitan areas where traffic congestion levels are high, and finding solutions are a high public priority. Also, in those states and metropolitan areas where there has been a significant commitment to privatization of government services, PPP's are more likely to be found. To some extent, it is hoped that the PPP formation will act as a catalyst to help PubP development. It may be that PubP's must develop to some extent before PPP's can be accepted and established. In those areas that received MDI funding, for example, there has been an effort

to use those funds to build all three partnership types concurrently, building upon a strong legacy of public cooperation.

This paper examines the three types of partnerships, beginning with a focus on the public-private partnerships. After defining and characterizing PPP's, models of potentially effective partnerships will be proposed. As an example of how ITS deployment could evolve, reference to Orlando/Central Florida will be made. A discussion of public-public partnerships will follow. Lessons to be learned and an overall conclusion will end the paper.

2.7 Public-Private Partnerships: Institutional Issues and Critical Success Factors

As part of its ITS Institutional and Legal Issues Program, researchers at the Volpe National Transportation Center evaluated selected Field Operational Tests (FOT), issuing the final report in September 1995 (Blythe and DeBlasio, 1995). Their analysis is useful in that it identifies issues and critical success factors (CSF) that arose as part of these tests. By implication, these issues and the barriers that they represent must be overcome by any ITS metropolitan deployment that is beginning to create partnerships. In other words, an assessment of whether the "lessons to be learned" from these studies have been adopted successfully by other jurisdictions must be made. Alternatively, the issue is to what extent must these lessons be learned again in different metropolitan settings.

Of special interest for this study are the partnership challenges--both public-public and public-private--that were raised. Under the topic of organizational and managerial Issues, two were of significance for this study

2.7.1 Newness of Public-Private Partnerships/Differences in Organizational Culture

The FOT's brought agencies and private vendors together in a partnership relationship. There had to be a period of adjustment because many of these were used to the traditional vendor-customer role (see below, pp 14-21). Public partners had to learn to accept private vendors as equals. Because of the newness of the ITS technology, private vendors had more knowledge of the appropriate hardware and software, and were entitled to viable input.

Plus, the business culture was different from that of the public sector. Private businesses are more familiar with implementing projects within a short time frame. They are more flexible, not constrained by bureaucratic rules and regulations. The need to make a profit or achieve a return on investment also contributed to a different culture, one that initially clashed with the public culture that is more committed to public service[4].

2.7.2 Ill-defined Roles/Unwieldy Organizational Structure

With multiple partners, it was often unclear which partners assumed leadership roles and which supportive roles. The assignment of responsibilities was also unclear. For FOT's with a great number of partners, an organizational structure that gave equal weight to all partners became unwieldy.

A lack of interagency coordination also contributed to partnership difficulties. Much of this was based upon poor communication among the agencies. There were several causes. First, there was no communication mechanism established. Second, the differing functions and policy priorities among the transportation agencies before the FOT precluded cooperation. There was no legacy or history of coordination in many of these metropolitan areas. Third, differing interpretations concerning what decisions were made at various meetings led to friction at later dates.

It was also difficult to gain sufficient support from the operating public agencies. The internal structure and management style did not have much experience with the shorter life cycle and fast developing ITS technology exhibited by the FOT efforts.

2.7.3 Lessons to be Learned

Formal partnership agreements helped resolve public-private differences, along with workplans that spelled out roles and responsibilities. In creating current PPP's, success is greatly determined by all partners playing different roles than those that are part of the vendor-customer relationship. The formal agreements, such as MOA's or contracts, can help to specify these roles. More important may be the resulting work plans. The public partners must adopt a role other than contract manager, while the private partners must communicate challenges and problems as well as successes in a more timely fashion.

Multi-layered organizational structures also solved many of these problems. As discussed in more detail below, commitment from all levels of all participating organizations is necessary for success. Top management and elected leader support is important from public partners. Similarly, top management support from the headquarters of private vendors, especially if the private partner is an international company, is also important (see, for example, Barton, 1999).

In addition, middle and lower level staff need to have the responsibility to represent their organizations and have the authority to make relevant decisions. The formal agreements outline specific organizational structures that by implication recognize that participating organizations have implemented processes and policies to facilitate appropriate representation[5].

This section is meant to be an introduction to more detailed analysis of some of these same themes. In the FOT's, many of these challenges were successfully overcome. Now that the FOT program is completed, however, metropolitan areas face many of the same challenges as they deploy ITS. After discussing basic definitions of PPP's, the following sections outline characteristics of effective partnerships.

3.0 Public-Private Partnerships: Definition and Characteristics

Increasingly, Public-Private Partnerships (PPP's) are found in a vast range of government related products and services. It is a term that is politically popular, as it connotes greater efficiencies and higher quality services/products than if the public sector were the sole provider. It is also a term, though, that has several different meanings and is often applied inappropriately.

In the most general sense, PPP's can be defined as:

> "An arrangement of roles and relationships in which two or more public and private entities coordinate/combine complementary resources to achieve their separate objectives through joint pursuit of one or more common objectives." (National Highway Institute, 1999)

This generic definition does not provide a full understanding of the "separate objectives" and the "common objective" as it relates to transportation projects and ITS deployment. A more specific definition more clearly identifies the private role in a PPP as involving

> "the investment of public risk capital to design, finance, construct, operate, and maintain a project for public use for a specific term during which a private investment consortium is able to collect revenue from the users of the facility (Levy, 1996).

The design-build-operate-transfer (DBOT) trend (and the variations of this arrangement) emphasizes the private objective to obtain a return or profit on its investment of a public infrastructure facility. The many instances of this trend in the transportation field, such as those involving toll roads, also identify the public objective as reducing congestion on already existing roads and providing better transportation services to the traveling public.

The application of DBOT's encompasses a wide range of infrastructure, across all levels of government and throughout many countries. In the United States at the state and local level, the PPP's that evolve from ITS deployment take the form of DBOT's even though there may be more software involved than hardware or "concrete and mortar" and even though the terms DBOT may not be found within the legal framework and regulations that characterize procurement practices.

In contrast, definition of partnering that comes from the highway construction experience is useful:

> "A long term commitment between two or more organizations for the purpose of achieving specific business objectives by maximizing the effectiveness of each participant's resources". (Partnering Task Force, 1991, as cited in Grajek, 2000)

This definition has more applicability to the private sector. In the public sector, the tradition of low bid and fixed price contracts in the construction industry means it is difficult for partnering as well as public-private partnerships to occur. A long-term commitment will not result. The creation

of a PPP means all partners have a common goal. In contrast, a public agency is unlikely to have a business objective, one that would entail seeking a profit or return on investment. This definition does recognize the need to commit resources in the most effective manner, which is certainly true for both private and public sectors. However, it more significantly illustrates the private side of a traditional vendor-customer relationship, one that is distinct from a PPP.

Another definition of PPP's shifts the focus to the United States federal research and development field, defining them as:

> "cooperative arrangements engaging companies, universities, and government agencies and laboratories in varying combinations to pool resources in pursuit of a shared R&D objective" (*National Transportation Strategy,* cited in Smallen, 2000.

By implication the separate objectives are similar to those identified for DBOT's. The government agency wishes the university/private firm partnership to develop a product that can be marketed in order to better meet a pressing public need or achieve a public policy goal. The private firms wish to make a profit/return for their investment in developing the product.

These definitions do not suggest that the only goals of public and private partners are these as identified. The private firm involvement may also lead to an improved reputation if the project is successful, as well as helping to meet a social or public policy need. Rather than a private firm, a non-profit firm may become part of a PPP. The public agency may be in a position to collect revenue from a successful project as well. The partnership will not be successful, however, if the separate objectives of public and private partners are not met.

3.1 Vendor--Customer Relationships Versus Public Private Partnerships

Since public private partnership is a term applied to almost all relationships between public agencies and private firms, it is often used inappropriately. It is often applied to the traditional public agency—private vendor

contractual or customer relationship. To more fully understand PPP's, characteristics of these contractual relationships must be identified.

First, the contract is to build a product or deliver a service 1) that has relatively **little complexity and uncertainty;** 2) there is a great deal of knowledge on the part of both public and private agencies concerning the most widely accepted ways/methods used to deliver the service, and/or 3) there is a generally accepted set of principles, methods and materials used to deliver the service. Municipal waste disposal services are not complex and easily understood by all involved. Road building, although very costly in comparison and involving a much longer time frame to complete the final product, is based upon engineering principles and a long tradition of generally accepted practices.

Second, once the contract is signed, it is highly **unlikely that new or innovative ways** or means to deliver the service will be employed by the private vendor. There is no incentive for the vendor to do so unless he is allowed to find more efficient ways—ways that cost less and maintain the same (or better) level of service and keep part of the resulting savings.

Third, the **public agency pays the private vendor to deliver the product or the service.** As a result, a fourth characteristic is that an institutional or organizational culture exists that recognizes that the **private vendor is employed by the public agency.** There is a hierarchical relationship that clearly identifies the public agency as the "boss" or the customer. Much of **the public agency role is that of Contract Manager.** The public agency checks the work of the private vendor, inspects facilities, monitors progress, reviews deliverables, and resolves problems or enforces deadlines and penalties if they are not met.

Fourth, the relationship is viewed as **project based, and short term.** A private vendor may collect garbage for a city for twenty years. One road construction firm may do business with a state agency on many projects over many years. But there is no expectation that the five-year contract to collect garbage will be renewed, or that the next road project will be awarded to the same private firm. There is no expectation of a longer term, continuous relationship.

Fifth, in terms of awarding the contract, the traditional procedure is to **choose the lowest bid** from among the private vendors that are qualified.

Even though the rating system used to rate bids allow for better qualified vendors to achieve a higher rating, in most cases cost is weighed much heavier than technical expertise or qualifications[6].

In general, the traditional contractual relationship is **not characterized by a sense of commitment to a higher level goal or objective.** There is no expectation that the private garbage collectors who collect garbage for a city have any allegiance to the improvement of the city residents' "quality of life". They should be polite and professional in dealing with the public, but no more is expected.

3.2 Public-Private Partnerships

PPP's consist of partners from public and private sectors. They differ from traditional contractual relationships in several ways.

First, they involve providing a service (or product) that potentially can involve a **great deal of uncertainty** regarding how best to deliver that service. The service may be highly complex; changing technology may determine varying ways to deliver the service; and/or require knowledge from service deliverers that is not present or difficult to obtain by one or more partners.

Second, all partners have **discretion** to identify ways/means of achieving goals. There is greater opportunity for innovation and creativity as a result. The design/build partnership, for example, that oversees the creation of the Atlantic City (NJ) Connector, allowed for the use of superjet grouting materials. As a result, considerable cost savings have resulted (Fairweather, 2000).

Third, **risk** occurs for each partner in a number of ways. For public agencies that contract out/partner an already existing service, there is always the risk that the private partner will not be able to deliver the same high quality service. Or, the private partner may not be able to achieve the initially agreed to stated partnership goals. From the private agencies point of view, failure of the service, to the extent that the private agency leaves the partnership, means loss of profit, jobs, and reputation.

Public agencies, for example, may contribute a greater amount of financial support for the initial stages of a project. The private partner may contribute

in kind services as well as a line of credit initially. Risk may involve the loss of taxpayer dollars or private investment funds if the project is not successful.

Fifth, **genuine cost-sharing** is part of the partnership commitment. Private partners will make significant contributions, even if no funds are transferred. The "matching" can be in terms of contributing in-kind services and personnel time and effort, as well as in development costs of products, such as software, that are contributed to the partnership.

Sixth, partnerships are characterized by **expected long-term commitments and relationships.** The time period transcends the completion of one project with an identifiable product or outcome. It assumes that overtime the products and/or services will evolve and change as new technologies are applied, or as problems are solved and improvements made. It also may be that return on investment may be many years after the product or infrastructure has been built, as is the case with the Dulles Greeneway project.

After the conclusion of the Seattle area-Wide Information for Travelers (SWIFT) field operation test, the public and private partners expressed interest in a long-term commitment to ATIS in Seattle. The three private partners: Sieko, Etak and Metro One networks, all were interested in a post SWIFT system. (Whetherby, 1998). The latter two became part of the Smart Trek project. (Jensen, et. al., 2000).

Seventh, **PPP's will vary extensively across the dimensions listed above.** A partnership may be formed because of significant private partner risk and cost sharing, even though the time period may end after a hardware or software product results.

Eighth, the roles that each partner plays vary considerably across a wide range of role characteristics. The **dependency** of one partner on another to achieve both separate and common objectives will vary. The amount of time and resources contributed by a partner may also vary extensively, as some public partners, for example, may be partners in name only.

Ninth, **the formal nature of the PPP agreement will differ.** Although many of the agreements are created as contracts, the language in terms of specificity will vary. In many cases, for example, goals are identified

without mention of specific means to achieve those goals. The implication is that the evolving nature of the partnership will lead to agreement regarding means. Or, one partner will have the discretion to choose the means without close review by other partners.

Overall, there is the expectation that the PPP is based on trust, on commitment to problem or conflict resolution, on recognition that flexibility is necessary, and that the relationship will evolve and change over time. If deadlines are not met, or public agency goals change with differing political climates, then the partners need to discuss the basis of the partnership and construct a different relationship.

3.3 The Public Agency-Private Vendor Relationship: Analysis

The relationship between public agencies and private vendors can best be viewed as occurring along a continuum. At one end is the traditional arrangement, where the private vendor works for the public agency on a specific project with a start and end date, with no expectation that there will be a continuing, partnership relationship. At the other end is the ideal partnership relationship.

3.3.1 Uncertainty

The greater the uncertainty of how best to deliver the service, the greater the service will be "custom made" for the clientele who receive the service. Contributing to the uncertainty is the lack of knowledge on the part of both public and private partners. As a result, completion of the processes and infrastructure needed for service delivery may take a longer time than originally anticipated. The partnership must be willing to accept this outcome to remain successful.

The greater the likelihood that "off the shelf" software can be purchased and applied to delivery of ATIS services, for example, the less time it will take to design and implement the service, and the more a vendor-customer contractual relationship is likely. Compared to services such as garbage collection, however, the complexity of delivering ATIS services may mean that PPP's will always be necessary to ensure success.

3.3.2 Risk

There is risk in any public-private relationship, as a private vendor may default on a contract and declare bankruptcy. With a PPP, though, the risk is much greater, and is much more varied. With a vendor customer relationship, the garbage will be collected and the road built, even if different firms complete the task because the initial firms no longer exist. When a new service such as ATIS data dissemination is the basis for a PPP, the uncertainty of technology and market may mean the service will not be provided at all if the partnership fails, with the loss of public and private investments that may be very difficult to recoup.

Since the continuum involves several dimensions, identified by the characteristics as discussed above, the relationship may "slip" or move from partnership back into contractual relationship on one or more of these dimensions, especially if there are difficulties. To the extent that this movement occurs, the partnership is not likely to succeed.

3.3.3 Cost-Sharing

The value of in-kind or "soft" contributions by the private partner may be difficult to calculate. The "overhead" or administrative costs typically added to the salaries of personnel in a contract with a public agency may be somewhat arbitrary. Alternatively, if the public partner contributes funds, and the private partner contributes software, hardware, and time of engineering personnel, for example, then the profit of the private partner from involvement in the project may be less than that compared to other projects. This situation may be acceptable to the private partner initially, as a lower return on an investment may lead to gained knowledge and product success that will translate into additional projects and enhanced reputation.

The risk of uncertain, soft cost sharing is that the PPP may not be that much different from a typical public private contractual relationship. If the public sector spends a great deal of time in "contract management", reviewing and responding to work performed by private vendors, then the there is less of a partnership and more of the traditional private vendors "working for" the public agency.

3.3.4 Dependency

PPP's can be assessed on the weight each partner plays in determining the final product or service. In other words, the amount of risk each partner has is determined in part by the degree of dependency each has on each other to effectively play the role that is determined by the partnership.

This risk and associated dependency is related to but separate from the quality of the service or product that partners produce. The greater the dependency, though, the greater the likelihood that the quality of service produced by one partner will be significantly affected by the quality produced by the other partner. If a public agency reports travel times on an arterial from which data is collected by the private partner, then the accuracy and reliability of that data will affect the traveler's perception of the publicly collected data.

To adequately define and assess the PPP in the context of ATIS deployment, then, a key aspect is the amount of data collection and fusion accomplished by the private vendor that duplicates what is collected and furnished by the public agency. For one scenario, both partners may collect data: public from freeways and some (or no) arterials; and private from arterials and few (or no) freeways. Both fuse each other's data, with the public agency providing a website, and the private partner providing a different website and value added services. If the data collected by the private vendor is not available to the public agency in a timely manner from other sources, and a significant amount of vital information is collected, then the private partner plays a viable role. This scenario seems more likely if the private vendor has placed cameras at arterials, or uses aerial surveillance means to discover congestion on arterial roads, or use reporting by travelers to determine travel times. This partnership dependency is greater to the extent that the private partner can identify recurring congestion on arterial roads. For non-recurring congestion, the public TMC is likely to receive duplicative data—from members of the traveling public calling 911, for example---within a short time after the private vendor obtains it.

In a different scenario, there is little recurring congestion on arterial roads, but a private agency will duplicate data collected by the public agency by monitoring congestion on freeways via aerial surveillance. Television and radio networks may choose to receive the privately collected data rather than

connect to the public data fusion themselves. The public agency is not dependent on the private agency for data.

3.3.5 Trust

When trust breaks down because there are indications that a private partner may not deliver a specified project, then the public agency role must switch into a contract manager role rather than partner. Additional communication and interaction must occur between the public and private partners under this situation. There must be a decision at some point to reconstitute the partnership, modifying roles and perhaps lowering expectations, or the relationship becomes a predominantly a contractual one.

What many public partners failed to recognize in the initial ITS metropolitan deployment efforts is the inapplicability of the traditional vendor-customer relationship in the development of ATIS services (DeBlasio, 2000). The more complex and uncertain the service, including the software and hardware designs, the more a PPP is the only means by which success will occur. The private partners must be accepted as equals, and included in the decision making organizational structure, e.g. on committees, if the project will be a success.

3.3.6 Coordination

There needs to be coordination of efforts between all partners. Too often, one partner may play a more passive role, allowing and/or expecting the other partner to provide information or services that may or may not be forthcoming. If the public partner plays the passive role, the danger is that a lack of coordinated effort may be perceived as the fault of the private partner, and contract management efforts commence, sliding the PPP back towards the traditional vendor customer relationship.

3.4 Benefits and Risks of Public Private Partnerships

The Strategic Plan for IVHS in America, authored by IVHS America in 1992, clearly outlines viable roles for the private sector in ITS deployment. The private sector roles include:

> "Developing base technologies for IVHS deployment;
> Conducting research and development on vehicle and

> Infrastructure hardware and software;
> Identifying and exploiting market opportunities;
> Providing IVHS services" (IVHS America, 1992: III-114)

At a minimum, private sector involvement requires:

> "A market that can be dimensioned, including a well defined service, a defined geographic area, and an understanding of key characteristics of the potential market;
>
> Reasonable, controllable risks, such as an understanding of legal liability and anti-trust risks and the establishment of an open technical architecture and standards;
>
> Promise of a reasonable return on investment;
>
> Resolution of certain structural barriers, such as assurance that a certain basic function will be carried out by the public sector or management of high, fixed up-front costs. (IVHS, 1992, III-115)

Ten years later, many of the predictions inherent in this Plan have occurred. The private sector has developed ITS technologies, products and services. In response, in many areas the public sector has created a regional TMC that includes many data collection devices. Great strides have been made in developing an open architecture and appropriate standards.

These benefits have been offset by risks that still exist. Markets in many metropolitan areas have not been exploited, defined or dimensioned. A reasonable return on investment can not be promised, as many partnerships in which public partners provide financial support are only short term, often no more than five years. Given the embryonic nature of markets for subscriber ATIS services, e.g., a short term agreement may not be sufficient for a reasonable return on investment. Not withstanding this absence of a market, by implication, the efforts that private sector vendors will make are beneficial because the public sector has neither the will nor the expertise to accomplish them.

In the ISTEA and in TEA-21, in many metropolitan Early Deployment Plans (EDP's), and in many ITS deployment efforts, there is a strong recurring theme of encouraging private sector involvement. The basis for this

encouragement recognizes the potential benefit that the private sector offers, both in terms of overcoming the weaknesses of the public sector and in terms of adding new expertise leading to better, more successful results. There is the concurrent recognition that the partnership can benefit both public and private partners, not just that private sector vendors are seen as the "rescuers" of an inadequate public sector.

Even though there is increasing acceptance among transportation professionals that building increased highway capacity by adding more roadway lanes is fast becoming infeasible for a wide variety of reasons (e.g., Briglia, 2000), acceptance of ITS solutions is far from complete. Several studies of ITS deployment experiences have indicated that the traveling public is still largely unaware of the benefits that ITS provides (e.g., Zimmerman, et. al. 2000; Jensen, et. al., 2000; Aultman-Hall, et. al., 2000). As a result, financing the planning, developing, operating and maintenance of ITS software and hardware will be difficult, even with the stimulus of federal funding.

The private sector offers an additional source of funding. Even if in-kind services and software developed elsewhere are matched with public funds, the private contribution would still have to be paid by the public sector if the traditional vendor-customer relationship existed. Furthermore, to the extent that design-build-operate agreements form the basis of PPP's, in the long term private funding can support most of the cost and even return funds to the public partners.

Up to date technological expertise is more likely to be found in the private sector. Although the public sector could hire ITS software experts, for example, they face the hurdle of getting new position descriptions approved by in-house human relations management staff. Second, attracting and retaining expertise continues to be problematic for the public sector, as salaries for transportation engineers and software developers are usually lower than what the private sector can offer.

There has also been a long standing tradition within public DOT's to hire private sector vendors to build roads, etc., rather than have such expertise on staff. This tradition coincides with the underlying assumptions of the increasing privatization efforts of governments worldwide that assume private vendors can provide a more efficient service, or less costly product—while maintaining high levels of quality—than their public sector

counterparts. To the extent that a line item in a DOT budget that identifies payments to a private vendor to operate a TMC, for example, is more politically acceptable than having the function performed by public employees, then the pressure to form PPP's is higher no matter if costs are higher.

With some PPP's, especially those found in ATIS dissemination, there is the recognition that some end products are likely to be sold to individuals rather than seen as a public good. Customized traveler information would not be sought by all members of the public and therefore should be provided by private vendors.

The partnership formed between HELP, Inc., and Lockheed Martin Management Information Systems (LMMIS) to provide electronic surveillance to commercial vehicle operators (CVO) has characteristics that reflect the benefits of PPP's. Both are engaged in marketing efforts to increase the number of CVO users of PrePass, the software that allows trucks to bypass weight stations. Even though Help still owes a substantial debt to LMMIS, a recently signed 20 year agreement reflects a long term commitment. (Briggs et. al., 1999)

Even though there have been few if any PPP successes in providing ATIS, the potential benefits outweigh the potential risks or drawbacks. Especially for those metropolitan areas that experience heavy levels of congestion[7], a strong case can be made that ultimately public policy goals will not be fully accomplished until ATIS subscriber services are more widely accepted among the traveling public.

3.5 Conflict Between Achievement of Specific Objectives: The ATIS Case

The definitions of PPP's discussed earlier identified the separate objectives of the public and private partners. They also imply or assume that achieving these separate objectives will not interfere with the achievement of the common goal or objective. In many cases, the validity of this assumption seems obvious: the private partner receives an acceptable return on investment, and the public partner achieves the goal of additional infrastructure and resulting service.

In other cases, however, the achievement of the public objective may impede the achievement of the private objective. The conflict in how to achieve objectives reflects either that the specific objectives come into direct conflict with each other, or that there needs to be a "balance" in how and to what degree the separate objectives are achieved. This is the case in the delivery of ATIS data to the traveling public. The conflict between the public goal of providing congestion data on the Washington DOT web-based traffic map for the Seattle area for free and the privately created subscription based services, for example, was recognized by Hallenbeck (1998).

The balance between the public need to control data and service delivery to ensure achievement of objectives and the private desire to let the free market drive the services can be achieved as part of the PPP agreement. The balance is established in terms of what information/services are provided at no cost to the traveling public, and what information/services require user charges or subscription fees, or generate revenue through advertising. There must be some no cost services, in order to achieve public goals of transportation management and to help generate public understanding and acceptance of ATIS.

There must also be a minimal amount of information available so that the traveling public will access the information. There is likely to be a duplication of information provided by both public and private partners, as it must be assumed that the traveling public will access either the free public website or the private ATIS services, but not both.

The privately disseminated information must have content of greater value to the traveling public than the publicly disseminated information. Otherwise, there is no incentive for anyone to access information that is not free. Although this point may seem trivial, the MDI evaluation studies for Seattle and Phoenix indicate that the value of privately added information was not sufficiently high and was likely to have contributed to the failure of PPP's in those cities.

In many cases the public seems to have assumed that the private partner will gain sufficient revenue from:

1) providing the same information available on a state DOT website at no cost to the traveling public enroute through cell phones, wireless PDA's;

2) providing additional information about travel on arterial roads either before it is provided by the public or that would not be provided by the public;

3) personalize travel information by identifying travel speeds, incidents, etc., along a route that a commuter would normally travel; and

4) personalize non-travel information, e.g., based on consumer goods purchases, that would accompany the travel information.

This assumption has proved incorrect in many instances, as 1) the information on the private website may not be sufficiently different from the no cost website; 2) if arterial data is collected by roving travelers reporting travel times by cell phone, it may be inaccurate or not timely; and 3)/ 4) personalized information and non-travel information may not be sufficiently technologically developed. The solution or balance between public and private goals must therefore involve either cutting back or not adding information to the free website to make privately provided services more attractive to the paying public.

In addition, the public partner needs to help expand the market for the private partner's products to a greater extent. Public outreach efforts should be coordinated with private marketing efforts.

3.5.1 Factors in Determining Balance

Information provided can be categorized into content, and dissemination means or mode. In choosing what information is free and what should not be, there must be the recognition that 1) the value of different information content to the traveling public varies, and 2) the effectiveness of different dissemination means also varies.

Information content can be classified as:

1) the existence of construction projects/work zones;
2) traffic speeds;
3) recurring congestion;
4) non-recurring congestion/incident information:

    a. where the incident occurred;

b. what is the resulting delay in terms of estimated travel time between identified roadway segments;

c. how much time will it take for the incident to be cleared.

5) weather conditions;
6) alternative or detour routes available.

A third factor is important in determining balance. The traveling public must be divided into those who wish to obtain information prior to embarking on their trips; and those that prefer to have information while enroute. The number of trips taken or the number of times the information is accessed also must be part of the equation. For this latter segment, travelers can be divided into commuters and non-commuters. The key distinction between the two is the assumption that non-commuters have greater flexibility in their travel plans in terms of changing the time they depart, plus they are likely to access the information at a much lower amount for any given time period.

Another factor is the legacy means of data collection already in place when public and private partners initially discuss the partnership. Added to this factor are the plans and commitments by the public to add data collection devices to the already existing highway system (most often, the freeway system).

It also must be recognized that the balance between public and private goals in any given ATIS partnership will be different from place to place. This analysis assumes a minimum public partnership role. In other words, the public goals are to minimally meet the metropolitan traffic management system needs by providing the most general, least costly, least specific information. This scenario would be the nearest to a traditional, pre or non ITS situation.

3.5.2 Information Content

Construction work zone information provides the road segments affected; the date and projected finish of roadwork; and the hours during which work

is performed and lane closure will occur. For a road widening project that would take 18-24 months to complete, for example, the information may not change during this time period unless completion work is earlier or later than expected. This information is useful on a pre-trip basis and it will be accessed only infrequently by both commuter and non-commuter since it is unlikely to change. Decisions to alter a planned route because of construction likely will be made much before the completion date.

Both public and private partners should provide this information. Since it is unlikely to change frequently, it should be conveyed via websites, newspaper maps or other means for which access will not be frequent.

Recurring congestion can be measured by identifying travel speeds along freeways, for example, that have cameras, loop detectors or wireless means to provide real-time information. In some cities, such as Phoenix and Seattle, travel speeds are reflected on a state DOT website map with no cost public access. In other cities the information is not provided and/or there is no website map.

In those cities where the website/real-time map exists, it will be difficult for the public partner to remove this information or charge the public for information that has formerly been provided for free. The balance is found in a PPP agreement that specifies that any travel speed information on any additional highways (such as arterials) will be provided only by the private partner via a similar map (in addition to duplicating the information on the public website). This information is accessible pre-trip for both the commuter and non-commuter.

For those enroute, however, information concerning travel time between road segments should be provided via CMS's by the public partner. This will also limit delay by allowing travelers to choose alternate routes.

By implication, for those cities that do not yet have real-time traffic maps, the information provided on public DOT websites should be limited. The focus should be on CMS's.

Information concerning incidents is key to the PPP agreement, as this information may be the most significant in heavily traveled urban areas. The traveling public wants to know a) where the incident occurred; b) what is the resulting delay to travel past the incident, and c) how much time it will take

before the incident is cleared and traffic flow returns to normal. The balance issue is to determine what partner should and can best provide this information.

Both public and private websites should contain notice of the incident location if it is an accident that will require a lengthy time to clear. The resulting delay depends upon lane blockage. Since the public TMC has CCTV's or algorithms that facilitate this calculation, they should provide it via the website and via CMS's for the en-route traveler. The pre-trip traveler would be most interested in alternative routes. To the extent that this information is relevant to arterials, it could be provided by the private partner and not the public partner.

The length of time needed to clear the incident depends in part on its severity. If it is a minor incident, and can be cleared by a service patrol within 15 minutes, for example, then the delay caused by "rubber necking" could be reported as recurring congestion by the public RTMC. If the service patrols reported information directly to the private partner, more specific information could be passed along to subscribers.

When the accident or incident is cleared, report of this needs to be made by law enforcement back to transportation officials. The nature of the incident management program in a given metropolitan area may determine the extent to which this occurs in a timely fashion. Again, both public and private partners should receive this information.

Weather information, especially in those areas that experience severe weather conditions, is of high enough importance to be reported by all partners. In addition, by its nature it is unlikely that severe weather conditions will influence only freeways and not arterials in a given area.

Finally, alternative route or detour information is a crucial distinction. Since suggested alternative routes are likely to involve arterials, this information could be passed along to subscribers and not via a cost free public website. For significant accidents that lead to law enforcement invoking previously agreed upon detour routes, both public and private partners should share this information via their respective dissemination means.

Effective PPP's depend upon public and private partners reaching more appropriate understandings of what is in the best interest of the traveling

public—the consumer or customer of transportation services. Achieving a balance of what information should be provided at no cost and what should appropriately be the purview of private providers begins with this understanding, and is made in light of other factors such as the severity of the traffic congestion and the public policy resources available to build data collection infrastructure.

4.0 Public-Private Partnerships: Advanced Traveler Information System Models

The choice of ATIS partnerships depends on several factors that provide a context for a specific urban transportation system. These include: the amount of congestion on the freeways and on the arterial roads, both real and perceived; the viability of arterial roads as alternatives to congestion on the freeways; and the resulting political pressure on local policy makers.

In addition, since ATIS is often adopted relatively late in the deployment of ITS, the viability of ATIS depends in large part on the nature and success of the ATMS, the traffic signal control partnerships, and the incident management partnerships. If, for example, the public sector ATMS is not well developed, the ATIS may depend heavily on private sector participation.

Several issues must be resolved before a metropolitan area decides to adopt an ATIS. These are relevant to the roles of public and private partners. They include:

1) who pays to construct the data collection system;
2) who pays to construct the data fusion system;
3) who pays for and disseminates the data;
4) the choice of data dissemination modes;
5) who provides marketing/outreach information concerning
    a) ITS/publicly provided ATIS services; and/or
    b) Privately provided ATIS services;
6) should the public sector receive revenue as part of any partnership;
7) who pays for the operations and maintenance of ATIS.

Partnerships occur, then, when one or more of the functions of data collection, data fusion, data dissemination, marketing/outreach, and operations/maintenance are shared between public agencies and private

vendors. Sharing must entail contributions of funds and/or in-kind services on the part of public and private partners, and not simply the contracting of a private vendor to perform one of the functions. Where functions are provided separately by both, sharing also means the exchange of information or data, and the coordination—or even integration--of efforts.

4.1 Public-Private Partnership Models and Strategies: A Literature Review

Various authors have identified PPP models and strategies, including Hallenbeck (1998), Jackson (1998), Orski (1996) and the United States Department of Transportation as cited in Hall and Yim (1996). These earlier efforts provide broad overviews of public private relationships and interactions. They suffer from: 1) incorrectly identifying traditional contractual relationships as partnerships; 2) not providing sufficient assessment of all five functions that comprise the ATIS PPP; 3) not indicating evolution from one model to another; 4) not reflecting a complete set of models; and 5) not sufficiently indicating under what conditions one model is more successful or effective than another. A more detailed analysis is presented in this section, followed by a section that presents models that more accurately reflect the reality of ATIS PPP's.

Hallenbeck (1998) identifies four business plans or PPP models, primarily describing public and private control of and responsibility for the functions of data collection, fusion, and dissemination. The first two models favor public control, while the latter two favor private control:

1) Public Centered Operations;
2) Contracted Operations;
3) Franchise Operations; and
4) Private Competitive Operations.

The Public Centered Operation model indicates that the public provides most of the collection and fusion, with data given away to the general public. Private partners may or may not perform separate data collection and fusion, but all would disseminate information/sell data to individual members of the traveling public.

The Contracted Operations model differs only in that data fusion is largely handled by the private sector. There are two variations: first, the public

partner could lessen the amount of data it gives away for free; and second, an asset manager could be hired to help market and sell the data.

The Franchise Operations model indicates that the public sector removes itself from the data fusion process entirely. The private partner that fuses data may collect and disseminate data in addition and agrees to give the public partners fused data free of charge. Other private partners that disseminate data must partner with the data fusion partner.

The Private Competitve Operations model indicates that the public sector partners with more than one private vendor to fuse data. This vendor may collect and disseminate data as well. Additional private vendors partner with one of the data fusion vendors to provide dissemination.

A major strength of Hallenbeck (1998)'s analysis is that it recognizes that different models provide different degrees of public and private control of ATIS. There is the implication that with greater public control, more data will be given away for free and revenue opportunities for the private partners will be lessened. The reverse is also true to some extent, as the franchise private partner is in a position to significantly develop revenue because of the exclusivity of the data fusion.

His analysis of each model, though, omits other relevant aspects that are crucial to the issue of the public achieving its goal of better transportation management and the private achieving a goal of a reasonable return on its investment. He states that the primary weakness of the Public Controlled model is that the public may lack sufficient expertise to fuse the data in ways that facilitate dissemination. He seems to overlook that the public could contract with a private vendor to fuse this data (in a traditional vendor customer relationship) and retain control by operating the TMC/server. Or, there is one PPP just for data fusion, with the agreement that the data fusion vendor does not contract separately with other vendors[8].

More important is 1) the content of data that is collected; and 2) the percentage of relevant freeway and arterial coverage. If public collection is focused on transit information and on travel speeds and incidents for a limited portion of freeways only, then a private vendor could generate revenue by collecting data for the remaining freeways and incident data (if not speed data) for the arterials. This may be accurate no matter which model is adopted in terms of data fusion.

The marketing and public outreach functions are given limited analysis in any of the four models. Although it may be assumed that the private sector knows more about marketing than DOT's, there is no indication that vendors disseminating ATIS information have sufficient expertise or will invest sufficient funds to market successfully. Funds for public outreach may be limited as well. Without these functions, it may not matter how much data is given away for free if very few members of the traveling public know it is available.

The success of a PPP may not be dependent on adopting one of these models, but on the dissemination means chosen and the willingness of the traveling public to subscribe to customized information. If the public sector disseminated information only through VMS and HAR, a private vendor website with real-time traffic speeds may be more important in determining revenue generation than which vendor is fusing the data.

Overall, the models are presented as if metropolitan areas have the ability to choose one or the other, not recognizing to what extent infrastructure and legacy agreements may be in place prior to any interest in creating a PPP. If a given metropolitan area has already invested in some data collection and created a regional TMC but has yet to interact with private vendors, it should adopt a different model than if virtually no data collection exists and there is no TMC.

Jackson (1998) identifies nine models or strategies, describing each briefly in terms of data collection, fusion and dissemination and providing pro's and con's. These models are:

1. The Public Model
2. Contracting
3. Franchising
4. Competitive Licensing
5. Asset Management
6. Outsourcing
7. Cost Sharing
8. Joint Ownership
9. The Private Model

In comparison to Hallenbeck (1998), her Public Model and Franchising are the same as the Public Centered Operations and Franchising Operations models, while Competitive Licensing is the same as Private Competitive Operations. Asset management is viewed as a separate model rather than a variation of Contracted Operations. The Contracting (#2) and Outsourcing (#6) models are not partnerships but reflect traditional vendor customer relationships, while Cost Sharing (#7) should not be a separate model as all PPP's contain cost sharing.

The final two models are useful additions, as the Joint Ownership recognizes that the private sector can collect significant amounts of data along with the public sector. In some metropolitan areas, the private sector performs almost all of the ATIS functions, as reflected by the last model.

Although the comments listed under pro's and con's are useful, Jackson's typology suffers from the same problems as do the four models posed by Hallenbeck. There is little information that would be useful to metropolitan areas that wish to deploy ATIS PPP's.

4.2 Effective Partnership Models: Guides to Metropolitan ITS Deployment

The following sections identify six models that can act as guides to officials in metropolitan areas considering creating a PPP. After briefly describing these models, some initial thoughts are offered concerning how they can be usefully analyzed and how effective they may be. Various existing PPP's are then analyzed in more detail, identifying "lessons to be learned" and assessing success. Where appropriate, references are made to the Orlando/Central Florida experience.

Although variations are "endless", especially when the issues of what data is collected and the types of dissemination modes are considered, general partnership patterns are beginning to emerge. In the following patterns or models, the public may collect the data by paying a private vendor to develop the software and hardware necessary to create and operationalize a server. The server is operated, though, by public employees, or private employees are hired in the context of a traditional customer-vendor relationship. As such, it is assumed that the data collection and/or fusion is performed by the public.

PUBLIC CONTROL –MODELS A, B, AND C

A) PUBLIC CONTROLLED--Public collects, fuses, disseminates; private collects, fuses, disseminates; no payment is exchanged; little or no data is exchanged; no coordination of marketing/public outreach---Portland, NITTEC (Buffalo), Cleveland, Grand Rapids, Atlanta, San Antonio, Orlando

B) PUBLIC STIMULATES/FUNDED: Public collects data, fuses data, disseminates data through website; public contributes funds for "start up" costs of private ATIS services; private disseminates data through website and additional modes such as cell phones, pagers, kiosks; data provided by public for free to private vendors; minimal coordination of marketing/public outreach---Seattle, Phoenix

C) PUBLIC STIMULATES/NON-FUNDED: Public collects data, fuses data, disseminates through telephone; public stimulates private participation by encouraging data use and organizational participation, but without providing "start up funds"; private disseminates via a wide variety of dissemination modes; minimal coordination of marketing/public outreach---TravInfo FOT San Francisco

PRIVATE CONTROL—MODELS D AND E

D) PRIVATE PARTNERED: Public collects data, fuses data; private also collects and fuses data; private disseminates data through website, telephone, etc.; public pays private to perform all three functions and to perform marketing/public outreach---TravInfo II San Francisco

E) PRIVATE CONTROLLED: Private collects data, fuses data, disseminates data; public pays private to perform all three functions and to perform marketing/public outreach; public pays private initially with the expectation that part of any profit will be returned to the public---Artimis, Cin/N. KY; Partners in Motion—Washington, DC; SunGuide---South Florida

NON-PROFIT

F) NON-PROFIT BROKERED: Public collects data; private disseminates data; non-profit fuses data and contracts with private for data dissemination; non-profit provides marketing and public outreach---TANN in Los Angeles

The first five models can be grouped into public controlled (models A, B and C) and private controlled (models D and E). In the first group, the public sector has paid for and still controls through operations and maintenance much of the data collection and data fusion functions. There is likely to be an extensive public-public partnership, especially with Model B, that supports ATIS through a regional (or even statewide) TMC or a series of network connected local TMC's. There is also significant data dissemination performed by the public sector, even though there is the expectation that the private sector will increasingly provide ATIS services that will reach greater numbers of users over time.

In the second group, a much greater amount of data collection and fusion is performed by the private sector. Data dissemination is also largely privately provided. For these functions, the public partners pay the private partners. Daily operations and maintenance as well as dissemination are all controlled by the private sector, even though the partnership agreement provides public partners with some degree of oversight and/or approval roles.

Interpreting the models also means that specific metropolitan areas have largely begun PPP's using one of the six. In some cases, though, there has been an evolution from one model to another. Movement has been within the two groupings, from A to B or A to C and from D to E, or from the public controlled models to the private controlled models.

In addition, it is best to view each model along a continuum, as some metropolitan areas whose experiences would place them in model A, for example, are closer to model B or C than others. Some areas in model A offer ATIS services on a limited basis, e.g., CMS only. As they add ATIS services, e.g. a website reflecting construction activity and travel speeds, they may find themselves moving closer to another Model if they find that congestion relief, for example, is not as great as hoped.

For those areas in Model B there will be differences according to the number of different ATIS services provided through PPP's. To some extent, there may be an evolution here as well, as some areas may wish to start with cable television and later add a pager service, for example.

4.2.1 PPP Effectiveness: Model Assessment

For some metropolitan areas, the model that presently reflects their PPP is the most effective. For others, evolution to another model may mean higher cost accompanied by greater risk—a situation that they are unwilling to commit to at present, even though effectiveness is not as great as possible.

Criteria to assess include the general dictum of lives, time and money saved by the traveling public. There is the assumption here that the lowering of congestion will lead to fewer accidents and fatalities, and greater amounts of money and time saved.

To fully assess the impact of the PPP, though, the impact of public-public partnerships must be considered as well. A politically acceptable level of lowered congestion may be achieved via improved traffic signal coordination and increased service patrol/incident management activity with ATIS provided through CMS's. Also, some metropolitan areas will have more public-public ATIS services, such as information about bus arrival times.

More specifically, the number of users of an ATIS service is a crucial measure. Generally, the greater the number of users, the greater the potential for trip diversion and the greater the chance that congestion will be lessened. This measure must be identified by type of service and/or information content. The impact of a 1,000 website hits may not be the same as a 1,000 users of a pager service.

To the extent that this measure is most significant, the adoption of a given model is narrowed. Model C, for example, seems to support the following:

> selecting participants is often more of an "inclusive" rather than an "exclusive" process, and any group that adds net value to the ATIS may be encouraged to participate. (Hallenbeck, 1998, p. 20)

To the extent that the public partner wishes to broaden the number of users, i.e., travelers who are aware of the ATIS, Model C may not be the most appropriate, as it may attract private vendors who ultimately will not succeed. It should be assumed that failure by private partners may have a negative impact on ATIS acceptance in a given market. The experience of the TravInfo FOT is an appropriate example. The assumption that all interested private partners should be encouraged to compete in a given metropolitan market and that competition among private providers will drive out the unsuccessful is not necessarily the best approach to build effective PPP's.

If Model B can not be adopted because of a lack of funds, then the public agency should establish some criteria, perhaps through the creation of a business plan, that screens or reviews potential private partners. The public agency, then, may not accept a partner if it feels the partnership would not succeed.

Overtime, as the desire for more specialized ATIS services develops, there may be a natural progression from Model A—under complete public control; to Model B—in which the public pays to stimulate specialized private ATIS services; to Model D—in which the public pays private vendors to furnish all ATIS services. This evolution occurs because the public sector lacks the will, either politically or financially, and/or the expertise to establish specialized ATIS services that ideally are funded via user fees and or advertising. In addition, as experience with TravInfo has shown, for example, private ISP's are not yet aggressively seeking to come to most urban areas to sell personalized ATIS services.

Under Model A, the type of ATIS provided via websites, HAR and CMS's is more directed to the general traveling public and is not specialized or personalized. It is also less likely to provide significant information concerning incidents and traffic speeds on arterial roads. For some metropolitan areas this information may be sufficient to relieve congestion in the short term. Model A partnerships that work effectively may reflect strong public-public partnerships with relatively few private partners and limited ATIS dissemination means. The higher cost associated with moving to Models B, C or D, may prohibit change in this direction.

Experiences with those metropolitan areas under Model B have not been successful according to generally accepted measures of numbers of subscribers or users and resulting profit or return on investment—with the possible exception of travel information on cable television stations. AZTech and Smart Trek PPP's, for example, have experienced failures or limited success with personalized ATIS services.

Ultimately, Model B PPP's must be judged according to the extent to which the "start up" costs lead to a private venture making a profit and continuing to provide the ATIS service, expanding it as time progresses. The agreement that governs these partnerships must be specific regarding the length of time the service is provided and the contribution made or expected to be made by all partners after the initial funding has expired. What should be avoided is the disappearance of the private vendor after the start up funding has been totally allocated.

With Models D and E, a key issue is whether or not one private partner should have a "monopoly" on accepting fused data (or fusing it itself) and disseminating it. Given an uncertain market for specialized ATIS services, a monopoly may allow one private vendor a better opportunity to establish a viable market and succeed. On the other hand, public partners risk losing ATIS services if the one vendor does not succeed, or are faced with contributing more funds than originally anticipated to continue providing the service. The value of open competition is that incentives to succeed may be greater for the private vendors involved. Lower prices to consumers may also result along with higher quality services. Open competition allows one vendor to specialize in one type of ATIS dissemination, e.g., through pagers, in many different markets, increasing expertise and greater profit on a nationwide basis. The monopoly situation may not provide enough incentive for the one vendor to provide as wide a range of services.

4.2.2 ATIS Business Plans

An ATIS Business Plan (BP) is a document that outlines in usually broad terms the nature of a public-private partnership as it is relevant to ATIS deployment. The BP should be considered a dynamic, evolving document that can and should be changed as the long term relationships among public and private partners evolve.

It is most often created by the public agency that assumes the leadership role in deploying ATIS in a given metropolitan area. It identifies—and by implication adopts—public transportation policy for that area. It can contain goals and objectives, and identify the means by which they can be achieved. It conveys a view towards PPP's that can range from "strongly encourage" to phrases that are more moderate in intention.

A first step should gauge the market potential for ATIS services. To the extent that the size of the market, the likely population that would use these services, and other geographical and demographic considerations can be determined, they should influence the BP creation. Other characteristics, such as the availability of public infrastructure, and the amount of public and private revenue needed to meet market demand could influence the nature of the BP at any point in time (Hallenbeck, 1998).

A metropolitan area that is presently in Model A should create a BP if it wishes to adopt PPP's that fall into the Model B through F categories. At a minimum, the BP will help the public partners to better prioritize the ATIS services they wish to support. For example, public partners can identify the extent to which they wish to support customized or personalized services, in comparison with only offering real-time web-based traffic maps and telephone services. To the extent that the BP can evolve through a series of interactions among public and private partners, it will be more likely to be accepted.

Throughout this paper various BP's are analyzed as they are relevant to Model effectiveness. These include those created by AzTech, Washington State DOT, Florida State DOT, and the I-4 Corridor (Central Florida).

4.3 MODEL A: PUBLIC CONTROLLED

Public collects, fuses, disseminates; private collects, fuses, disseminates; no payment is exchanged; little or no data is exchanged; no coordination of marketing/public outreach---Portland, NITTEC (Buffalo), Cleveland, Grand Rapids, Atlanta, San Antonio, Orlando

This model does not really reflect a significant public private partnership, as data exchange is limited or non-existent. It is significant, however, as many of the 78 nationwide metropolitan areas deploying ITS can be placed in this

model. There are several dimensions that are appropriate for this model. These include:

1. severity of traffic congestion—both real and perceived;
2. tradition of privatizing government services;
3. interest in developing PPP's; and
4. strength of public-public partnerships/regional focus.

The traffic congestion problem is viewed in several ways. At one end of the dimension, there are metropolitan areas for which it is not severe according to generally accepted measures[9]. Alternatively, it may not be viewed as severe by the traveling public and therefore not a highly prioritized public policy issue. For some cities, congestion is viewed as a growing problem but not yet severe. Predicted strong population growth leads to this conclusion. At the other end of the spectrum, congestion is severe and is a very evident public policy issue.

The response to traffic congestion varies as well. The lack or absence of response is due to several factors: 1) low levels of congestion; 2) lack of regionally based public-public partnerships; 3) low interest in developing PPP's; and a lack of funds to invest in ITS. Where there is a response that includes ITS, it may be the result of efforts of a small group of state DOT officials, for example, that collect a small amount of data from cameras and loop detectors found on a limited amount of freeway miles. They may also implement HAR, VMS's, or establish service patrols but do not have the support from other local government public agencies to provide a wider range of ATIS services.

At the other end of the response dimension, some metropolitan areas reflecting this model may have strong regional support and choose to focus efforts on advanced public transportation and other publicly supported ITS modes rather than forming PPP's. Accompanying this strong public response is the perception that there would not be a sufficient market to support personalized, subscriber-based services.

4.3.1TransPort (Portland)

ITS deployment in Portland represents a natural evolvement of cooperation among state and local transportation agencies. Although the roots of ITS deployment in Portland data back almost 20 years to the first ramp meters on

area freeways, the most recent efforts began with the creation of an Early Deployment Plan in 1993. The same group came together to develop an MDI grant proposal, submitted in 1996. To create this proposal, a public-public partnership was formed involving the Oregon Department of Transportation (ODOT) as well as city and regional transportation agencies. Out of this effort, which established a plan to share resources and staff to deploy ITS, TransPort was created. It represents a collaboration among ODOT, City of Portland, The Tri-County Metropolitan District of Oregon (Tri-Met—the Transit agency) and METRO (the Portland area Metropolitan Planning Organization) (Mitchell, 2000).

With a light rail system operating in downtown Portland, much of the emphasis of TransPort is on developing and expanding mass transit. In addition, Corridor Incident Management Teams (COMET) have been formed. Traffic signal coordination has increased, as many of the local communities allow ODOT to assume control during the evening and weekend hours. Cooperative efforts to create a new fiber optic network is managed by a Cooperative Telecommunications Infrastructure Committee that represents cooperation among agencies and governments beyond transportation (ICDN, 2000).

In many ways, the ITS deployment experience in Portland represents a strong public response to a congestion problem that is viewed as growing (the Portland Vancouver area is ranked 8th out of 68 metropolitan areas in terms of having the worst congestion):

> Traffic on Portland area highways has doubled in the last 20 years. Travel speeds are gradually dropping, as congestion becomes the rule rather than the exception. (Mitchell, 2000: 10)

With a strong history of public-public cooperation and partnership, interest in involving the private sector in partnerships seems limited.

4.3.2 Navigator (Atlanta)

An extensive ATMS was built and deployed in time for the 1996 Summer Olympic Games in Atlanta. It consists of a regional TMC connected via a fiber optic network with seven other Transportation Control Centers (TCC's) in the five Georgia counties of Clayton, Cobb, DeKalb, Fulton and

Gwinnett, the City of Atlanta, and the Metropolitan Atlanta Rapid Transit Authority (MARTA). This freeway management system consists of:

> 66 color surveillance cameras, 41 CMS, 318 video detection system cameras, and five ramp meters (Presley, et. al., 1998).

These are placed along 220 centerline miles (USDOT, 1999).

In addition, there is an aggressive incident management program that consists of 26 Highway Emergency Roving Operator (HERO) vehicles, operating 24 hours 5 days per week and 10 hours per day on the weekends. Also a Motor Vehicle Emergency Response Team is available. A region-wide incident management team oversees operations.

The Atlanta region is ranked the 8th most congested urban area by the 1999 TTI Urban Mobility report (Schrank and Lomax, 1999). Although the Olympics galvanized federal and state support, congestion has long been recognized as a problem. Average man miles driven by Atlanta residents was 200 in 1990; 243 in 1997; 263 in 1998. By 2020, the number driven will be twice the number that exists today (Shackleford, 2000).

The public response to congestion has taken the form of a strong state DOT working together with area local governments to form a decentralized network of traffic management and control centers. The information produced by this network provides the basis for an aggressive incident management program and a real-time speed map. At present, PPP's are not envisioned, as the Navigator software is not adaptable for private sector use.

4.3.3 Cleveland and NITTEC (Buffalo/Niagara Frontier)

For both Cleveland and NITTEC in Western New York, the publicly supported collection of traffic information is limited, as there are few cameras, and in-road loop detectors are used primarily for traffic counts but not as part of a ATMS (Cleveland). In these cases, the ATIS is largely provided by private partners such as Metro One Network (Cleveland), with a certain degree of reliance by the public sector on information collected by the private sector. In both of these cities, data is disseminated primarily by HAR.

4.3.4 Orlando

Orlando is an example of this model at the present time. It differs from other metropolitan areas in that the traveling public sees freeway congestion as a major problem. In addition, cooperation among Orlando public agencies is limited (although growing). Some ATIS information is available on a public website (CATSS website at UCF for I-4 information), but information is not complete for all freeways (not yet for those under control of the OOCEA) and it provides a limited amount of information.

The private sector role is primarily played by Etak and Metro One Networks. These firms collect traveler information data and sell it to area radio and television stations. They do interact with the Regional TMC.

4.3.5 Conclusion

Metropolitan areas that currently adopt this model fall into reflect a wide range of ITS deployment efforts. Some have responded with a strong public cooperation, emphasizing public transportation (Portland) or incident management and public provided traveler information (Atlanta). Where public-public partnerships are not strong, other areas are still in the process of providing sufficient public responses to congestion. As this occurs, there is the potential for PPP's to occur along with public based deployment of service patrols and real-time speed traffic maps.

4.4 MODEL B: PUBLIC STIMULATES/FUNDED

Public collects data, fuses data, disseminates data through website; public has contributed funds for "start up" costs of private ATIS services; private disseminates data through website and additional modes such as cell phones, pagers, HAR; data provided by public for free to private vendors; minimal coordination of marketing/public outreach---Seattle, Phoenix

In these instances, the primary public partner, usually the state DOT, has committed to regional traffic management services. Often a traffic management center has been in place for some time. In Phoenix, for example, ADOT built the Freeway Management System in the early 1990's. In Seattle, the SWIFT FOT enabled the WS DOT to support the "ITS backbone" –developed and operated by the University of Washington---that

served as the basis for ATIS. It was then expanded under the Smart Trek MDI.

Operations and maintenance are also supported by the public partners. In Phoenix, the regional (or state) TMC is supported by ADOT, with Maricopa County DOT supporting a smaller county TMC.

The private partners primary responsibility is to disseminate the data. They do not furnish additional cameras, for example, that collect data to be fed back into the public data fusion process. Even though they may collect data through independent means, much of this information is collected by public means as well. A traffic helicopter may see an accident, for example, but the information about the accident is likely to be called in to a Public Service Answering Point (PSAP) by a traveler using a cellular telephone.

The issue of collecting data from arterial roads in addition to freeways is a troublesome one for most partnerships. Private partners want as wide a base of information as possible, while state DOT's may not see the value of expanding data collection beyond freeways.

The choice of which means to disseminate the data is the result of collaboration between public and private partners. In Seattle, the official WSDOT business plan welcomes private partners, as long as no additional data collection requirements are placed on the public sector.

Because of private partner failures in Phoenix, AzTech has chosen a different method to add partners in Phase II—the operational phase. Here there is a greater concern with success in dissemination of data.

4.4.1 AZTech

The official start date of the AZTech project is listed as October 24, 1996. This is the day that Secretary Pena formally announced the winners of the MMDI awards. AZTech received $7.5M in Federal funds. AZTech was created as a seven year project: the first two years constituted the implementation phase (Phase I), and the operational phase (Phase II) is scheduled for the final five years. In Phase I, the project used the federal funds to leverage over $24M of additional public funds and over $5M of private funds, for a total project budget of over $37M.

4.4.1.a The AzTech Business Plan

For both phases, the AZTech Business Plan applies. It is a general statement of the PPP vision and philosophy expressed by AZTech:

> The AZTech ATIS business model is one of a public/private partnership that will enable the private sector to eventually operate a self-sustaining ATIS. The philosophy is that the public sector will fund and assist with the public sector data collection and fusion at their own cost. This data will then be made available free of charge to the private sector for dissemination to the traveling public. However, all value added information that the private sector add to the data stream must in return, be provided at no cost, to all the participating public sector partners. (Pretorius, Powell and Upchurch, 1997)

More specifically, the AZTech Business Plan lists the following objectives:

1) maximize availability of traveler information by transmitting to the greatest number of users in the shortest possible time;

2) create an environment that fosters market development by: encouraging product and service providers through open and flexible architecture combining it with a national roll-out;

3) creating a system that is self-funding through:
   advertising
   subscription fees
   transaction fees (Pretorius, Powell and Upchurch, 1997)

Any assessment of the AZTech PPP's must include the extent to which these objectives have been met. The Business Plan does not identify standards—how many users, what time period--for the first objective, nor is it specific regarding dissemination means and information content. The plan apparently does not recognize that the more objective one is achieved, the less the second and third objectives may be achieved. Information such as travel speeds on freeways, for example, can be disseminated to a great many travelers through television or HAR. If the traveler can make effective

decisions to travel via alternate routes with this information, then that same traveler is less likely to subscribe to a more personalized service (Jensen, et. al, 2000).

To achieve self sustaining ATIS, the public partner funded data collection, including infrastructure and software and hardware system development, by contracting with various private vendors.[10] It also has supported data fusion by funding the "wholesaler" ISP, the ETAK Traffic Work Station that in turn has provided data to ISP's who intended to disseminate data through the more specialized means of pagers, cellular phones, kiosks, etc. Other than through the real-time traffic map found on the AZTech website and via CMS's, the public partners do not disseminate data to the traveling public.

What is missing is a recognition or understanding of the information that is most relevant to decisions made by the traveling public. The results of a customer or traveler survey may have indicated that some dissemination modes were more preferable to others. Placing this information in the business plan could have led to greater customer subscriptions.

4.4.1.b Implementation and Evolution

The ADOT Freeway Management System (FMS) furnished the infrastructure basis of the AZTech Project. The AZTech Server was designed to collect and fuse data from a variety of sources, including the FMS as well as from the Smart Corridor projects dealing with traffic information from arterial roadways, and from the Transit system. Two private partners joined the project from the start: TRW, which designed, created and implemented the AZTech Server, and ETAK, which developed an ATIS server that interfaced between the AZTech server and other ISP's. After the project started, various other private vendors participated, including US West who helped set up telecommunications links between the AZTech server and the municipal TOC's.

4.4.1.c System Design

As stated in the FWHA Guidance for Implementation of AZTech, system design consists of:

> taking the recommendations from the planning phase, converting those needs into hardware/software requirements, and formulating

> the equipment needs into contract documents. (AZTech Implementation Plan, 1998, p. 5)

The roles and responsibilities for system design are indicated in Table One below (AZTech Implementation Plan, 1998, p. 6).

Table 1-1 AZTech Design Responsibilities

AZTech Element	Designer
1. AZTech server	TRW
2. Communications system	AZTech, TRW, US West
3. Central software	TRW, Kimley-Horn, Computran, ETAK
4. AZTech workstations	TRW
5. Arterial detectors	AZTech
6. Arterial video cameras	AZTech
7. Arterial variable message signs	AZTech
8. Transit AVL	ADS
9. Fire Department interface	TRW
10.Handheld computer software	Fastline, ETAK
11.Kiosks	AZTech
12. Pagers and e-mail	ETAK

The varying roles of public and private partners are easily reflected by this table. The role of AZTech in developing the AZTech Server and associated software is minimal, as private vendors and partners are given major responsibilities. The PPP's in these areas recognize that the private partners have the expertise that the public ones do not. The arterial data collection and VMS's, (elements 5-7) are the responsibility of AZTech, indicating traditional contractual relationships in choosing the appropriate product and installing it, rather than creating a PPP. The private responsibility in the handheld computer software, and the pagers and email elements reflects the AZTech Business Plan philosophy of eventual, wholly private, self-sustaining more specialized ATIS dissemination means.

Finally, the elements that are shared, such as the communication system, indicates expertise from the municipal public partners managing local TOC's, and communicating to and from the AZTech Server. In addition, PPP's are not likely here, as the public partners assume responsibility for the everyday operations of the TOC and AZTech Server after the communications network is completed.

During Phase II, the operational phase, AZTech also has supported four additional private partners as they establish an ATIS service. Nineteen proposals were received from 32 private firms. These were reviewed during the fall of 1998, with four private partners chosen. These are Cue Corporation, Maxwell Technologies/Smart Route, Post Buckley Shuh and Jernigan (PBS&J)/Traffic Station, and TranSmart.

Cue Corporation was paid $310,000, with their matching contribution totaling $283,000. It was to develop Traffic Net, a project to broadcast real-time traffic information over an FM station; and Transit Net, a system of information concerning bus schedules and stops to prospective riders in the Phoenix area. Their project was expected to be completed by September 21, 1999[11].

Maxwell Technologies/Smart Route is to develop web-based traveler information services, plus route-specific, personalized traveler information services.

PBS &J initially was paid $94,500 for architecture inventory and mapping the AZTech architecture against the national architecture. In conjunction with Traffic Station, PBS&J also partnered to provide traffic information via digital television, pager, dial-in telephone, and the internet.

TranSmart Technologies and the American Trucking Association received $150,000, with a matching amount form ADOT and the two private vendors of $194,000.They will develop a CVO Online project. Their project was to have been completed by December 31, 1999.

4.4.1.d Key Factor Description

Who pays to construct the data collection system

Most of the data collection system was paid for by the public sector, with USDOT and ADOT contributing funds to build the AZTech server. TRW, the major private partner, contributed hardware and software to the project. In addition, public funds added cameras and loop detectors to expand the coverage of the existing FMS and to selected arterial roadways. Public funds also supported the telecommunications system between the AZTech

server and municipal TOC's. Upgraded traffic signal coordination and data collection efforts were also publicly funded.

Data was also contributed by Metro One from aerial surveillance and roving roadway reporters. No other means of data collection were furnished by private partners.

Who pays to construct the data fusion system

The public supported the construction of the data fusion system, including the AZTech server, and the ADOT TOC that supports the FMS (created in the early 1990's). Etak was paid to create the ATIS server that interfaces with the AZTech server, and the Metro One data, as well as with several private partners that distribute specialized ATIS services. Etak contributed hardware and software to the partnership. In Phase II, PBS &J and Traffic Station were paid to develop another link between the AZTech server and Traffic Station ATIS services, including dissemination via cellular telephone.

Who pays for and disseminates the data

AZTech has committed public funds for the five year operational period that is part of the seven year MDI project (1996-2003). This included upgrading of the ADOT FMS website, as well as initial funding for Etak (which contributed some dissemination means), Fastline—data dissemination via handheld PC devices; and Scientific Atlanta—in vehicle information means. These were the private partners that joined at the start of AZTech in 1996.

Since the latter two partners have had limited success, they were replaced by four additional partners at the start of Phase II. All four have received funding from the public to initiate their efforts.

The choice of data dissemination modes

Since ITS deployment was relatively untested in 1996, the choice of dissemination modes was largely a response to the private vendors who expressed interest. Only four private firms responded to the RFP to set up the MDI at that time.

Marketing/Public Outreach Services

There was a concerted public outreach effort by AZTech from the start of the project. A variety of efforts were made by the public partners, including a) publicizing AZTech at a wide variety of conferences, meetings, and trade shows; b) creating shirts, pins, and other items reflecting the AZTech logo; c) creating a brochure, a video, and a power point "executive" presentation that could be distributed to various groups; and d) public service announcements and press releases.

A marketing strategy was also proposed by Etak, who agreed to recruit additional private vendors to disseminate more specialized ATIS services.

Should the public sector receive revenue as part of any partnership?

The AZTech Business Plan does not include any expectations for public receipt of revenue. There is a "barter" arrangement identified, as the public will provide data without charge to private partners. In return, whatever private partners add to this data is to be available to the public partners free of charge. It is unclear whether the goal of a self-sustaining ATIS service implies that the operations of the Etak server should be supported through funds paid by the private ATIS service providers.

Who pays for the operations and maintenance of ATIS

Since the data collection is largely in the hands of the public sector, there is the expectation that this part of the process will be maintained by public partners. ADOT's Freeway Management System, the Incident Management System as well as the traffic coordination system along eight identified corridors remains in the public hands. Also, the data fusion capabilities of the AZTech server are expected to be maintained by public partners.

The ATIS services continue to be supported in part by public funds at the start of the operations Phase II. Whether additional public funds will be necessary is unclear at this point in time.

4.4.2 SmarTrek--Seattle

The State of Washington DOT (WSDOT) entered into public private partnerships as part of its response to the MDI RFP and subsequent award to create "Smart Trek". Many of the partnerships built upon relationships that had been formed with the Seattle area-Wide Information for Travelers (SWIFT).

4.4.2.a Background: Seattle area-Wide Information for Travelers (SWIFT)

SWIFT was proposed by a team of public and private partners on January 6, 1994 in response to a September 1993 RFP issued by FHWA for field operation tests. SWIFT involved a test of an area wide ITD communications system. Data was collected from several public and private sources and transmitted via a flexible FM sub-carrier High Speed Data Collection System (HSDS). The University of Washington was retained to provide data collection and fusion. Data was disseminated by three means: a Delco in car radio; a portable computer; and a Seiko watch. A total of 690 users tested these three dissemination devices.

The total budget was almost $7.5 million, with the federal government contributing 61%, private partners contributing 25% and other public partners submitting 14%. The project began with an MOU signed by all SWIFT team members on October 18, 1994. With a signed agreement between WSDOT and FHWA completed on January 10, 1995, the project began.

Five partners contributed data. Three of these were public: WSDOT, sending freeway loop data; University of Washington, providing ride sharing data (called Smart Traveler); and Metro Transit contributing bus locations and schedules. The two private partners were Etak/Metro One, sending traffic incidents, events, advisories and closures; and Seiko Communications Systems, providing time and date, personal paging services, and general information.

By June 30, 1996, the SWIFT test was essentially complete. An evaluation followed, with data collected during July 1, 1996 through September 27, 1997. (Perez and Wetherby, 1999)

4.4.2.b SWIFT Institutional/Partnership Issues

As part of the SWIFT evaluation, institutional issues were studied (Wetherby, 1998). Although the partners felt that the issues discussed had been easily overcome and did not diminish the success of SWIFT, the study does offer insights that may be relevant to ITS deployment in other metropolitan areas.

The issues discussed with all the partners were placed into three groupings:

1. Organizational/jurisdictional
2. Financial
3. Legal/regulatory

The major issues in the first category centered about the clarity and understanding of roles and responsibilities of each partner, including what were the expectations and meaning of public-private partnership. Some partners felt more urgency to complete their tasks because SWIFT was an FOT with results that could be potentially implemented on a larger scale, not something that was a research and development project. Because of a lack of clarity regarding expectations, some partners performed tasks that were in addition to the responsibilities they had when the began the project.

The differential roles of the public and private partners also required discussion, as both partners differing objectives needed to be clarified before the Teaming Agreement and related contracts could be finalized. The primary private partner objective was to make a profit; while the public objective was to provide additional services to the traveling public. Both had to accept these objectives as they understood the partnership.

Financial issues, including those regarding procurement/acquisition, contracting/auditing, and market uncertainty caused deployment delays. These issues were ultimately overcome. The regulatory and legal Issues included concerns about property rights. In addition, some public partners felt uncomfortable about the right of the private ones to make money.

The MOU that constituted the SWIFT Teaming Agreement was not a legally binding contract, but one that allowed each partner the freedom to leave the partnership (at any time). The result was that each felt it could better

contribute to develop the project without being legally bound. The lead partner along with WSDOT was Seiko.

Finally, there was the issue of whether UW could license and generate revenue from the software developed for SWIFT. Some private partners felt that making money should be reserved for private partners. Some felt the PPP had the incompatible goals of making money v. making travel easier for the public.

4.4.2.c Smart Trek Public-Private Partnerships

The partnerships formed during SWIFT carried over to the Smart Trek MDI. Smart Trek included two of the public partners from SWIFT: WSDOT and the University of Washington. In addition, several suburban cities, King County Metro Transit, Washing State Ferries, King County DOT and the Port of Seattle joined Smart Trek. Of the private partners that became part of ATIS partnerships, ETAK and Metro Networks remained from the SWIFT FOT.

Unlike AZTech, private partners were contracted to help manage several different aspects of project management, as two partners were designated as deputy project managers, one for system integration and one for operations and maintenance. Of the ITS "bundles" created as part of the Smart Trek organizational structure—Transportation Management Systems, RMMTI Systems, Transit Management and Electronic Commerce, Emergency Services and Incident Management, and Public Outreach and Marketing—four were headed by a private sector representative.

In addition to ETAK and Metro Networks, ATIS private partners initially included Boeing, Fastline and Microsoft.

Fastline offered software called Personal Travel Companion. During the MDI project, users could download the software for free and load it into their portable personal computer. A variety of travel information was available, including real time traffic speeds, incidents and road conditions; transit information and detailed street maps with navigation instructions.

Fastline's marketing strategy was to get the word out via a "one time shot" using means such as advertisements on Metro buses. Of the approximately $300,000 total non-recurring budget (non including share of the ITS backbone), of which Fastline contributed $65,000 of in-kind services, only $14,500 was allocated for marketing. (don't know if any of the in-kind amount was for marketing). This non-sustaining approach attracted very few users. Given the approach of allowing the software to be downloaded for free, with the intention of charging subscribers at a later date, the profitability as well as usage was most likely very low. (Jensen, et al., 2000)

Microsoft intended to provide traffic information into its "Sidewalk" entertainment guide for Seattle and other MDI cities. This project was cancelled before it could be fully implemented. The success of the WSDOT website may have been a major reason for the cancellation of the Microsoft project (Jensen, et. al., 2000).

The ETAK Traffic Work Station that was built as part of the SWIFT project was expanded to receive information from additional ETAK also had plans to develop cooperative agreements with other ISP's, developing information that would be disseminated by pagers.

4.4.2.d Washington State ATIS Business Plan

One of the significant results of the Smart Trek Program is the development and adoption of the Washington State ATIS Business Plan (Bradshaw, Hallenbeck and McIntosh, 1999). Although in some respects it is similar to the AZTech Business Plan, it provides more detailed analysis of the issues that must be resolved before ATIS services become more widely accepted.

In July 1996, the Washington State Transportation Commission strongly supported ITS development in Washington by adopting policy that urges the state to:

> "Continue WSDOT's lead role in coordinating the statewide implementation of ITS technology, working collaboratively with cities, counties, transit agencies, other state agencies and the private sector"

With regards to developing partnerships, it strongly urged transportation agencies in Washington to:

> "Be aggressive in forming partnerships among state federal, and local agencies where relevant;
>
> Be aggressive in seeking and forming partnerships with private companies that have technological resources and knowledge applicable to ITS applications;
>
> Require a significant benefit to the public in any public/private technology partnership and pursue advanced technology applications that allow access and use by the broadest possible spectrum of the traveling public." (Washington State Transportation Policy Catalog, as cited in Bradshaw, et. al. 1999).

To implement these policies, the WSDOT Business Plan has adopted the following three goals:

1. Promote the safety and efficiency of WSDOT transportation facilities by providing traveler information services as a by-product of transportation management systems;

2. Encourage private sector investment in ATIS services as a way to further leverage WSDOT data resources and to further promote the safety and efficiency of WSDOT transportation facilities;

3. Reduce WSDOT's costs of providing traveler information services.(Bradshaw, et. al., 1999: xviii).

More specific implementation guidelines are also listed that spell out the projected public and private roles in delivering ATIS services. These include:

> "WSDOT will continue to provide ATIS services as long as the sources of the data are generated by public agencies during their normal course of business; and that are available to a broad segment of the public through dissemination means such as the internet, television and variable message signs.

> WSDOT will not collect data for the sole purposes of assisting a private ATIS service, nor will it develop ATIS services that compete with a private service unless there is a clear public benefit.
>
> The presently existing ITS backbone, developed under SWIFT and expanded under Smart Trek, will serve as the WSDOT data collection and fusion means".

Private vendors are encouraged to provide ATIS services, as:

> "WSDOT will provide the collected and fused data to any private firm that wishes to obtain it for only the cost of physical access—as long as there is a net public benefit.
>
> WSDOT will treat all private sector partners equally. There will be no exclusive franchises."

There is also the expectation that WSDOT will have to continue supporting operations and maintenance costs of the present system for at least two years, since the market for privately disseminated ATIS services is still uncertain.

4.4.2.e Smart Trek Business Plan Analysis

Similar to the language found in the AZTech Business Plan, the goals recognize the value of ATIS services to the traveling public in order to better meet the more general transportation public policy goals of providing a safer, more efficient transportation system. To achieve this goal, both Plans recognize that public partners must provide some minimal level of ATIS services to the general traveling public without charging any subscriber fees or user charges.

With the AZTech plan there is the assumption with private ATIS self-sufficiency that the AZTech server and its data collection/fusion role will remain under the jurisdiction of the public sector, supported by public funds. For the WSDOT Plan, there is a somewhat contracting intent that private ATIS services will help fund and support the public costs of data collection, fusion and dissemination, as:

> "it is expected that public support of ATIS services will diminish over time, eventually reducing to zero as the private market evolves." (Bradshaw, et. al., 1999: xxiv.)

Unlike the AZTech Plan, specific cost sharing mechanisms are discussed. A consortium could be created, setting up data access fees relevant to the amount of data used; collecting fees for accessing the ITS backbone; or a percentage of private profits could be returned to the public partners.

The two plans also differ in their plans and expectations to expand the publicly supported data collection plans. Under WSDOT, there is apparently little interest in placing data collection devices on arterial roads, letting the private sector collect data either by deploying devices such as cameras or loop detectors or relying on aerial or range rover means of collection. Under the AZTech, data from the city and county TMC's is already coming to the AZTech server, so many more arterial roads are included in the existing system as compared to the situation under Smart Trek.

The risk taken by WSDOT is that the private sector will not invest in the Seattle market without additional public support. ATIS information services, therefore will not expand, and for highway travelers remain primarily a means of information concerning freeways.

4.4.2.f Key Factor Description

Who pays to construct the data collection system

The ITS server was built and maintained by the University of Washington as part of the SWIFT field operation test (FOT). It was expanded under the Smart Trek program to include information concerning travel by ferries and transit.

Who pays to construct the data fusion system

Public partners paid for the data fusion system. The ITS backbone, created and maintained by the University of Washington, was developed under SWIFT and expanded under Smart Trek.

Who pays for and disseminates the data;

The public has paid to support initial private ATIS services, as Etak and Fastline have received funds.

Who provides marketing/outreach information

A private marketing firm was hired by Smart Trek to provide outreach.

Should the public sector receive revenue as part of any partnership?

It is expected that cost sharing with the private sector will occur, allowing for the public sector to receive some funds from the private sector to support O&M of the present ITS backbone. Public support for expansion of existing data collection and fusion system is unlikely.

Who pays for the operations and maintenance of ATIS.

Public pays for O&M of ATIS. For the smaller cities and public agencies, the cost of maintaining equipment and salaries is negligible, as ITS deployment has been integrated with the usual operations budget.

4.5 MODEL C: PUBLIC STIMULATES/NON-FUNDED

Public collects data, fuses data, disseminates through telephone; public stimulates private participation by encouraging data use and organizational participation, but without providing "start up funds"; private disseminates via a wide variety of dissemination modes; minimal coordination of marketing/public outreach---Trevino FOT San Francisco

PRIVATE CONTROL—MODELS D AND E

4.6 MODEL D: PRIVATE PARTNERED

Public collects data, fuses data; private also collects and fuses data; private disseminates data through website, telephone, etc.; public pays private to

perform all three functions and to perform marketing/public outreach---Trevino II San Francisco

4.6.1 TRAVINFO—San Francisco

TravInfo began as a field operational test that ran from September 1996 to September 1998. It was funded originally by FHWA and by Cal Trans. It was unique among FOT's in that it encouraged an open architecture for its ATIS, allowing any private vendor to easily access collected data and provide specialized service to the traveling public. Because of difficulties in data collection and fusion, and the resulting lack of effective PPP's, the project has evolved into TravInfo II. The MTC of the San Francisco Bay Area has recently committed $37.7 million for the next six years of operation. Most of this funding support comes from CMAQ funds, with an 11.5% match from local and state transportation funds.

TravInfo II represents an evolution from Model C under the FOT. Eventually it is likely to evolve into Model E if private partners operate, maintain and perform more data collection and take over more of data fusion than at present. As part of the TravInfo II partnership between MTC and PB Farradyne, a business plan will be developed in 2002 that will likely lead to revenue returning to the MTC (Werner, 2001)

4.6.1.a TravInfo Public Private Partnerships

Under the initial TravInfo FOT, data collection primarily focused on freeway data coming from the Caltrans Freeway Traffic Operations System which initially consisted of about 100 directional miles of information coming from loop detectors. In addition, incident information came from the California Highway Patrol's automated incident log book. A third potential source of information came from speed data provided by roving service patrols.

Data Fusion was performed by the Traffic Information Center (TIC). TRW was hired to provide the software to establish the center. Operations were performed by employees of Metro Networks under another contract. TRW did not provide an automated collection system as contracted, and the TIC has suffered to some extent because of an over reliance on manual operation of the TIC (Yam and Miller, 2000). For purposes of this analysis, neither of these contractual relationships is considered partnerships.

The evolution of TravInfo into Model D is in large part due to the failure of the public collection. Data collected has been viewed as unreliable. Also, potential private partners have felt that without arterial data, the effort to add value and market the TravInfo data has not been financially viable.

The experience of TravInfo (and others such as Smart Trek) suggest a concern with the success of ATIS partnerships. The contract between the Metropolitan Transportation Commission (MTC) and PB Farradyne (PBF) indicates a public desire for the traveling public to adopt more ATIS services. Incentives are provided to PBF for increased usage by the public of a range of dissemination devices.

The TravInfo experience reflects a concern that the traveling public use the ATIS data to its fullest extent. There are two general avenues of dissemination of this data used by the Metropolitan Transportation Commission (MTC) to support . First, the Traveler Advisory Telephone System (TATS), a free information service available to the public, was created. Usage, however, has been historically below expectations (Miller, 1998). Second, private vendors or value added retailers (VARS) were encouraged to use the TI data to provide subscription based data to the traveling public.

The degree and nature of the public role in helping VARS to utilize the database is key in deciding to what extent publicly supported marketing efforts can directly benefit private vendors.

4.7 MODEL E: PRIVATE CONTROLLED

Private collects data, fuses data, disseminates data; public pays private to perform all three functions; public pays private initially with the expectation that part of any profit will be returned to the public---Artimis, Cin/N. KY; Partners in Motion, Washington, D.C.; South Florida—Smart Route

With Model E, the public may have built some data collection infrastructure by entering into traditional contractual roles. The amount of data collection provided by the public partners and the amount provided through the private sector will vary. The private partner, however, does perform the majority if not all data fusion and dissemination functions. The public partner will pay for these three functions, including the data collection. In essence, this

model is not that much different from Model D, with the exception that some metropolitan areas have started collection without creating a PPP, while others have begun ATIS services with Model E.

4.7.1 Artimis—Cincinnati/Northern Kentucky

The initial agreement between the states of Ohio and Kentucky for the ARTIMIS system was made in January 1994 with TRW, Inc, the systems manager. Both states contracted separately (with vendors other than TRW) for installation of loop detectors and CCTV's, with TRW providing design, testing, integration, implementation and system maintenance of the software needed for the ARTIMIS TMC.

TRW has continued as systems manager for operations, with functions including:

1) managing the TMC workstations and operations;
2) operating and maintaining the CMS's, CCTV's, the HAR and TATS systems;
3) coordinating the regional incident management team, including providing training using the Total Station equipment;
4) managing the FSP operations.

TRW contracts with Smart Route to provide operations for the TMC workstations. Some data is collected from Smart Route cameras and other collecting devices that are included as part of the TMC.

4.7.1.a Evaluation of Artimis Public-Private Partnerships

As part of the ATIS services provided by Artimis, a telephone advisory service (TATS) was begun in 1995. Initially using a seven digit number, Artimis soon switched to 211 and 311 numbers for easier recall. Information is updated every 20 minutes from 6 am to 7 pm, Monday through Friday. As of Spring 1999, calls to the TATS were averaging over 80,000 per month.

In March, 1999, a customer satisfaction survey was administered by the University of Kentucky Survey Research Center (Aultman-Hall, et. al., 2000). Callers to TATS were intercepted and asked if they would respond to

a customer satisfaction survey when called back at a later time. Of the 1100 callers who agreed to be called back, 579 completed surveys resulted.

The results were very favorable, as callers rated the service an 8 on a scale of 1 to 10. Most felt the accuracy of the information was very high. Almost 80% of the customers, though, used the service less than five times per week, with almost a quarter calling only once per week. The researchers noted that similar surveys in Boston, Washington, DC and San Francisco had resulted in similar high levels of satisfaction, but with low public awareness (11-22% of traveling public). The absence of awareness survey data for Artimis means that a complete assessment of the TATS can not be made.

In February, 2000, Cambridge Systematics (2000) held two focus group meetings regarding Artimis usage. In addition, 375 travelers were randomly contacted in April 2000. Results were mixed, as name recognition of Artimis is "marginal at best". (p. 13). 40% of those interviewed had were aware of Artimis, and less than half of these thought the term reflected traveler information and other services. When responses were categorized by message content type, 74% were aware of CMS's, while only 26% had heard of TATS and only 13% had used the internet site. Overall, though, satisfaction and perceived quality of service is quite high, and levels of traffic congestion are viewed as lessening.

Artimis is responding to these issues. In the contract signed in January 1999, TRW has agreed to provide more public outreach through broad image campaigns, proactive media relations, and community outreach.

There seems to be few incentives for TRW or Artimis to seek out other private vendors who could provide more personalized ATIS services. Although vendors other than Smart Route are allowed to access Artimis data, other than radio and television stations, no vendors have come forth to do so.

4.7.2 Partners in Motion—Washington, D.C.

On July 1, 1997, the Partners in Motion (PIM) partnership was formally announced as part of an official launch of ATIS services for the greater Washington DC area. The genesis of this partnership began in 1995 when a group of public transportation agencies joined to address traveler mobility

needs for the area. With a total of $7.5 million in federal earmarked funds for the system as identified in the 1996 and 1997 federal budgets, the partnership had an added incentive to begin (Marston, et. al., 1998).

PIM began with a $12.2M total budget for three years, with private partner in-kind contributions totaling $4.7 million. PIM includes 26 public partners and 13 private partners and vendors, with Battelle as the system manager and SmartRoute Systems (SR) providing the ATIS services. The contract between Battelle and SR is for five years, ending on July 1, 2002. The original intention was that the ATIS service provision would become self sufficient by that time.

Initially, the publicly provided data was to feed into a server created by TRW who used software adapted from the Atlanta Navigator system. This server was to send data to the SR server, and in turn receive privately collected data and "repackaged" public data for their own uses. An ETAK workstation was also created, with the goal that ETAK would receive data from SR and attract additional ISP's to join. Finally, SR created a third server, one that collected data from sources such as 24 cameras (originally proposed) as well as from aerial and wireless sources. The Virginia Department of Transportation (VDOT) agreed to head the partnership, providing procurement services and acting contractually to represent the partnership.

4.7.2.a Public partnership challenges

It was thought originally that collecting data from the public partners and providing it back to them would be easy. But, it was discovered that not all public partners had a data system, and some of the agencies were rebuilding theirs. Also, operating systems that were functioning were different, e.g. Unix and Windows, and software applications had to be used to make these systems compatible. As a result, almost four years later, PIM is just beginning to receive a complete set of data from all of the major public partners.

There was a need for all public agencies to sign MOA's. Two issues needed agreement: 1) that public partners would not send the repackaged data received from SR on to other private vendors; and 2) that VDOT would be the lead agency. However, different agencies required their own MOA. Some agencies were concerned about the "leaked" data issue, some were

concerned about limitations on the data collected, and liability was an issue for others. As a result, 26 different MOA's were created, taking about a year and a half for all agencies to sign formal MOA's.

For some agencies, revising their expectations of what the private partners could provide had to occur before the MOA was signed. For example, some agencies thought that SR could place cameras along arterials in their jurisdiction. If it was concluded that there were more important places for data to be collected, the agency had to accept this decision as part of the partnership. Initially there was the perception that the public share of the revenue generated by SR, originally anticipated to be $60,000 annually, could be used for additional deployment efforts. This original perception was sufficient enough incentive for many public agencies to join the partnership. Since the revenue generated has been $11-15,000 annually, it has been accepted that this business model is not working.

After the agreement was signed, there was a major outreach effort to bring on board other major public agencies. Police, fire, city and county agencies were contacted. Those agencies that declined to join primarily did so because they claimed a lack of resources—this would be one more thing they would have to do. No additional agencies have joined since the original partnership was formed.

Among the public partners, there is a problem of maintaining interest. This is often because of turnover, resulting in new personnel that may not have an understanding of the need for the partnership, and/or may not support it. Some time must be spend bringing these folks "on board": re-educating them regarding the value of the partnership. Otherwise, they will not send representatives to subcommittee meetings on O&M, for example, and decision making suffers. If a quorum does not exist, and a decision must be made to proceed with a task or hold it up until more support is gained, VDOT makes this call, not Battelle.

The monthly reports from SR have been compiled and sent to the major public partners and given to any other public partner who asks. Initially, feedback was received and action items resulted. Lately, as the partnership has matured, little feedback has been received.

Data collection for major roadways has posed challenges, not in terms of accuracy and reliability but in terms of the range of coverage. It was

originally perceived that a 20 mile range from downtown Washington would be sufficient. Now efforts are being made to extend that range to approximately 60 miles along major freeways. Along 1-95 heading south, for example, an accident five miles north of Fredericksburg—55 miles out, needs to be folded into the data coverage as it will cause backups for travelers coming out of the city.

There are holes in the coverage within the metropolitan area that have proven difficult to fix. First, only eight of the originally promised 24 SR cameras have been deployed. Owners of buildings began to charge to put cameras on their rooftops. Second, there are right of way problems, with public agencies not wanting cameras placed there, e.g., utility companies, National Park Service—for the parkways. Third, since aerial surveillance is prohibited over much of the city, if there are no other means of collecting data for these streets, no information is available.

4.7.2.b Marketing

A great deal of effort was spent on marketing SmarTraveler. A Public Relations and Marketing Committee was established, with active participation by public and private partners. Three of the private partners contributed most of the work in terms of executing the marketing plan. Global Exchange had overall responsibility of a budget of about $400,000, while SR was contractually obligated to contribute $650,000 in the form of money and in-kind services. Castle Rock received funds to publicize SmarTraveler to the toll tag users of the Smart Toll operations that they managed. Street Smarts was asked to execute a plan for commercial vehicle operators. Since SR wasn't interested in developing customized services for CVO's, this project did not come to fruition.

The public partners were involved in marketing in several ways. The participated on the Public Relations and Marketing subcommittee, provided public service announcements, and performed joint marketing efforts (VRE and MARC). The subcommittee meetings were sometimes helpful, but attendance by the public partners was spotty. The public partners didn't always feel they had a lot at stake. However, all public partners show a link to SmarTraveler on their websites.

All VDOT provided marketing funds were spent on a wide variety of marketing efforts, including :

The media event (launch)
Production and distribution of the purple cards (contain information about SmarTraveler services
Employer outreach through efforts by the COG
Press releases and media kits
Television and radio interviews

It is difficult to identify the overall total amount of money that was spent on marketing, as public partners do not know whether or not SR spent the entire 650k that was in the original budget. The way that cost sharing was reported by SR made it difficult to identify, as it was not broken down by function. SR did take care of printing of some of the purple cards and shipping them. They did share costs of participation at conferences; co-funded the launch event, and paid for mobile signs along key roads.

4.7.2.c Evaluation

A customer satisfaction evaluation estimated that approximately 15% of travelers in the Washington DC area were aware of SmarTraveler by summer, 1998 (Schintler, 1999). This figure is likely higher at present. Promotional advertisements are being shown on a television channel that broadcasts news to a two state/DC area. Also, washtingtonpost.com is paying SR for travel information that appears on its site.

The key issue for evaluation purposes is whether the approximately $1M spent on marketing has been well spent if only 15-20% of area travelers are aware of the ATIS service. Other indicators such as the number of hits on the SmarTraveler website would be useful measures of increased awareness.

Personalized or customized dissemination services, however, have not reached many travelers. The ETAK server, created to attract ISP's, is no longer functioning. Although ETAK is still technically a partner, since it is not receiving income it has chosen not to participate). The recently completed PUSH demonstration involved sending traveler information via email and pager to employees of 55 firms (100 firms were asked). It is unclear how successful this effort will be in recruiting additional subscribers.

Other means have had limited success as well. The attempts at disseminating information over cable television have not been profitable, as advertising revenue has not met expectations. This service has been ended.

Of the three servers originally in operation, only the SR servers remains. Although some public partners do receive more specialized information, e.g. traffic speeds, that the SmarTraveler website does not provide, SR owns all real time data collected by the ATIS system.

Perhaps a more mature version of Model A is a return to public-public partnerships after an initial PPP has been tried. With PIM, public partners may decide to end the partnership with SR after the present agreement expires in December 2002, and rely more heavily on the 511 system as a way to provide ATIS to travelers. In the DC area, four areas are leading the way in developing 511, including Shenandoah, Valley, Hampton Roads. The reality is that SR is not going away, especially since it has merged with Metro. It will still remain, feeding its info to the Metro feeds. Perhaps a no-cost "data trade" will be worked out, with public partners feeding their data to SR in return for the SR collected data. Or public agencies may want to sell their data to ISP's.

4.7.3 South Florida

This next section presents and analyzes in more detail the South Florida experience in developing a public-private partnership. The original request for proposal was distributed as an Invitation to Negotiate (ITN) (Florida DOT, 1999k), with proposals due June 24, 1999. Three responses were received from teams of private vendors headed by SmartRoute Systems, PBS & J, and Digital TI. The technical proposal from each was rated by a team of eight, consisting of representatives from each of the primary public partners. By July, all three teams had received a rating that was above the minimum 80 points, but they were not formally ranked. At a review team meeting in August, 1999, it was determined that no alternations to the scope of services was required.

A smaller team of three public partner representatives then initiated a lengthy ITN process. Four negotiation sessions were held with each of the three teams between September 28, 1999 and November 16, 1999. On December 19, 1999, the Notice of Intent to Award was made, giving Smart

Route Systems the contract. The contract was signed on November 13, 2000, with an initial start-up date of April, 2001.

The following first describes the content of the ITN. The responses are presented next, comparing the content of each team's by section of the technical proposal.

4.7.3.a ITN Content

Proposers were instructed to submit a technical proposal and a separate cost proposal. The technical proposal was to contain the following sections:

1. Technical and Deployment Plan
2. Operation and Maintenance Plan
3. Business Plan
4. Management Plan
5. Legal and Institutional Issues
6. Qualifications and references (p. 3)

Proposers were to describe two deployment options: Option One, using public partners infrastructure and in-kind services; and Option Two, not relying on any of the public provided resources.

For the first option, the deployment plan should clearly identify infrastructure and resources of the proposer and the public partners, as well as other private and public entities that are not part of the proposed team but whose efforts may affect the deployment. Proposers resources should be classified as either "existing" or "newly acquired for the project". The deployment plan should also describe how information will be interfaced and exchanged among all partners, including how the phasing of the project will occur. The Technical Proposal should also:

> Demonstrate the PROPOSER's understanding of the processes of interjurisdictional cooperation in the Tri-County Region as well as the potential for functional and spatial growth and expansion of the system(s) being proposed. (p. 5)

The ITN makes in clear that the winning private partner shall work with all existing public agencies that sign the agreement, as well as expect that

additional public partners will join at a later time. Expansion of the ATIS is anticipated and expected.

For the Operations and Maintenance Plan, Proposers are to describe where the real time information will be disseminated for periods less than 24hours/7 days per week; and where it will be disseminated for the full 24/7 period. In doing so, the Proposer is allowed to describe up to three scenarios of how advisories and specific information will be described over what media. Given the two deployment options mentioned above, private partners were to identify four combinations or alternatives.

For the Business Plan, it is stated clearly that the public partners wish an "economically viable operation". ITS, travel and demand management, and the communication infrastructure are gradually being implemented at the public expense. The intention is that all these systems will be made available to the private partner. Also, the public partners

> Expect that this public-private partnership should generate, in the near future, in-kind returns (in lieu of cash revenue sharing) that will help accelerate the growth of ITS in the Tri-County Region (p. 6).

As part of this section, marketing and revenue generation efforts also must be described.

In the Management Plan, the proposer shall describe the organizational structure, including the persons who will be occupying all positions and their job duties and responsibilities. A critical path method based schedule should be provided.

Two legal/institutional issues are described. The Florida State Statutes on Public Records, Chapter 119, states that all public records shall be open for public inspection by any person. The Proposer must describe how the ATIS services will be consistent with this statute. This is especially relevant if there are any data that the private partner would be prohibited from giving out, or if it desires to retain that data, it must spell out how and for what time periods the data will remain proprietary.

A second issue is privacy. There are concerns about the images captured on videotape that should be addressed.

The Cost Proposal should contain all fiscal data and cost estimates as related to the Technical Proposal. It should be divided into at least three sections:

1) cost for the initial deployment and subsequent deployment phases if proposed;
2) cost for system operation maintenance and management on a monthly basis;
3) cost for marketing and public outreach activities for each successive year.

An evaluation committee on a maximum 100 point scale will grade the Technical Proposal with the following points assigned to the specified sections:

Technical and Deployment Plan……..25 points
Operation and Maintenance Plan…….15 points
Business Plan……...20 points
Management Plan…….10 points
Legal and Institutional Issues…… 10 points
Qualifications of Key Personnel……..20 points

Proposals with an average grade of 80 points will be invited back for an Oral Presentation which will not be graded, nor will there be a numeric ranking within those invited. Following the oral presentations, the public partners may revise the technical scope of work and ask for revised technical and cost proposals.

Exhibit "A" outlines the Scope of Work. It identifies eight categories that the private partner will discuss how the work in these categories will be delivered. They are:

1) Data and information collection
2) Data fusion and developing advisories
3) Information dissemination
4) Marketing and outreach activities
5) Record keeping and documentation
6) Evaluation Support

7) System deployment, operation and maintenance
8) Management and coordination (3.0)

3.1 Data and Information Collection

The priority roadways from which data must be collected are identified. There is the statement that public agencies will furnish data to the private partner on an "as-is" basis, implying that no additional data collection will be provided beyond what is available. Staff contribution from the public partners "will be limited". It is recognized that all public agencies do not have sufficient infrastructure and that the private partners may have to collect data using "additional elements such as air-surveillance, traffic monitoring cameras and cellular probes to cover data shortfall".
Two other sections provide admonitions. First, the private partner is "cautioned against recording video signals from traffic cameras". The public agencies declare themselves harmless if the private partner does record video images and a liability issue arises.

Second, the private partner is encouraged to provide traveler information on roads and transit not identified as priorities; and for airport and seaport travel.

3.2 Data Fusion and developing advisories

The private partner is expected to assume all data fusion responsibilities. The ISP shall be willing to use the public agency data "when offered". Additional software that is needed to fuse this data shall be purchased "off the shelf". This software will be made available to the public partners at no cost "along with full documentation".

The ISP is required to work closely with all relevant public agencies to collect data, but is not required to receive approval from them before issuing travel advisories.

> "Reliable and continuously updated transportation advisories on the Tri-County Region surface travel network shall be prepared and disseminated….Travel advisories shall take into account user needs at the mass level and also at an individual level, particularly in reference to impacts of incidents, congestion and delays for all travel modes."(p. 8)

It is suggested that these advisories can include “diversion and alternate routes, road closures recommending alternate transit system units, etc.”

The use of proprietary software is to be kept at a minimum, and any such software identified in the response. If the ISP uses public agency software, it shall enter into a licensing agreement with the agency or original software developer.

3.3 Information dissemination

Two types of information are to be disseminated: basic and customized.

The basic package should be oriented towards the automobile and the transit traveler. At a minimum, it shall include information regarding roadway segments and destination-specific diversions, weather conditions, and congestion levels and delays. Other information such as alternate routes, parking availability and intermodal transfers are suggested as information content. Information regarding transit should include arrival and departure times, delays, locations, etc. This basic information must be provided at no direct cost to the user.

The dissemination of customized information is encouraged,

> Delivered over private media at the expense of individual clients, major employers, retail centers, information wholesalers, commercial vehicle operators, etc., as long as these revenue generating efforts do not reduce quality, quantity and frequency of giving out the basic information (p. 11)

Finally, all information and advisories is to be made available in English and Spanish, as well as via TDD, TTY or a relay service for disabled patrons.

Information needs to be provided back to public agencies at no cost, especially congestion and incident information. In terms of legal issues:

> In reference to delivering the traveler information, the ISP shall meet the (public partners) obligations under the Sunshine and other state and federal laws. It therefore shall devise mechanisms to protect the public-private partnership’s

> fiscal interests without violating the (public partners) legal obligations. (p. 12)

The choice of dissemination modes is to include at a minimum a telephone advisory service that can be accessed over a single toll free number, with the N11 number to be used if there is no additional charge to the user. A performance standard is mentioned: there must be sufficient lines to ensure that no caller is placed on hold more than one minute. Human operators or interactive audio text systems are allowable, with a welcoming message to be no more than 20 seconds in length.

3.4 Public Outreach and Marketing

There is a clear distinction between public outreach and marketing. The former emphasizes promotion of services under the Sunguide name, while the latter discusses efforts to generate commercial revenues.

Outreach and promotion can be accomplished independently or in concert with public agency efforts. Prior approval of the Project Manager is required for any activity. Objectives are listed, including:

1) Demonstrating to the public the benefits of ATIS services, "thereby encouraging multi-modal travel and facilitating demand management" (p. 14)
2) Providing examples of successes to elected officials;
3) Enhanced and increased levels of communication/coordination;
4) Establishing a consumer base.

Marketing is strongly encouraged, especially to generate commercial revenues. Advertising, contract agreements with in-vehicle navigation support providers and commercial businesses are mentioned as potential recipients of these efforts. All agreements must be approved by the Project Manager. The value of agreements that do not involve revenue exchange, e.g. in-kind payments, must be estimated for purposes of the revenue sharing agreement with the public partners.

There is a clear statement of revenue generation and an expected return to the public partners. The amount shared is to be a percentage of gross revenue, including cash and the value of in-kind receipts. In addition, the overall financial goal of the partnership is clearly stated:

> The (public partners) desire is that the project will be self-sustaining within the first three years from the date of Execution of the Contract or earlier, and, thereafter, revenues exceeding the self-sufficiency stage shall contribute to the growth of the service (p. 17)

3.6 Evaluation

The public partners propose to "formally and rigorously" evaluate the private partners once every 12 months, using their staff or hiring a consultant to perform the work. Evaluation criteria to be used include: user satisfaction, the number of users, quality of information disseminated, user complaints, impact of advisories on incident and demand management, cost benefit analysis, and adherence to deployment and operation schedule (p. 18).

3.9 Other Services

This section seems to indicate that additional services can be added after the contract is signed at the discretion of the Project Manager. These services are viewed as a supplement to the contract, and as such it is presumed, will require additional payment by the public partners. It is not clear what additional services may be requested, especially since the ISP is strongly encouraged in many cases to develop ATIS services as broadly as possible.

4.0 and 5.0 Responsibilities of the Private and Public Partners

These final two sections provide additional information concerning the responsibilities of all partners. The private partners must have a basic information service deployed within one year from the date of the Notice to Proceed. Also, it made clear that the public partners will not "alter the configuration or functionality" of any of its infrastructure to meet the private partners needs.

Key responsibilities of the public partners include:

1) provide the financial seed money as agreed to in the contract;
2) operate and maintain the present ITS at no cost to the private partner;

3) provide access to public right of way and structures;
4) share all information, including that pertaining to local conditions that may impact the service delivery;
5) provide full and open communication.

4.7.3.b Analysis

The ITN format allows for the maximum flexibility, as the basic minimally required goals for ATIS services are mentioned, while the pursuit of additional, seemingly less important goals are "encouraged". This is true for the information services provided, as information via telephone and website are to be free to travelers, while customized ATIS services are not specifically required. There is the implication here that the public partners want the services to be self-sufficient by the end of five years, with a return of a percentage of revenue. Other than projections of revenue from various dissemination means there seems to be limited interest in what means the private partners will use to generate revenue. How minimally required and more specialized (not required) goals are to be achieved is not specified, leaving private partners complete discretion to identify technical and managerial responses.

One risk with this approach is that private vendors may not fully identify the fullest range of needed services in order to generate sufficient revenue. Alternatively, the business plan in the initial response may not provide enough information to give the public partners confidence that self-sufficiency can be achieved.

It is assumed that the negotiations process can result in identifying the information needed to answer all concerns. Whether this is accomplished, however, depends upon several factors, including the knowledge of the public partners, and the realistic ability of the public partners to have viable choices among the respondents. If the amount budgeted for the ATIS services is conveyed to the private partners during negotiations, and the "last best offer" from two of the three is above the amount budgeted, the amount of discretion to choose anyone but the private partner whose bid is below the budgeted amount is limited.

In retrospect, the ITN language may have not been strong enough in requiring a clearer picture of how the ATIS services provision would become self-sufficient.

It is not clear how much of the public provided infrastructure, both existing and planned, would be available for the ATIS services.

4.7.3.c Responses to the ITN

Responses were received from three groups of potential private partners:

1) SmartRoute Systems (SRS), in partnership with Frederic R. Harris, Kimley-Horn and Associates, David Fierro Associates, and the Center for Urban Transportation Resources, University of South Florida;
2) Post Buckley, Shuh and Jernigan (PBSJ), in partnership with Battelle Memorial Institute, Southwest Research Institute, Traffic Station, US Wireless Corporation, TechnoCom Corporation and Metro Networks/Etak, Inc.;
3) Designed Traffic Installation Co. (DTI), an ITS division of MasTec, in partnership with PB Farradyne, Metro Networks, Etak, Transcom, and Amtech.

The technical proposals for all three were rated above 80 points, and they were approved for further negotiations without ranking.

In the following sections, comparisons are made of all three responses by section of the ITN. Analysis follows a summary description of each respondent.

4.7.3.c.1 1.0 Technical and Deployment Plan

The three responded provide different responses to the technical and deployment plans. Smart Route Systems (SRS) proposes using its own developed software that it has deployed in five other metropolitan areas nationwide. PBS&J proposes using the existing data collection system used by Metro Networks to furnish travel advisories immediately, an adaptation of the TransGuide software (San Antonio) as the basis for a public partner controlled ATIS, plus using soon to be finalized wireless technology to obtain data from arterial roadways. DTI proposes a system based upon the Sunguide transponders, using software adapted from that used by TRANSCOM in the New York/New Jersey/Connecticut region.

SmartRoute Systems

SRS proposes to design an interface with the SUNGUIDE central software system that will allow this data to be imported into the company's WINGS software architecture. SRS will augment existing data collection with additional CCTV surveillance—at least 20 cameras, a mobile probe network—the volunteer Road Reporters providing information via cellular phones and two way radio probes, aircraft surveillance during rush hours, and emergency services monitoring. This is based upon the plan that FDOT will be adding additional cameras and speed detectors throughout the region until 2003.

SRS will design and build a Traveler Info Center, centrally located within the Tri-County region in a privately leased facility. A three work station configuration is suggested.

The WINGS (Windows Internet Next Generation System) architecture is currently operating in five metropolitan areas (Minnesota, Washington DC, Philadelphia, Cincinnati and Boston). In those five areas, more than 7.5 million inquiries were handled between January 1 and May 31, 1999. The use of the Windows NT 4.0 Platform provides an architecture not tied to a single hardware vendor, thus facilitating the use of off the shelf software components. There is a redundancy system that provides a back up if one or more of the normally operating servers fails.

The WINGS system provides information in color codes, identifying 1) Alert (blue) a severe traffic tie-up (270% above Speed Limit Travel Time (SLTT); Delay (red) 50-269% above SLTT; Slow (yellow) 15-40% above SLTT; and OK (green) up to 14% above SLTT.

The TRIDENT (Traffic Information Database Environment using New Technology) is a highly structured formatting of data. The ODYSSEY interactive voice response system allows travelers to call one number, identify route segments of interest through pushing buttons on the telephone, and listen to the appropriate recorded message. STANDOUT (SmarTraveler Alert and Output) is a stand alone server that can easily be "plugged into" the WINGS network. Its function is to provide personalized information. Individual subscribers can register personal preferences "as to what

information they would like to receive, when they like to receive it, and in what manner" (p. A-12)

The information concerning the current status of public ITS infrastructure components (provided as Appendices in the ITN) are summarized, including those that are under construction along specific roadways. Less than 30% of the countywide signal systems have detectors that have been maintained and are functional. AVL systems are in place for two of the three bus systems and in the Metrorail system. Other publicly funded efforts are noted. Then the response identifies where CCTV's would be placed by SR to fill in gaps and meet the short term and medium term needs of the region's ATIS.

A critical path chart identifies a six month completion time frame that would be needed for deployment.

Interjurisdictional cooperation efforts are noted, identifying efforts such as the commuter rail service between West Palm Beach and the Miami International Airport; the creation of commuter services; and the I-95 HOV Program. Efforts to upgrade signal systems and the ATMS by various cities and counties are noted, as well as the activities among the three FDOT districts and FHP Troops within the region.

SR next deals with the deployment options and work alternatives. Clearly the preceding information is based upon adding their service to the existing infrastructure and resources. SR then states that it would not pursue the option of providing an ATIS without using publicly collected data. It would most likely create ATIS services without entering into a public private partnership.

PBS and J

PBSJ begins its Technical and Deployment Plan by stating it will begin by identifying which ATIS services are likely to be most attractive to the traveling public in South Florida. It will identify which are commercially viable without public funding support, and which will require initial support. A Data Collection Coverage Plan will combine the need for static and dynamic data required by each service identified "and then detail what will be done, by whom, by when to create a data stream to meet the requirements". (p. I-5)

By implication PBSJ proposes to seek out private capital financing to start up the commercially viable services. PBSJ will support their ISP's, Metro Networks and Traffic Station to market their services to multiple distribution channels such as wireless companies, internet portals, etc. PBSJ will contract with a local marketing firm to assist in all marketing services locally. In addition, it will encourage ISP's to further develop national markets.

This introductory section ends with a discussion of deployment philosophy. It purports to be flexible in that it is not requesting exclusive access to collected data, nor is it relying on a single ISP or single data collection technology. It will adapt to changing technologies to provide the most effective set of services. PBSJ also suggests it has limited the public sector partners risk through its selection of the appropriate team members and data collection, fusion and architecture. Five phases are proposed, with transition between each identified as a time for assessment and reflection. An investment strategy will provide a viable set of assets.

Deployment Option One relies upon three sources of data collection:

1) Metro Networks existing private data collection system will be used to develop advisories. Metro has collected data and provide feeds to over 25 on-air radio and television stations for over 10 years in the region. It has seven cameras in place in Dade and Broward counties Information is collected from two helicopters flying six hours per day during morning and afternoon rush hours. In West Palm Beach, airborne coverage is provided for two hours in the morning and an additional two hours in the afternoon. Both operations have excellent relationships with law enforcement and other related personnel in both regions.

   The advantage of using Metro is that it already has an operations center that could be used, rather than paying to build a new center and duplicating operations that are already in place.

2) Interfaces with SUNGUIDE public partners will occur through a variety of manual, semi-automated and fully automated data sharing operations. Both highway and transit data will be collected in this manner.

3) Field data collection will furnish key data from arterials. Over one-third of the budget will be spent on this data collection. Point detection devices such as loop detectors placed on arterial roadways do not provide data that is accurate enough to be useful for ATIS. Flow sensing devices such as transponders placed on vehicles using toll roadways will be used.

   A combination of Remote Traffic Microwave Sensors (RTMS), permanent count stations in lieu of loop detectors and wireless probes would be used: RTMS on freeways and the latter two for arterials. The wireless probe technology, scheduled to be more fully developed by US Wireless by September, 1999, far in advance of the NTP date, can be applied to priority roads and inexpensively added to arterials.

   Finally, the SunPass Probes and supplemental readers could be used to collect data on the Turnpike roadways.

Data Fusion

PBSJ has determined that the data server and ATMS software developed for use in San Antonio would best suited for use in South Florida. TxDOT should readily agree to share their software with other public agencies in return for updated source code if new elements are added to the system. Southwest Research Institute developed the software for TxDot and would be hired to develop the necessary interfaces for South Florida.

Data collected from various public agencies would be inputted into the server using generic or "standard interfaces". This would facilitate the addition of new data sources that could "come on line" at any time, as well as adding ISP's at various times in the future.

The FDOT Data Server would interface with various data collection systems mentioned above. The Metro Networks/Etak Traffic Workstation interface will enable Metro to enter advisories. The Traffic Station Battle Station interface will enable public agencies to input data to the Server and allow them to view the latest information available from the server, as well as to provide the data to Traffic Station and other ISP's. Interfaces will be developed with flow sensing and point sensing data collection devices, as well as with public agency automated systems.

Information Dissemination

The fundamental tenet that underlies PBSJ's response is that multiple ISP's,

> "none of which have direct control over the terms and conditions under which other ISP's get access to the SunGuide Data Server, will lead to more robust and sustainable traveler information service offerings in the region." (p. I-18)

With relationships established with two ISP's from the beginning of the project, additional ISP's will be sought no later than 24 months after the NTP.

Unlike a non-exclusive right to public agency data, other ISP's would have to either create a new server to receive public data or sub contract with SR to obtain this data. With the existence of an FDOT server, access to the public data is facilitated for other ISP's.

PBSJ proposes an Interactive Voice Response (IVR) Telephone system that would be free for callers—as specified in the ITN—but could also provide more personalized information for subscribers. This personalized system would be provided en-route for subscribers within a two year period.

Both Metro and Traffic Station would offer different commercial services, including internet web pages, email advisories—one free per day or subscription based, and the same for faxes. Other products include the Etak Traffic Angel, a personal website which allows users to set up and maintain travel profiles by selecting road segments from traffic maps; a cellular telephone which can be set up to receive Traffic Angel alerts if there is an incident of sufficient severity; PDA's such as Palm Pilot; and In-Vehicle information systems which are under development. Traffic Station offers a free personal traffic adviser service among other products.

System Evolution

PBSJ proposes five deployment phases, with each lasting about one year. Phase I includes establishing the Data Server, using existing data formats and communication protocols as much as possible; installing RTMS at 40

locations and wireless phone probes in Dade County as a pilot deployment; and have the toll-free telephone system, web page email and fax systems implemented by the end of the first year.

For Phase II, PBSJ will add 40 more RTMS sites and add Broward County to the wireless probe system. Existing commercial services will be marketed heavily and new ones added. An extensive program review will be held with the public partners at this point before entering Phase II, designated as a full operation year. At this point 160 RTMS sites will be added to complete the point sensing system along the freeway. The wireless probe system will also be completed by added Palm Beach County and area toll roadways.

In Phase IV, the first year without public partner start up funding, PBSJ offers the positive cash flow that will exist after operating expenses to be given to the private partners or be spent by PBSJ to continue to upgrade the ATIS for the region. Phase V will operate much the same, working with the public partners to identify future efforts.

Deployment Option Two

PBSJ assumes that there would be funding support from the public partners under Option Two. Without use of publicly collected data, PBSJ would concentrate its efforts on field data collection and on wireless data probes working closely with Metro Networks to provide advisories.

Design Traffic Installation

The technical and deployment plan section comprises almost one-third of the total response (21 pages out of 64). The introduction to this section emphasizes the great value of regionally collected data that would support the operations and management of SUNGUIDE. To collect the data, DTI proposes using the TRANSMIT system, a surveillance system "which uses toll tags and readers to develop traffic data." Of the three levels developed as part of the National ITS Architecture:

1) the communication level that is composed of a great variety of public partner equipment and software, will not be affected by the deployment of the technical surveillance component of the project;

2) the technical level, composed of the traffic control centers (FDOT Districts 4, 6, and 8), will be the focus of the surveillance equipment;

3) the institutional level, will require policy and operational agreements, but will not directly affect the technical level.

The use of probes to gather data has advantages over the point detection approach. The latter gathers speed data, counts traffic volume, and detects incidents. The probe approach links travel time to determine speed, which provides more accurate and timelier data when an incident occurs. The collection of origin and destination data provides information concerning patterns of traffic flow that would be of great assistance in communicating information during hurricane evaluation, for example, as well as alert traffic to upcoming delays on a given roadway. The vehicle identification capability could allow operators, for example, to know when emergency vehicles would reach an accident scene.

With over 100,000 SunGuide probes projected to be sold by the end of 1999, there should be sufficient probes on South Florida highways to provide the needed data. Studies from other deployments have indicated that accurate real-time traffic data can be achieved from probes that are attached to as little as 5% of the traffic.

The TRANSMIT system is that used by TRANSCOM for the New York, New Jersey, Connecticut area. One server would be needed, co-located with the ETAK transportation server. The TRANSMIT system contains the following components:

1) TRANSMIT operator interface—it accepts data input and uses this to display maps, reports, etc.
2) Toll tag device driver—this is the interface between the toll tag readers and the TRNSMIT system server. Status reports, including system failures, can be easily printed or saved.
3) Toll tag incident detection—the TRANSMIT system calculates the probability that an incident has occurred at designated time intervals. “It declares an incident if the system-calculated incident confidence level exceeds the user-specified incident confidence threshold and the number of non-arriving vehicles on the link exceeds the user specified link non-arrival threshold.” (p. 12) A

variety of incident related information is generated which can be generate a series of reports and can be saved for historical purposes.

4) Tag data processor—TRANSMIT collects link data every 15 minutes and smoothes the data into the historical data base for that link. Reports regarding flow time and flow link data can be calculated at any time. The same information can be used to manage congestion as well, with the information translated to a real-time traffic map.
5) Interactive computer kiosks—these can be added to the South Florida area with no cost, as fees charged for access to the kiosks will make the system self-sufficient.
6) Transit trip planning—TRANSMIT has the capability to add to trip planning to the services offered transit users.

The two options deployment plan options are then discussed, outlining the data from public partners in option one, and stating that option two is feasible, because it would mean the present Metro Networks services would constitute the data collection for the ATIS.

Three phases are then identified, outlining the approximately 166 miles of freeways that would be covered by 40 tag readers, placed approximately four miles apart. All tag readers would be placed overhead. Also, the seven currently operating Metro Network cameras would be supplemented by four additional cameras. Phase two is identified as concurrent with option two, with the need for additional data collection devices (since the public ones would not be used) would increase the cost. Phase three represents the option of expanding TRANSMIT coverage to all freeways, tollways, "desired arterials" and other freeway management devices for all three counties. Given the unknown magnitude of phase two and three, no cost estimates are provided by DTI.

Analysis

All three responses are similar in that they propose to adapt already existing software to be used in South Florida. SRS is different in that they will bring in their own developed software, while PBSJ and DTI are offering a systems management model, in that they will manage the deployment of a number of different efforts, represented by the partners. The latter two responses do have the advantage of using Metro Networks existing software and cameras

for more immediate traveler advisories, while SRS must import and deploy its system.

The different deployment philosophies are worth discussing, as they represent divergent means to offering ATIS services. The PBSJ approach of creating an FDOT controlled server is attractive in that it potentially widens the number of ISP's who would have access to the publicly provided data (plus that provided by the RTMC wireless data collection efforts). In theory FDOT would have more control over which ISP's access the data, and the rates that would be charged. With the SRS or DTI service, the data collected by SR would be also available to other ISP's, but SRS would be in a more monopolistic position, with more control over what rates it could charge. A more likely scenario is that SRS would develop its own customized services rather than sell the data to other ISP's.

Both philosophies have benefits and risks. With the PBSJ approach, FDOT is relying upon PB as the system manager to make appropriate business decisions about which ISP's are connected in order to maximize revenue. Clearly there is the risk that some ISP's will partner and fail to produce enough revenue. Furthermore, the likelihood that more than one ISP can offer the same kind of customized services, e.g., services received through a PDA, is slim, given the embryonic nature of the ATIS market.

With the SRS model, the potential benefits as well as the risks are greater. Since SRS is performing its own "system manager" functions, in theory the costs are less than what PBSJ offers. It can conceivably gain greater revenue with its own customized services than if other ISP's provided them. If the customized services fail to generate enough revenue to achieve self-sufficiency, though, the viability of the entire ATIS service is threatened.

In both cases, there must be enough incentive for either PBSJ or SRS to seek out and establish the customized service base. The public partners need to play a significant role in ensuring that marketing efforts, etc, are sufficient for the private partners to succeed.

4.7.3.c.2 Operations and Maintenance Plan

SmartRoute Systems

The day to day operations would be under the jurisdiction of a Director of Operations. This person would be recruited locally. Reporting to him/her would be two Operations Supervisors and a Systems Administrator. Traveler Information Managers (TIM's) would directly receive the inputs and manage the non-automated data. Extensive training is provided to the TIM's, as SRS realizes that accuracy and timeliness is important in selling the data to the private market. When an emergency occurs, SRS operators will remain available to help until the emergency passes without additional cost to the public partners (assuming a less than 24/7 staffing model). SRS feels at this time that a 24/7 staffing model is not justified.

PBS&J

The Metro Networks Miami Operations Center will house the Data Server and become the hub of the operations. PBSJ proposes to offer 24/7 coverage immediately without additional cost to the public partners. PB would also provide an operator to be located at the SunGuide Traffic Operations Center during morning and afternoon rush hours. Funding is requested for increased staffing at the Metro hub, including a project manager to oversee rush hour operations and interfacing with the Traffic Station operators based at District 6 and at Metro's West Palm Beach facility, a second back-up person whose time during "off hours" would not be charged to the project. All appropriate PBSJ partners are responsible for maintaining their equipment.

Three scenarios are provided, as allowed/suggested by the ITN. These include 1) a severe traffic accident; 2) a transit accident; and 3) a hurricane evacuation.

DTI

All four deployment options are discussed, with Option two—using public collected data and disseminating it for 24 hours/7 days a week—identified as the preferred option. An additional operator is proposed to located at FDOT's District six headquarters during morning and afternoon rush hours. A "back up" full-time operator would also be hired, without charge during off-peak hours. Requests for these positions is for the first two years only,

as DTI proposes that increased revenue will support these positions after that time.

The remaining part of this section discusses in detail the existing Metro Networks operations for both South Florida and West Palm Beach locations. Under system maintenance, DTI states that it will operate the system for five years, and that it is their goal to make SUNGUIDE ATIS services commercially viable within three years. However, DTI also states:

> "To the degree that some desired government services (such as support of government functions or provision of free telephone services are not commercially viable, continued government support might be required."

Analysis

PBSJ and DTI proposals will require lower manpower costs because they will add staffing to the existing Metro Networks operation. Both offer 24/7 coverage immediately, while SRS states this level of coverage is not needed initially.

4.7.3.c.3 3.0 Business Plan

SRS provides the BP that exists in six other metropolitan areas. The approach used involves:

1) private investment in field infrastructure, computer hardware and software, and telecommunication systems support;
2) sale of certain services to public sector partners, including a free to the user audio text telephone system and website;
3) sale of information products to the private sector;
4) revenue sharing of 5% of the gross private sector revenues

SRS has seven different information dissemination channels that are capable of producing revenue:

Cable television
Broadcast television and radio
Wireless personal communication devices

Interactive voice response
Internet
Kiosks
In-vehicle information

Interactive voice response has become the major public sector means of information dissemination. Even though SRS states that it is a good source of advertising, it does not give any indication how successful advertising has been using this medium.

SRS has its own website, providing content to it and distributing it through partnerships with various newspapers, web portal sites such as Yahoo, and broadcast stations. It claims that the sites for the ten cities for which it has information have generated almost 20 million page views per year. SRS has contracted with an Internet ad sales firm to sell ad banners on these page views, with projected gross revenue of $15-$45 per 1,000 views, with SRS receiving 50% of this revenue. With 20 million page views, this will generate $30,000 to $90,000 per year.

Cable television is another possibility, as a four hour morning rush hour television show devoted to travel information and other variety items now airs in Boston, Washington, DC., and Philadelphia. Although the number of households receiving this information is over 1 million in Boston, for example, there is no mention of revenue generated or success of the venture.

Similarly, broadcast television has responded in the major metropolitan areas served, with payments to SRS for helicopter reports and other travel information.

Other dissemination means that show opportunity for revenue generation are kiosks—although kiosks would necessitate investment of additional public funds—and wireless communication devices such as cellular telephones or pagers. The in-vehicle navigation devices are projected to become more widespread in the United States by 2004, as over 4 million devices will be deployed by then.

PBS&J

In its business plan, PBSJ reiterates its belief that the data fusion process should be managed on behalf of the public partners and not controlled by a single ISP. Multiple ISP's should be encouraged from the start of the project, leading to growth in the ATIS market. Effective data coverage includes arterial roadways.

PBSJ provides market analysis for three groups of ATIS services: Internet, Wireless handheld devices, and In-vehicle devices. Subscribers of more than 34,000 internet, 98,000 hand held devices, and 45,000 in-vehicle devices are forecast by 2004 (p. 3-3).

PBSJ identifies both public and private objectives that should guide the business approach. Public objectives include:

1) Support of a revenue generating, data infrastructure development effort;
2) "support and promotion of commercial ventures"
3) archiving public policy goals related to transportation for the region
4) minimizing and managing risk
5) provide a self-sustaining reliable traveler information service
6) "effective, efficient use of legacy systems and arrangements"

Private objectives include:

1) "fair return on investment"
2) "guaranteed availability of appropriate data at agreed quality levels
3) free market access to all ISP's

PBSJ stresses the business to business markets and sales as well as promoting ATIS services to regional travelers. The team will look to coordinate marketing efforts with other ISP's and other information product developers within the broader market for information services. These efforts will be coordinated with separate efforts by Traffic Station and Metro Networks.

Traffic Station "has secured co-branded distribution and shared revenues" with top internet "information aggregators". It has also entered into

agreements with wireless companies to bundle its traffic information. The goal of their marketing strategy is

> " to build a dominant mobile media company around a core service—traffic and traveler information—just as Yahoo! built the first internet portal around the core service of its search engine" (p. 3-7).

Traffic Station will offer free basic core services, with upgraded personalized services requiring paid subscription. Those who access the free services will be reminded of the additional features that upgraded services will provide. In addition, web access cost will be discounted for those who make equipment purchases such as cellular telephones or pagers.

By employing a national syndication model for its services, Traffic Station will gain advertising revenue as well as revenue from paid subscriptions

Metro Networks and Etak

The information from SunGuide will also be integrated into the Metro-Etak Real-time information for Travelers (MERIT). By the end of 2000, MERIT will make real-time traveler information from 65 cities nationwide available "from a single source from a single location". This would facilitate access to a more national market audience for advertisers, and thus increase advertising revenue. There is no mention, however, of how this revenue would be shared with South Florida public partners.

DTI

The share of Metro Networks contribution in the DTI business plan is the value of radio advertisements. The current value of traffic reports is almost $400,000 for the three county area. This value is based upon 50 traffic reports daily at $100 per spot. Metro will offer up to $200,000 of radio advertising time to provide greater publicity to the telephone service or other FDOT or public partners projects.

The contribution of ETAK is the same as it is for AzTech and Smart Trek MDI's. It will provide licenses for the software and databases used in the Etak systems in return for support of project labor, material, and services expenses.

The data collected as part of SUNGUIDE would be incorporated into the MERIT national traveler information system. Webpages would be provided at www.etaktraffic.com; ATIS services would be provided to Palm VII subscribers and through the Traffic Angel program to wireless subscribers; and traveler information would be provided to in-vehicle navigation devices.

In addition, DTI would establish an automated cable television service. It would also enhance the Etak website to provide information in Spanish, and allow the viewer to access camera images and congestion reports.

Marketing efforts will include highway signing, air-time radio spots, brochures, print media advertisements, sponsorship activities and public presentations. After an initial campaign focusing on brochures and pamphlets, highway signing similar to the present signs advertising SunGuide will be installed.

Analysis

Although SRS presents many opportunities for revenue generation among the various means identified, there is little indication of how much revenue was generated in those markets in which SR presently operates. PBSJ offers more emphasis on Traffic Station's ability to generate advertising revenue and nationwide "business to business" sales than on its marketing efforts to promote ATIS services regionally. As discussed elsewhere, (see pp. 110-112) this approach has shortcomings as well. DTI—as well as PBSJ—offer Metro Networks as a partner in publicizing the services, and does give some indication of what marketing efforts would be made.

Overall, there is little presented that could convince the reader that self sufficiency will be a reality in South Florida. Much reliance is placed upon estimates of revenue generation that accompanied the response and subsequent negotiations.

4.7.3.c.4 4.0 Management Plan

SmartRoute Systems

SRS proposes that there are two major phases to developing the project: phase I: deployment and Phase II: operations and maintenance. Deployment is the "pre-operations" phase that includes such tasks as developing and finalizing the contracting necessary to implement the supplementary surveillance and data collection, the siting and build out of the TIC and the hiring of local staff. The same team of nine professionals will work during both phases. The General Manager, David Fierro, will contribute 50% of his time during deployment, and 100% for the operations and maintenance phase. The other eight team members will contribute no more than 10% after deployment is completed. The General Manager will supervise a Director of Operations, who in turn will supervise the Operations Supervisor and System Administrator.

PBS&J

PBSJ proposes a systems management approach, with a team of professionals from PBSJ managing the entire effort. The project is divided into eight scope of services categories:

1) data and information collection;
2) Data fusion and developing advisories;
3) Information dissemination;
4) Marketing and outreach activities;
5) Record keeping and documentation;
6) Evaluation support;
7) System employment, operation and maintenance;
8) Management and coordination

A matrix is provided that identifies which people from what partners will be involved in which of the eight categories. In addition, the percentage of time each would contribute for each of the five phases (one for approximately each year of the project) of the initial five year agreement is listed.

Three PBSJ professionals would provide overall program management for all eight service categories, with Bob McQueen, Program Manager,

stationed in Winter Park, Florida, contributing from 15-25% of his time. Two Deputy Program Managers, Charles Robbins and Richard Shuman would also contribute from 50-75% and 20-35% of their time. Robbins is stationed in Fort Lauderdale and Shumann in Winter Park. In addition, seven other PBSJ staff would contribute smaller portions of their time over the course of the project.

Staff from the Southwest Research Institute and Battelle Memorial Institute would be involved in data collection and fusion, contributing up to 25% of their time during the first three years of the project. Personnel from Metro Networks would be involved in the first four service categories as well as system operation (category 6). Etak, would not be involved in data collection, but would assist in data fusion, information dissemination and marketing as well as operation. Traffic Station would not fuse data but would provide the same services as Metro Networks. Finally, US Wireless and TechnoCom Corporation are two partners that primarily would be involved in data collection (from arterials as proposed).

DTI

The work schedule listed as part of the management plan is divided into six milestones, with each milestone including a number of more specific tasks associated with it. The timeline offered is also broken into three phases for each milestone and task:

Plan/design/prepare
Implement/operate/support
Refine/enhance/upgrade

The following milestones are identified, with the total amount of time required to complete all three phases:

Etak Traffic Workstation installed in TIC—6 months
Public Data via the TRANSMIT server incorporated into MERIT data—12 months
Traffic Check Television Program Debuts—15 months
IVR Phone Service Commences—12 months
SUNGUIDE Web Page On-line—10 months
Email/Fax Service Commences—10 months (pp. 36-37)

The organizational structure is headed by a team of six MasTec (the parent company of DTI) professionals, with Mike Hunter, the Project Director, located in Atlanta, contributing 20% of his time to the project. John Coyne, the Deputy Project Director, would be located in Fort Lauderdale (contributing 50% of his time), as would four other team members. Eight PB Farradyne personnel would constitute the project management, with James Reynold, Project Manager, the only member located in Fort Lauderdale (50% of his time contributed).

Analysis

It is difficult to assess the management approaches, as each has strengths and weaknesses. SRS has an advantage of placing a full time general manager and a Director of Operations on site in South Florida. PBSJ and DTI do not offer full time managers, although "deputy managers" located in South Florida will offer half or more of their time under the guidance of larger management teams—conceivably with more collective expertise--that will be directing the effort on a part-time basis. In terms of daily operations, a new full-time general manager on site may not be needed because of the presence of Metro Networks.

The issue of the percentage of time contributed by members of the management team can be interpreted in other ways. Private partners wish to offer a sufficient percentage so that public partners have confidence that the management of the project will operate to fully achieve project goals. On the other hand, if the percentage is viewed as unrealistically high, the public partners may feel the percentage is unduly inflated, especially if the time is offered as an in-kind match.

DTI offers percentage of time "available", not contributed. Both Christopher Leonard, the Miami/FTL Ops Director for Metro Networks, as well as the Assistant Director, Chuck Henson, are listed as available to give 100% of their time to the project. Likewise, Gary Latshaw, Senior Managing Engineer for Etak, based out of San Francisco, is listed as available for 50% of his time. In contrast, PBSJ lists Leonard and Latshaw as contributing based on a contract basis, without any specific percentage of time devoted to the project.

The overriding issue concerning management is the confidence that the background and expertise held by the management team members are

sufficient to successfully implement the project. Although a description of the experience of all team members for all three respondents is provided, perhaps the best assessment of these skills can come from the negotiation process.

4.7.3.c.5 5.0 Legal and Institutional Issues

Smart Route Systems

The SUNGUIDE system has three types of data that it will be processing. The first is publicly collected data. SRS requests only a non-exclusive right to have access to this data and to resell it to other private vendors to generate revenue. Regarding the information collected through the SR cameras and detectors, SRS proposes that in exchange for the data to be given to the public partners at no charge it will not be given out to other private ATIS service providers for distribution. SRS is willing to negotiate this policy if the FDOT lawyers hold a different view of the Public Records Statute.

There is no privacy issue, as SRS will not videotape any images received in the TIC from either private or public surveillance systems. SRS proposes to adopt the protocol that it has with the Massachusetts Highway Department to protect privacy of individuals.

PBS&J

The legal and institutional issues section reviews Chapter 119 of the Florida Codes. The responses are divided into 1) data collection and fusion; and 2) information dissemination.

First, the public partners will have access to all data collected by the private partners. Public partners will be prohibited from taking the private data and disseminating it in a "publicly available data stream". Second, PBSJ is not asking for exclusive rights to the public partners data. Third, once the data has been collected and fused, it would be available to other private partners on payment terms that are the same for all who wish to purchase access. This is in compliance with Chapter 119.085, which allows for fees to be charged for remote electronic access to public records. PBSJ recommends that the public partners obtain an exemption from Chapter 119, as it would allow non-disclosure of any information that is deemed to interfere with the goals of the partnership.

Since a free telephone service and website will be offered to the public, PBSJ feels that consistency with Chapter 119 is met regarding access to public records. With regard to historical data, the same issues apply as to real time collected data.

With regards to privacy, PBSJ proposes to adhere to the Interim Fair Information and Privacy Principles as currently adopted by ITS America. These include the following key points:

1) ITS systems should respect the privacy of individuals, and make sure that there are safeguards so that information about individuals that is part of an ATIS service remains private.
2) Information will not be transmitted to law enforcement officials unless ordered to do so by a legal process or government authority.
3) ITS systems will contain protocols to strip personal traveler information from data collected and archived. Once stripped, data can be used for non-ITS applications.

Additionally, data collected from SunPass probes and wireless phone probes will be used to calculate travel times and congestion. Any individual identifying information will be immediately discarded. In the same vein, CCTV images will not be archived.

DTI

A brief discussion states that Metro Networks has agreements with public safety agencies, including five cities in Florida, that protects the privacy of individual names, addresses, and license plate numbers. Data collected by Metro can be used by the public agencies as long as it is not distributed to other private companies. In terms of Chapter 119, DTI states:

> The definition of agency in CH 199.011 includes other acting on behalf of any public agency. That may not actually apply to this project unless the contract makes us agents of the Departments (p. 45)

Finally, DTI feels video feeds are exempt from Chapter 119.

Analysis

All three proposers agree that the privately repackaged data sent back to the public partners can not be made available for use by any other private firm/ISP. They all feel that there is no problem with Chapter 199 issues, although SRS and DTI deal with this chapter in different ways, and PBSJ suggests that the public partners obtain an exemption from this Chapter as a precaution. Privacy is not a concern as well. PBSJ provides the most detailed and in depth legal analysis, as well as the statement that it will adhere to the developing privacy guidelines adopted by ITS America.

4.7.3.d The Results of the ITN Process

During the negotiation process, refinements and clarifications of technical proposals can be made. New ideas can also result from these discussions, as public partners can elicit one idea from one of the private vendors and "persuade" the private vendor chosen to join the public-private partnership to agree to adopt that idea. Adjustments or refinements can be made to the scope of services. For example, it was agreed early in the negotiation process that ATIS services would be offered 24/7. Also, establishing cable TV services became a higher priority as negotiations progressed.

One of the goals of an ITN process is to negotiate price once the technical proposals have been reviewed. After all of the negotiations, the vendors are asked to present a "last best offer" accompanied by any changes in service delivery from earlier versions of the proposal. The challenge facing public partners is to choose a vendor when the proposals differ drastically in terms of price, service delivery and range. In other words, the ability to adequately compare vendor offers can be drastically reduced.

Three other difficulties can enter the price proposal picture. First, if the public partners state during the negotiation process how much money has been budgeted for the project, and two of the three proposers last best offer is higher than this amount, the reality of a lack of funds may force public partners to choose the vendor with the lowest offer. Service quality issues may become a much lower priority in this case.

Second, there is the risk that the last best offer is really too low to provide adequate services, as "lowballing" may occur. The vendor may do so anticipating that additional funds may be obtained from public partners

during the life of the partnership or that promised delivery of goods and services such as CCTV's and other equipment may not have to be provided. Similarly, the public partners may not wish to consider the possibility that the budgeted amount for the project is not sufficient for the private vendor to provide needed services. Because of the more uncertain nature of goods and/or services to be purchased through the ITN process, it would be more likely that attempts to lowball would be less likely to be identified prior to the signing of a contract.

Furthermore, if a cost benefit analysis can be made, the public partners must choose to accept the results and make a decision based upon them, or discount the analysis, claiming it is faulty. In the case of ATIS services in which the public partners expect to receive a portion of revenue generated, a cost-benefit comparison can be made.

The last best offer of SRS was $3.96 million; for PBSJ it was $5.995 million; and for DTI it was $10.34 million. In comparison with the revenue generated over the five years of the project: SRS projected $6.45million; PBSJ $14.594 million, and DTI $8.029. Each of the three offered different revenue sharing schedules: DTI: a flat 10% each year; PBSJ: 0% the first year, 5% the second year, 12% the third year, and 20% for the last two years; SRS: for each year, 10% of first $.8million; 20% of $.8 to 1.2 million; 30% of $1.2 to $1.6 million, and 40% above $1.6 million.

SRS offered to share the most revenue: $3.67 million, a public partner cost to revenue share of 1: .94. PBSJ offered $2.68 million, with the corresponding ratio of 1: .44, while DTI offered $.8 million, a ratio of 1: .06.

In this case, the choice of SRS was justified financially, as the public partners contribution is the least of the three, under the amount budgeted for the project, and the revenue share is the largest and the most advantageous in terms of the ratio of revenue shared to public partner contribution.

4.7.3.e Conclusion

With the recent revelation by SRS that the self-sufficiency model is no longer a workable business model, there must be concerns by the public partners for the long term viability of ATIS services in South Florida. At a minimum, SRS is stating that to continue services past the five year period, additional public funds will be needed. Alternatively, another private

partner could be found at that time; or the minimum ATIS services will be taken over by the public partners.

During the five year life of the current partnership, the role of the public partners must change from what may have been originally envisioned. Trust will be more difficult to maintain, especially if SRS does not generate the projected revenue and revenue sharing amounts. The marketing efforts by the public partners should be more extensive to assist SRS to come as close to self-sufficiency as possible. Finally, there is the great danger that the partnership will slip back into the traditional vendor-customer relationship if public partners perceive that SRS may be reneging on previously promised efforts in order to minimize costs.

4.8 MODEL F: NON-PROFIT

Public collects data; private disseminates data; non-profit fuses data and contracts with private for data dissemination; TANN in Los Angeles

As stated in TANN provided publications:

> "TANN is a media network of travel data suppliers and information service providers brought together in a mutually beneficial business relationship through the efforts and services of a non-profit business manager. Suppliers, providers and the business manager are united in their goal of providing consumers with the most comprehensive, timely and accurate information available to make their travel more efficient, safe and convenient."(Technology Transfer Network Workshop, 1999: 12)

All private vendors who express an interest in using publicly collected data will be granted access to it for a fee. If an individual vendor fails or leaves the partnership, it is expected that other vendors will replace them, or the market will choose other dissemination means.

This model may be appropriate only in the Los Angeles area. With over 200 public agencies contributing data, it was felt that a non-profit agency would be the best approach to establish ATIS services, rather than choose a lead

agency from among public partners. The huge size of the potential ATIS market has attracted a great number of real (and potential) private partners, including:

1. ETAK – Cable TV TrafficCheck
2. CUE – Auto PC
3. Travel TIP – Web site
4. SmartRoute -- Internet
5. Fastline – Handheld PC
6. Metro Dynamics – Intranet
7. Roadirector – Pager
8. TouchVision – Kiosk

4.9 What Should Orlando Do

4.9.1 Option One

Orlando stays in Model A regarding PPP's, focusing on building the public-public partnerships in the short term. FDOT and OOCEA need to build a website with real-time traffic data for I-4 and the OOCEA roadways. With fiber connections, the FDOT TMC can receive and transmit data to other city TMC's. CMS's continue to provide traffic speeds and incident reports, as the incident management systems, including service patrols, are upgraded for both. In this manner public awareness and gradual usage of ATIS services can increase.

4.9.2 Option Two

Orlando moves into Model B or Model C, and makes a concerted effort to establish PPP's. With Model B, an RFP is issued, and funds are provided to support a private more specialized ATIS service. Cable TV, for example, has been one source of travel information that has proven successful in other ATIS deployments, and it can potentially reach a large number of people.

With Model C, working through agreements based only on data exchange—without funds and without "screening" of which private firms have access to the data may not prove feasible—and may prove more chaotic in the short run. The risk associated with Model C is that data may be given to private

vendors who are ultimately not successful in delivering specialized ATIS services. Alternatively, no ISP's may wish to take the data and try to establish an ATIS service. In either case, the public sector policy goal of reaching a greater number of travelers/subscribers through a PPP may not be attained.

Model B may be best, implemented by funding small "operational tests" that could be demonstrated along the I-4 Corridor.

One solution regarding which model to choose is for the public agencies involved to develop their own business model. In the process of creating a model, the priority given to specialized services may be clarified. Business plans should identify goals and objectives that are related to each other in logical, "cause and effect" fashion. To save lives, time and money, it is important to relieve congestion. To relieve congestion more quickly, incidents need to be detected, verified and cleared faster. Also, congestion can be relieved if motorists either begin their trip at a later time or choose an alternative route to reach their destination. The greater the number of motorists that receive relevant information in a timely manner, the greater the number who will choose a different travel time or route.

Most business plans reflect these goals. Differences occur in the choice or identification of objectives which reflect how these goals are to be reached. There are various choices facing public agencies. First, they could allow potential private partners to suggest which means would achieve the goals the most. Alternatively, public agencies could specify which ATIS means they wished to see implemented, e.g., cellular telephones, pagers, etc. A third choice may fall between these two: a business plan could identify a dissemination means which must be implemented by at least one private vendor, e.g., a real time travel map reflecting travel speeds, and/or cable television travel news, and indicate that the choice of additional means of dissemination could be at the discretion of the private vendor[12].

Ideally, the choice of which dissemination means will be supported by the public partner—either by bartering data and/or with "start up" funds—should be based upon a market analysis and resulting commitment to public outreach. If a market analysis indicates there are more cell phone users than pager users, then a private vendor proposing cell phones as an ATIS dissemination means would be preferable to one proposing pagers.

If no such market analysis exists, and the market for all ATIS users is considered embryonic, then the choice of which business plan to adopt becomes more difficult. The third choice becomes preferable, as long as all groups of travelers are able to receive relevant information in a timely manner. Pre trip travelers can receive information through websites and cable television. In the absence of in-vehicle navigation systems, en-route travelers must be reached in some manner. It becomes a public policy decision, then, to determine if VMS's are sufficient, or if the public should support additional means available to these travelers.

4.9.3 Option Three

Orlando moves to Model D or E, contracting with one system manager to perform all functions by 1) adding to the existing data collection CCTV's and cameras by collecting data from arterial roads; 2) taking over the fusion capabilities at the RMTC in Orlando; and 3) contracting with additional private vendors to encourage more specialized ATIS services.

This option contains several risks. First, given the experience of AZTech and others, relying on a system manager to generate additional partnerships may not be successful. The experience of using incentives as in the case of TravInfo II may help if this option is taken. Second, heavy reliance on one system manager may place too much control in the hands of one private vendor. If there are problems with the partnership, and the public partners wish to retreat to a contract management mode, then it may be more difficult to replace the private partner under this option.

Third, the needed strong public-public base to support this option may not yet be in place. If adopted early in the ITS model deployment process, models D and E may be based upon the logic that implementing ATIS services will lead to greater public-public partnerships. As local governments see the success of ATIS, they will wish to join a partnership that may be comprised of the state DOT and the private vendor. Whether this logic is accurate remains to be proven.

On the other hand, adopting model D or E may lead to faster implementation of ATIS services. With a great deal of construction occurring along I-4 in the near future, this Model may provide greater coverage of conditions plus more data collection from arterials. Plus, operations and maintenance of

existing equipment may be more current if the same vendor that operates the TMC is also responsible for O&M.

4.10 Florida ITS Statewide Business Plan

The business plan (the Plan) that is part of the Statewide Florida ITS Plan is a comprehensive, five year implementation plan, scheduled to be in effect from 1999-2004. It provides a series of recommendations designed to assist ITS deployment throughout the state, encompassing organizational, project-based, and financial considerations. The business plan represents the short term plans that will complement the longer range (20 years) statewide ITS strategic plan.

The Plan outlines the need for a statewide ITS Program Manager, with corresponding positions for each DOT district. It lists as highest priority the development of freeway management centers for each district, with applicable operations, maintenance, staffing and training, procurement and architecture development concerns. Each district should also work with local governments and MPO's, provide rural-urban and CVO elements, and support ITS research efforts. Stakeholder involvement, including private sector representatives, at statewide, regional and project levels, is important for all implementation efforts. Program budgeting and funding for all efforts must also be developed.

The Plan recognizes the significance of public-private partnerships as part of an emerging approach for managing traffic in the 21st century. This approach is based upon several assumptions, including growing traveler demand in urban areas, the considerable financial constraints in using the traditional means of expanding highway capacity through construction, the growing disruption of incidents along highways, and the need for increased consumer responsiveness. Public-private partnerships would support

> "…private provision of a variety of traveler information, logistics, security and amenity services-both free and custom-tailored consistent with the wide range of needs."(p. 7)

Another complementary part of the approach is that of traveler information:

> "…informing the traveling public, business and commercial carriers about current and predicted travel conditions and viable travel options to better match travel behavior with available capacity." (p. 7)

Although the Plan does not spell out which information to travelers would be provided by the public and which by private vendors, there is an emphasis on the PPP as a crucial part of this effort.

In fact, by implication, the Plan would seem to support that PPP's support **all** traveler information. The emphasis on creating freeway management centers and upgrading the capacity to obtain information through cameras and loop detectors seems to be higher priority for the Florida DOT. There is mention of the need for statewide and district level websites, but there is no suggestion of the information that should be found on these websites.

Reinforcing the importance of the private sector, one section of the Plan outlines the need for private sector outreach:

> "Participation by private sector partners is key to the full deployment of ITS in Florida. The Department must strongly encourage proposals, solicited or unsolicited, by firms or persons desiring to participate in the Florida ITS program." (p. 20)

This section also suggests that one method of encouraging private sector participation is to support demonstration projects or field operational tests at the district level. This suggestions would seem to support moving from Model A to Model B, with the Department funding " start-up" costs for private vendors to offer and deploy specialized ATIS services.

Unlike business plans for specific projects such as AZTech and Smar Trek, the Plan does not provide specific goals for ATIS PPP's. It implies that District ITS Plans will identify these goals and the means to implement them.

4.11 I-4 Corridor Coalition Business Plan

The I-4 Corridor Coalition has drafted a business plan that is designed to implement the more inclusive Florida Statewide ITS Business Plan discussed above (PBS &J, 2001). This I-4 Plan describes the "challenges, opportunities, strategies and tactics" that will become the basis for an implementation strategy that will identify specific projects including potential funding sources. The I-4 Plan

> "is one element of the I-4 ITS Corridor Study which is designed to deploy ITS technologies in a coordinated, integrated, interoperable and cost effective manner" (p. 5)

The I-4 Plan groups ITS deployment into three more general areas or themes: Coordinated Operations, with a strong focus on incident management; Facilities Management, which focuses on regional traffic management in support of incident management, transit management, emergency management, CVO and electronic toll collection; and Central Data Warehousing and Regional Information Distribution.

Strategies and Tactics are also grouped under several headings, including deployment management, which includes developing common public information content; operations management, which includes establishing an operations committee; and the development of PPP's.

Relevant to PPP's, Appendix B of the I-4 Plan outlines answers to several key issues in adopting ATIS PPP's. Revenue can be generated through such partnerships dealing with websites, customized subscriptions, and advertisements on the 511 traveler information number. It may be, though, that revenue would not be expected from any ISP's because of the public benefit of the information provided.

5.0 Key Issues Relevant to ATIS Private-Public Partnerships

5.1 ATIS Consumer Surveys

Consumer demand for ATIS products remains a mystery in most metropolitan markets. In markets such as Phoenix and Seattle where ATIS information has been disseminated by private vendors, consumer

subscriptions to personalized information have been much lower than forecasted. In response to customer surveys distributed by the national MDI evaluation team, the reasons for this lack of success include:

1) satisfaction with the information provided on the public agency sponsored real time traffic website (Seattle) and/or via cable television newscasts (Phoenix);

2) a satisfactory number of arterial roadway alternatives to freeway travel (Phoenix); and

3) lack of awareness of ATIS products such as receiving information via cellular telephone or pager.

Consumer demand is also influenced by other factors. Lappin (2000) cites four major factors:

1) regional traffic context;
2) quality of ATIS service;
3) individual trip characteristics;
4) characteristics of the traveler.

Each of these factors needs to be examined in more detail than that provided by the MDI analysis. The interrelationship among various aspects of these factors may explain consumer demand for more than one factor. A more thorough discussion can lead to recommendations to improve ATIS service delivery and acceptance.

First, the nature of ATIS services must be discussed. It is important to identify which may be provided by the public sector and which by the private sector. In the Seattle and Phoenix MDI experiences, for example, the state DOT has collected and fused the data, providing a real-time traffic website with information for the traveler about freeway conditions, in addition to using variable message signs on the freeways. The private sector role is to "add value" to this information by disseminating it through means such as cell phones, pagers, email, faxes, and kiosks, as well as adding personalized information.

In other areas, the public agency furnishes some information via Highway Advisory Radio (HAR). Real time traffic speeds are not posted, but rather

construction information and incidents are broadcast using HAR. In a real sense only using HAR represents a minimal ATIS, as HAR information may not be timely, leading to low usage by the traveling public-. The private role can potentially provide a real time traffic map as part of its personalized services.

Second, the type of information furnished by the ATIS must be categorized. Recurrent congestion, influenced by factors such as weather conditions, peak or rush hour time periods, and day of the week, can be identified through loop detectors, cameras, microwave, etc., and transferred to websites or VMS. Average speeds on a traffic map or Information concerning road construction can be disseminated in a similar fashion, instructing the traveler concerning alternative routes.

The markets most receptive to ATIS services are those characterized by high traffic congestion, limited options to add more traffic lanes to existing freeways and major arterials, constrained alternate route options, and frequent incidents that add to congestion. (Lappin, 2000). Although these are relevant contributing factors, they need to be prioritized and expanded.

More important than high traffic congestion, measured by vmt's, for example, is the public perception that traffic is a highly prioritized public policy problem in a given metropolitan area. In one area, delays of five minutes during peak hours may reflect strong public concern, while in other areas waits of twenty minutes may be more accepted by the traveling public if traffic congestion is overshadowed by more pressing problems.

The existence of viable alternative routes to major freeways has an unclear impact on consumer demand. If there are few alternative routes, and the traveling public has some degree of scheduling flexibility, then knowledge about congestion on the freeway will be of some benefit. The commuter who can leave work at a later time than usual because of undue congestion will benefit from information about that congestion. Otherwise, it is unlikely that knowing about congestion on the freeway will influence trip behavior.

5.2 Marketing/Market Assessment/Public Outreach Issues

The issues raised by traveler or customer surveys may be resolved through a greater emphasis on marketing and public outreach to increase public

awareness. In many metropolitan areas, marketing and public outreach efforts have occurred, with substantial funding supporting these efforts in some cases. Yet the low traveler awareness, both of the public websites and the private subscription based programs, suggests that these efforts have not been successful. Evaluations of the MDI efforts in Phoenix and Seattle, for example, have supported additional efforts and a greater emphasis on marketing and public outreach to increase public awareness.

To more fully analyze this area, the following factors are important. First, the difference/similarity in the goals and objectives of private marketing plans compared to public outreach plans should be analyzed. To what extent should these goals/objectives overlap or lead to duplicate efforts to reach overall project goals? Second, what are the target groups that both partners should be identifying? Third, what is the content and emphasis of the message that needs to be conveyed? Selected examples of both public and private plans are discussed below.

5.2.1 The AzTech Experience: Public Outreach and Marketing Efforts

All goals and objectives of outreach and marketing plans should be similar (if the not the same). To the extent that they are not the same, they should at least be complementary, with linkages between the achievement of specific objectives clearly identified. To the extent that this does not occur, the overall success of any ITS project will suffer.

Public Outreach efforts deployed as part of the AzTech project included a wide range of activities. Since it was an MDI project, one of its major goals included increasing local and national awareness of AZTech (DeBlasio, et. al., 1999, Appendix E.2).[13] It chose three groups as part of its target audience: stakeholders, media representatives and the traveling public. Stakeholders included a representative group of local, state and federal agencies, as well as members of Congress, local employers and professional and technical organizations. The media included local editors from newspapers and magazines, as well as contacts with radio and television. Finally, the traveling public essentially consists of commuters.[14]

The methods of reaching these three groups varies considerably. For stakeholders, presentations are made at professional organizations, including Chambers of Commerce, professional business organizations and

transportation groups. Information is also made available to large employers in the Phoenix area. Participation at local and national conferences also has occurred.

For the media, AzTech has written many press releases and held at least two press conferences. The transportation trade press has also provided national and international exposure to AzTech. Updates regarding progress and accomplishments are provided to the press on a regular basis.

The public is reached through advertisements on grocery bags, tent cards in restaurants, ads in programs for local sporting events, billboards, advertisements at local libraries and in inserts in bills sent by utility companies, and announcements on radio and television. AzTech participates in local community events and fairs. Finally, for all of the target audience, information is posted on the website.

5.2.1.a Analysis

It is certain that many of these activities did occur, and that plans made were implemented. The MDI national evaluation team (Jensen, et. al., 2000), however, found that knowledge of AzTech among citizens of the Phoenix area was still lacking and users of personalized ATIS services were few, recommending that additional marketing efforts were needed. Further assessment of what went wrong, or what efforts need to be changed from the original plan is useful in providing insights to other metropolitan regions.

Even though there is considerable overlap among the three target audience groups, there may not have been a clear sense of priorities among these groups. The evaluation team may have been assessing the outcome of efforts made to the traveling public, while the AzTech plan focused more on increasing and maintaining stakeholder support. Perhaps there must be a recognition that there is a natural evolution to successful outreach efforts, and that stakeholder support must be cultivated and solidified before there is a turn to increasing awareness among the general public. Ultimately, though, the acceptance by the general public must be the most significant factor in determining ATIS success.

Second, it is difficult to gauge specifically how many of any one item was distributed, or presentations made, etc., so that anyone knows what percentage of the general public was influenced and is aware of AzTech. In

hindsight, it may be that fewer funds should have been spent on presentations at national conferences and more on billboards or utility bill inserts.

Third, and perhaps most important is the content of the message. Increasing awareness of AzTech as an organization and what it represents may be less important than communicating the availability of personalized ATIS services. Travelers in Phoenix must recognize the AzTech "brand name", but they must also associate that with the range of ATIS services that are available for subscription from the private partners. Although the private partners that provided these services must be expected to also have the goal of increasing awareness of AzTech as they sell a product, it is the lack of coordination among marketing AzTech and marketing a product that may have lead to the result identified by the MDI evaluation team.

5.2.2 Traffic Station Marketing Strategy

In Phase II of AzTech, Traffic Station, as part of the PBS&J team, has partnered with AzTech to provide a variety of personalized ATIS services. These are spelled out in a marketing strategy report delivered to AzTech in July, 1999 (PBS&J Team, 1999). The requirement of this report, due within 90 days of the Notice to Proceed, perhaps represents an attempt to overcome the lack of attention paid to marketing by the public partners in Phase I.

The introduction to the report emphasizes the approach taken by Traffic Station. It is interested in building a national base of traveler information in a variety of metropolitan areas nationwide. In doing so, it feels that it is better able to attract advertisers and gain more revenue than if it relied solely on advertisers for the Phoenix market.

Traffic Station offers a variety of core services, including the ability of a non-subscriber to view real-time traffic information on a web-based map, as well as to receive personalized information regarding usual commuting routes. Telewarning, a service by which subscribers receive notification of incidents, etc, that indicate a change in route choice, is also provided. Under development are a series of services, including intelligent alternate routing for anyone lost within 100 major metropolitan markets; historical traffic flow maps, a ride sharing database, and traffic news.

Its marketing strategy heavily favors use of the internet, as it partners with a number of different private vendors to provide traveler information. For example, it has contracted with Microsoft and Infoseek for "co-branded distribution". In the wireless arena, it is also pursuing agreements with Nokia, for example, to provide "bundled sales of equipment and services". It has made in roads to provide information to a number of television and radio markets. It will also focus on clients in the areas of fleet management, shipping, transportation services such as taxis and rental cars, and those with mobile workforces such as IBM.

Pricing strategies for advertisers--charges per 1,000 viewing pages/ website hits—and for subscribers are also suggested. The approach is to attract subscribers by providing some information for free and offering additional, more personalized information for a monthly or per use charge. It also will provide charges through its bundling services with cellular phone companies, for example, that will be part of an overall fee.

5.2.2.a Analysis

The Traffic Station marketing strategy seems comprehensive and multi-faceted, relying upon a variety of revenue producing strategies. It seems reasonable to explore using the internet as a source of advertising and marketing revenue, given its relatively low cost and increasing exposure as access to the internet grows.

There is little to suggest, however, how Traffic Station plans to market its services to individual travelers in the Phoenix area beyond using the internet. It is not clear whether the range of core services will be offered, encouraging potential subscribers to choose from among them. Or, if analysis of what travelers in Phoenix really want in terms of an ATIS service such as wireless has been or could be performed, then a higher priority could be given to that dissemination mode.

To the extent that the partnership agreement with AzTech identifies the business plan goal of eventual self sufficiency, a marketing strategy should include projected adoptions of the various ATIS services by subscribers in the Phoenix area. These should be linked to the efforts identified in the marketing strategy. Likewise, it is not clear to what extent national advertising revenue is contributing to the commitment of Traffic Station to remain in the Phoenix area after Phase II is completed.

Branding is an important issue, as travelers need to easily identify a brand and quickly associate the service represented by that brand. It is not clear from the Traffic Station report nor from the AzTech public outreach plan what brand should or will be promoted. There seems to be at least three alternatives.

First, both "brands"--AzTech and Traffic Station—are promoted. Public outreach could focus on AzTech and private marketing on the latter. Unless efforts to market the two brands are closely coordinated, though, the public may not be able to differentiate between them.

Second, Traffic Station provides services and closely links them to AzTech in its approach. Their nationwide emphasis, however, would not seem to complement this approach.

Third, AzTech promotes Traffic Station personalized services along with promoting its own brand name. It has already recognized the importance of ATIS, as its business plan stresses getting out information to the most people quickly. The issue here is to what extent personalized ATIS services should be prioritized. If AzTech is satisfied that the number of hits on its website and the number of viewers of cable television programs are high and/or sufficiently growing, then personalized services may be given higher priority. This may be true if in addition congestion is not diminishing significantly.

To the extent that there is a long term commitment to Traffic Station as one of the AzTech partners, then part of that commitment should be an interest by the public partners to help Traffic Station grow a personalized ATIS market. The manner in which this interest manifests itself is a key issue. Would there be a reluctance to provide a Traffic Station link on the AzTech website because local elected officials may think it is not an appropriate role for a public agency to help a private firm make a profit? To the extent that this is true, and there are no legal barriers, AzTech may need to better educate its stakeholders regarding the nature of public-private partnerships.

5.2.3 Partners In Motion: the Washington Traveler Information Service Public Relations and Marketing Plan

Ideally, there should be links between the outreach and marketing efforts. The plan created Global Exchange, Inc. (GEI), on behalf of the public partners, and SmartRoute Systems (SRS), the ATIS private partner, states that there are such links. GEI has the responsibility of providing public relations and "providing public relations services to the initiative overall", while SRS

> "is primarily responsible for reaching travelers, Independent Service Providers, and Commercial Vehicle Operators, in addition to providing advertising and promotion services to the initiative overall (Global Exchange and SmartRoute Systems, 1997:2)

The plan recognizes the overall mission which includes 1) reducing "frustrating and inefficient travel", and 2) creating an environment that will attract ISP's to the greater Washington market. Specific market objectives include doing market research to discover what types of information Washington consumers want; increasing traveler awareness of SmarTraveler; and providing on-going technical support for public agency participation.

SRS states that it will market several services to CVO's, including email, high speed broadband services, emergency alert warnings and in-vehicle navigation devices as they become commercially viable. For subscribers that are not CVO's, SRS will " negotiate with other ISP's to sell its data for resale to end users of traveler information". The means of data dissemination are similar to those suggested for CVO's, plus the Internet and kiosks will also provide information.

Target audiences are identified, along with the stated intention of focusing on the heaviest users of the roadways in the Washington area. In addition, the plan reflects efforts to keep public partners informed, to communicate with specific media including print and broadcast, both in greater Washington and outside the area; and to reach "campaign intermediaries", including government agencies, CEO's and human Resource directors of a wide range of for-profit and non-profit organizations; community, civic, religious and social groups; and colleges and universities.

Specific tasks as part of overall strategies and tactics are outlined, along with identifying which organization is responsible for each task. GEI intends to foster a campaign identity, work with the media by developing/executing media events, creating news releases, coordinating media tours, create a speakers bureau, and tie into conventions and conferences. SRS will develop promotional materials and take care of advertising in a variety of modes. Finally, development and distribution of brochures and newsletters will be the joint responsibility of both partners.

5.2.3.a Analysis

The plan ties together a wide variety of public outreach/relations and marketing efforts. It promises a great deal of cooperation among public and private partners in ways that other similar efforts do not. There is much evidence that many of the activities planned did take place.

Information regarding measures such as the number of hits on the SmarTraveler website are not available. As discussed elsewhere, other indicators though suggest a low traveler awareness of SmarTraveler. If SRS is not self-sufficient in the Washington market, the relevant issue is to what extent are the reasons due to a lack of sufficient marketing and outreach efforts.

One key area is the attraction of ISP's to provide additional services to travelers and CVO's. There is some indication that efforts to attract CVO's were not successful, and the same could be true for ISP's who would provide subscriber services to commuters and other target populations. To the extent that this is true, the situation in Washington is similar to other efforts to disseminate ATIS services.

5.2.4 Solutions

As indicated in the above discussion, market research would be invaluable. Potentially it could identify the dissemination means preferred by the traveling public. It may also help to increase awareness of the ATIS services available, by increasing "brand name" recognition by the public.

However, it is recognized that performing marketing research regarding existing products is an inexact science with much potential for error. For

products that are innovative, for which there are no existing models or versions, the marketing research is even more difficult (Lappin, et. al., 1994). Because the consumer has little experience with the product, the research may have to proceed more slowly with many iterative steps. Under these conditions, responses from lead users may be more valuable than from a sample of the general public. It should also be anticipated that views concerning the product are likely to change over time as consumers become more experienced in using the product.

In a similar vein, a study of vanpooling in Puget Sound (Shadoff, et. al., 2001) found that as many as 40% of commuters would use vanpools if they knew about them. Product marketing and packaging would be appropriate just to increase awareness. This approach would be applicable to ATIS services as well.

Another approach would be to offer incentives for potential users beyond subscribing for free to more personalized services. Frequent Flier miles, discounts on gasoline, discounted auto insurance and low cost loans are examples that fall into this "affinity" program. 30% of commuters would use vanpools if these incentives were available. Additional incentives, such as tax breaks, could be offered via public policy decisions.

A demonstration project tried by Partners in Motion in the Washington DC area shows promise as a means to increase awareness and traveler acceptance. The project involved using push technology to reach selected participants by various means, sending them information via email and/or pager at various times of the day without responding to a traveler request for this information (Miller, 2001). Participants were chosen from those employers in the region that agreed to participate in the project. Although there were technological problems with data transmission, over half of the participants that received the data did change their departure time.

5.2.5 Conclusion: Orlando applications

The issue of how much of what type of outreach and marketing and in what manner is key to achieving greater awareness and increase ATIS subscribers. The amount of congestion experienced by the user is another key element that is important. In Orlando, there is the assumption that every traveler who uses I-4 or the E-W expressway to commute to work would welcome the

information provided by an ATIS. This assumption needs to be tested before PPP's can be established (Jensen, et. al, 2000: 87-4-45)

Potential ATIS users in the Orlando area must be identified. Seattle profiles indicates that lower income users follow the cable TV traffic information and Transit Watch, while others use the WSDOT website and SmarTrek. When choosing the range of information that we can provide in Orlando, an assessment of likely user profiles needs to be made.

The issue of the availability of arterial roads for the Orlando commuter is also significant. There must be some assessment of to what degree arterial roads are perceived as viable alternatives. If they are not, then for the commuter pre-trip information is not of much use unless there is an incident on the major freeways. Also, pre-trip information will be more important than enroute information, because the commuter will not leave the freeway unless there is a major incident causing much higher than normal congestion. Having traffic information for arterials available for the commuter may be important if/when they become viable alternatives. Outreach efforts may help to dispel inaccurate perceptions about the amount of traffic on arterials.

6.0 Public-Public Partnerships

Public-Public Partnerships (PubP's) consist of state and local agencies and governments which coordinate efforts toward deployment of ITS. There are many similarities to PPP's. The nature of ITS is highly uncertain, there are risks that projects may not succeed; cost sharing is normal; the range of participation by public partners varies considerably; and the partnerships are considered long-term.

There are significant differences. There may be stronger barriers to creating the PubP's. Differences in terms of public policy priorities among governments may exist. For some, lessening transportation congestion may be much lower than other issues such as fighting crime. Since cities and departments of transportation have a "monopoly" over transportation policy, they must be convinced that ITS deployment will achieve transportation policy goals more efficiently and effectively than the more traditional ways of building additional roadway lanes.

There may also be barriers of distrust between cities and counties and local governments and state governments. In some states, home rule provisions

have led to parochial views that inhibit local government personnel from working with their counterparts in a given region. A sense of working towards the betterment of a region rather than a specific local area may be absent in many areas as well.

In creating PubP's, there are a variety of issues to consider:

1) the goal or purpose or problem to be solved;
2) the mechanisms by which the partnership can be built;
3) the expected roles/contributions by each of the partners;
4) the need for formal organizational structure/new government organization (NGO);
5) the MOA's or MOU's that furnish the formal foundation of the partnership.

To the extent that there is a pressing, high priority problem that can be solved using ITS, then the creation of public-public partnerships is facilitated. In many cases, if traffic congestion is not perceived as high by the traveling public, then one key incentive to encourage partnerships is removed. If there are efforts geared toward increasing coordination of traffic signal timing across jurisdictions, or the creation of more formalized incident management teams, then PubP's are more likely.

There are a variety of approaches to building partnerships. Much has been written about gaining the commitment from top public managers and finding ITS "champions" (DeBlasio, et. al., 1999). In many communities, the metropolitan planning organization has acted as a catalyst to bring public agencies together. In others, the state DOT has taken the lead. In a few cases, in Atlanta and Salt Lake City, preparations for Olympic games has been the stimulus.

The presence of federal transportation and CMAQ dollars has also been significant, in that it has overcome a major barrier to partnership involvement. It has allowed for "bargains" to be struck that form the basis of partnership agreements. For example, interjurisdictional cooperation in Phoenix was facilitated by the ability of AzTech to provide updated traffic signal equipment in return for cooperation and coordination.

A major issue in the evolution of PubP's is the expected role and contribution made by the public partners. There are partnerships that will

fail unless key local agencies/jurisdictions, for example, are involved. On the other hand, a high level of participation by every partner in multi-agency partnerships may be unrealistic. One key successful element in PubP's is the recognition that public partner participation will vary, both over time and by relevance of the issue to that partner. If small cities choose not to participate early in an ITS partnership, for example, the door should remain open for them to join the partnership at a later point in time.

The creation of a separate organizational structure, often termed new government organization (NGO), is an issue that must be faced by each potential partnership. The choices facing state and local officials include 1) continuing to develop consensus on an informal basis; 2) the creation of MOA's or MOU's; and 3) the creation of NGO's[15]. A fourth option occurs as a result of the creation of a PPP, which may result in the need for cooperation among public partners without an NGO[16].

These organizational choices are influenced by the evolution of public–private partnerships. If there is a lack of legacy agreements or substantial cooperation among area public agencies, and PPP's do not exist, then continuing informal meetings among interested personnel is the most appropriate structure. In one sense these are not PubP's, as it may be difficult to develop the trust, flexibility and openness over the long term without some formal partnership agreement. It may be, however, that the relationships built during informal discussions will lead to a more formal agreement. In this situation, an MOU concerning tentative commitment to traffic signal coordination or IM is the most likely PubP to result.

6.1 MOU/MOA Applications

6.1.1 Transport—Portland

The MOU, not much more than a page in length, created by transportation agencies in the Portland, Oregon metropolitan area represents another scenario. Here there is a strong legacy of cooperation and coordination among public transportation agencies. There is no need for an extensive organizational structure. The public agencies that signed the agreement are the Oregon DOT, the city of Portland DOT, and Metro—the Portland area MPO. A steering committee is established to provide program guidance, and Oregon DOT, the proposed lead agency provides a full-time staff person "to be responsible for overall program leadership and coordination of system

and subsystem implementation". This very loose structure is sufficiently flexible to allow contracts and sub contracts with private vendors as they occur. Any intellectual property rights issues that arise will be "separately negotiated" with applicable team members.

The MOU also contains appropriate language that reflects the independent roles of all team members:

> This MOU shall not constitute, create, give effect to or otherwise be construed as a joint venture, corporation, pooling arrangement, partnership, contract or formal business organization of any kind. The team members shall be deemed to be independent contractors, or as applicable, independent agencies, and the employees of one shall not be deemed to be employees or agents of the other. No team member identified in this MOU shall have the authority or control over any other team member, nor shall any team member have the power to bind any other team member. (MOU, Portland ITS Deployment, 1999)

6.1.2 South Florida

In contrast, the MOU signed by the public partners who are participating in the ATIS partnership with SmartRoute Systems in South Florida is much more specific. Required by the FHWA in order for federal funds to be approved, the over four page MOU identifies four sections: Purpose, Background, Roles of the Parties, and Conclusion (MOU (South Florida)), 1999.[17]

The Purpose section begins by identifying the partners: Florida DOT Districts 4 and 6, Florida DOT Turnpike, the MPO's of Broward and Palm Beach Counties and the Miami area, Miami-Dade County, Palm Beach County, the Tri-County Commuter Rail Authority, and the Miami-Dade Expressway Authority. It states that these partners are "interested in providing uniform, multimodal, real-time traveler and traffic information" in the South Florida (Tri-County) area, in a cost-effective manner under the SUNGUIDE Program". The purpose of the MOU is to document and coordinate each agency's roles and responsibilities in implementing ATIS

services, referencing the contract with SmartRoute Systems. It is expected that additional MOU's may occur among the public partners.

The background section refers to a 1994 study that recognized the value of regional ATIS services. There is also the recognition that the public partners have already initiated many projects and deployed infrastructure that may become part of the new regional sub-system. There is the implication that the private partner may use the data collection and dissemination means already implemented.

The roles of the public partners are then identified in general terms. Florida DOT District 6 assumes the role of lead agency and overall responsibility for the partnership. Florida DOT District 4, the Turnpike District, Tri-Rail and MDX "will coordinate and provide technical assistance". The MPO's will help District 6 coordinate, while the county agencies will "review and evaluate" plans for any installation, with the expectation that the impact of these installations on daily county activities will be minimal.

Although the roles are spelled out in general terms, the responsibilities are more specific and with potentially greater impact. Public partners are to provide full and open communication, sharing with private partners their knowledge of local conditions. More important, they are to operate and maintain their own ITS systems and provide to the private partner at no cost the data collected as well as other resources. Finally, they are also to provide access to public right of way areas as needed.

6.1.3 AZTech Public Partnership IGA

As the primary PubP for the AZTech MDI project, one Intergovernmental Agreement form was used for all local agencies to sign. The IGA refers to the AZTech project, indicating that the intent of this agreement is to "define the terms of the parties with respect to respective responsibilities for the project". The role of the designated public agency is first to jointly develop projects that will advance multimodal ATIS projects, expand existing transportation management systems, and "facilitate" traffic signal coordination across jurisdictional boundaries. Each public agency/local government is to provide a representative to a regional traffic signal working group, and permit integration with specified private partner systems as needed. Each is to provide appropriate information concerning events and

construction efforts as well as support outreach and marketing efforts of AZTech (AZTech, 199?).

In return, the State of Arizona agrees to fully participate in the development of regional ATIS services and an ATMS. The state will "allow timely access to the State traffic system databases". It will participate fully in the development of traffic signal coordination. A key point follows:

> Contribute financially, in amounts to be determined and approved by the State on a case-by-case basis, to obtaining, installing and maintaining field equipment such as detectors, monitoring equipment, motorist information equipment, etc. Be responsible for any contractor claims for extra compensation due to delays or whatever reason attributable to the State. (p. 3)

Finally, the agreement can be cancelled by either party with 30 days notice.

6.1.4 NITTEC (Buffalo/Niagara Frontier) MOU

The Niagara International Transportation Technology Coalition (NITTEC) MOU was signed on March 1, 1999 by representatives from the following public agencies: Ministry of Transportation Ontario; New York Department of Transportation; New York State Thruway; Niagara Frontier Transportation Authority; Buffalo and Fort Erie Public Bridge Authority; Niagara Falls Bridge Commission; Erie County; Niagara County; Regional Municipality of Niagara; City of Buffalo; Town of Fort Erie; City of Niagara Falls, New York; City of Niagara Falls; Ontario, and Niagara Parks Commission (Ontario). This ten page MOU is different from the other MOU's in that it spells out a specific governance structure.

NITTEC's mission is "to improve regional, and international transportation mobility, promote economic competitiveness, and minimize adverse environmental effects related to the regional transportation system". To achieve this mission, it establishes a multi-level governing body. At the top is the NITTEC Executive Council, which provides overall program and policy direction. It is comprised of the Chief Executive Officers of all public member agencies. The Regional Transportation Coordination and Management Council (RTCMC) is comprised of senior level executives from the member agencies and potential key stakeholders such as FHWA

and local police agencies. It has oversight and approval responsibilities for activities of the three working Sub-committees.

The Traffic Operations Center (TOC) Sub-committee, the Technology and Operations (T&O) Sub-committee and the Business Development Sub-committee are identified in the MOU. These all consist of senior staff level employees from the member agencies. The TOC is responsible for the oversight and guidance of the member TOC's. It will monitor traffic congestion and recommend "traffic management strategies to minimize delays and improve safety". It also receives construction plans and coordinates solutions to any mobility problems because of conflicting lane closure plans. The TOC also operates and controls selected ITS elements.

The T&O Sub-committee identifies and coordinates member plans for the use of ITS elements, and facilitates the development of "regionally compatible ITS technology for traveler information and traffic management". The Business Development Sub-committee administers the Revolving Load Fund and actively pursues business opportunities to generate revenue for NITTEC.

Three other aspects of the MOU are significant. First, the term lasts until March 31, 2001, with an automatic extension for another year unless termination is agreed to by a majority of member agencies. Second, any member may withdraw with 60 days notice. Finally, membership in NITTEC does not in any way commit a member to provide funds for NITTEC.

6.1.5 Analysis

The four preceding MOU agreements that underlie PubP's range from the more general to the specific. In many ways, the TransPort agreement is the simplest, as it designates Oregon DOT as the lead agency with participation by other partners as needed as projects develop. It is the least restrictive in terms of requiring partners to modify their daily operations or activities.

In contrast, both the South Florida MOU and AZTech IGA identify specific roles and responsibilities, with clearly stated goals and objectives. The former MOU refers to the private partner and requires cooperation and assumption of responsibilities for the success and effectiveness of the ATIS services. The IGA is also specific, as it focuses on traffic signal

coordination and traffic management with the provision that the State will provide the needed equipment to facilitate this coordination.

All four emphasize coordination and cooperation among public partners and across jurisdictional boundaries in order to meet common goals. There will be a sharing of technical assistance, collected data, and knowledge of local conditions by South Florida public partners. The State of Arizona will share data collected from state roadways, and the IGA expects local governments to share similar information from local roadways. NITTEC members, through the committee structure, are also expected to coordinate in a regional fashion ITS deployment efforts as well as other efforts that will relieve traffic congestion and improve safety.

The timeframe implied by these agreements varies. For Transport, AZTech and NITTEC, member agencies may leave with notice. This agreement may be what is needed to elicit initial commitment. There is the hope that longer term agreement may result. For South Florida agencies, since the MOU is made with reference to the ATIS agreement with SmartRoute Systems, the time frame must be the same: five years with options for additional timeperiods up to another five years.

Ultimately, the value of these agreements depends upon the resulting efforts of the agencies and their real-time ability to work together. With no funding necessarily expected from Transport and NITTEC members, the resulting effectiveness must rely upon the historical or legacy means by which members have cooperated. These are much stronger for Transport than for NITTEC at the present time. For South Florida, most of the public partners have shared in the public partner contribution to the ATIS partnership. To the extent that their contribution was made with the expectation that revenue would be forthcoming, their willingness to participate may be lessened with the prediction that revenue will be less than expected. For AZTech, it is the future operations and maintenance costs that must be borne by the local agencies that will be significant in maintaining the IGA.

Many of these issues can be affected by the means by which these agreements were formed initially, and the roles played by organizations and committees formed by the MPO's. This topic is addressed in the next section.

6.2 Integrating Transportation Planning and ITS: Building Public-Public Partnerships

In many metropolitan areas, such as Phoenix and Seattle, the metropolitan planning organization (MPO) has played a key role in the deployment efforts to date. In many other areas, the MPO has the potential to replicate the significant efforts that have taken place in these areas. There have been significant challenges and barriers to integrating ITS, however, into the traditional planning process.

MPO's, as they create the Transportation Improvements Plan (TIP) have traditionally focused on expanding highway capacity by adding roadway lanes. ITS projects provide a challenge to this planning process, in that to be accepted they must be rated differently to give enough priority to be highly ranked in the TIP. Furthermore, projects geared to support improved operations have not often received funding support. Since many ITS projects are operations based, MPO staff have been doubly challenged to devise appropriate rating plans.

A second related issue is the role of the MPO in the general ITS project creation and planning. In many metropolitan areas, ITS projects have been deployed by individual transportation agencies without strong input from the MPO. These areas must judge if there is a key role that can be played by the MPO even if it is not a leadership role.

Many MPO's have created ITS Committees that attempt to provide a coordinating role for ITS projects and planning in a given region. Also, the MPO can provide a means by which elected officials are educated concerning the value of ITS projects. In Seattle, the MPO staff provides feedback concerning why ITS projects are not rated more highly in a given TIP process and makes suggestions for projects to achiever higher ratings in the future.

In their study of transportation planning efforts in ten metropolitan areas, Jackson, Dreyser and DeBlasio (2000) identified three conditions and related strategies necessary to help mainstream ITS projects into the metropolitan panning process. These are:

1. "The public **endorsement of** ITS initiatives by elected officials or agency administrators;

2. The presence of **communication and coordination** among transportation agencies in a metropolitan area that leads to a regional perspective for the deployment of ITS technologies;

3. The willingness of area agencies to **collect, share and use data and information** to determine the benefits of deploying ITS products and services, and to make ongoing improvements to operations and planning of the transportation network" (p. 30)

There are various strategies employed to meet each of these three conditions. Endorsement can be obtained through public outreach efforts and committee reports. More important, endorsement can be demonstrated by the appearance of ITS projects in TIP's, regional plans, and advocacy by key leaders. Improved communication and coordination can occur across geographical and mode boundaries. The efforts of MPO staff can play a part in helping to achieve this condition.

There may be a need to convince elected officials and top management personnel of the value of ITS deployment. Before and after studies identifying costs and benefits are most appropriate, even if these studies are of ITS deployment in other areas. Elected officials must also be given a realistic timeframe for ITS integration. Even though initial ITS deployment costs may be minimal, it may be important for benefits and costs to be identified in the short term future, as these officials may decide whether to support operational expenses associated with ITS efforts.

The best means to educate these officials varies. In Dallas Fort Worth, the MPO staff made presentations to the policy-making body of the MPO. In Fort Lauderdale, Florida International University sponsored a half day workshop attended by many transportation officials from across the state. (Jackson, Dreyser and DeBlasio, 2000)

To demonstrate endorsement, ITS projects need to be included in one or more of the following: Regional Transportation Plan (RTP), TIP, Congestion Mitigation Strategy (CMS), and Major Investment Study. If ITS is at least mentioned in the RTP, then it is likely more specific projects will appear in the TIP or other planning documents.

The problem with ITS projects in the TIP is that they are regional in nature. If one jurisdiction that sponsors such a project received all of the funds needed, it would appear to unfairly receive a large portion of the funds, therefore jeopardizing it ability to receive funds for other projects. The costs of ITS projects need to be attributed not to just the lead agency, but broken down and assessed all participating agencies.

CMS projects can include ITS in several ways. In Dallas/Fort Worth, specific ITS guidelines were adopted, indicating, for example, that projects supporting incident management should be ranked highly. They also stressed leveraging transportation resources so that PPP's would be encouraged.

Coordination and communication efforts have been hampered in many metropolitan areas, as agencies have traditionally focused on activities that fall within their scope and boundaries. Also, it is difficult for personnel from agencies to speak with their counterparts in other agencies about ITS project planning if there is no process or policy internal to an agency that allows those individuals to speak on behalf of their agency (Jackson, et. al., 2000: 51). One means is through an MPO committee. In Washington D.C., for example, the MPO created an ITS Task Force in an attempt to showcase ITS efforts.

In many areas, MPO staff have established working relationships with agency staff. They are in a position to assist agency staff to develop more regional ITS perspectives. They are seen as representing an impartial third party view with a strong regional perspective. In Albany they have acted to broker the issue of giving emergency vehicles traffic signal priority. In Denver they prepare traffic signal coordination plans. In Milwaukee they are helping to mitigate institutional issues that have arisen in the creation of incident management scenarios. In Dallas-Fort Worth, they have helped with coordination of traffic control centers, and have been asked by TxDot officials to take a leadership role in ITS deployment. (Jackson, et. al., 2000: 65-66)

Overall, the role of the MPO varies. It generally is viewed as playing a supportive role rather than a central or leadership role. MPO staff must first become knowledgeable concerning ITS. Then they are in a position to educate elected and other local leaders concerning ITS. Their role in

furthering ITS deployment depends upon in large part on their role in allocating funds for specific projects. In other words, if the TIP does not support ITS, then the role of the MPO staff in helping ITS is limited. If CMAQ funds are not available, this further lessens the role of the MPO.

Three levels of mainstreaming of ITS into transportation planning were identified. The most advanced is when ITS applications are routinely considered for funding as part of the normal planning process. The second level is where ITS projects need to be highlighted as part of a regional effort to integrate already deployed ITS components. The third or minimal level is when ITS projects are considered as parts of larger, non ITS efforts. When these smaller projects can be shown to provide benefits, then ITS can be considered as stand alone projects and movement can be made to a more advanced level. In areas where ITS is not deployed and officials are not knowledgeable, it may be better to start slowly rather than mainstreaming ITS immediately and risk a back lash before benefits can be demonstrated.

6.3 Traffic Signal Coordination Partnerships

The extent of interjurisdictional cooperation regarding traffic signal coordination varies considerably. In some areas, e.g. Phoenix prior to the MDI, there is a lack of coordination, as neighboring cities set timing at predetermined times of the year without any regard to actions taken by the each other. In other areas, there are formal agreements that encourage one jurisdiction to contact other neighboring ones if there is an accident or event that would adversely impact traffic flow in those areas. The extent to which cooperation occurs, however, may be inconsistent and sporadic.

ITS deployment offers partnerships that can lead to signal adjustment on a much more frequent basis, along arterial roadways that traverse more than one neighboring jurisdiction. In order to establish the Smart Corridors, traffic engineers and other transportation personnel met regularly. In the process of meeting, relationships were established that created the partnerships.

6.3.1The AZTech Experience

The AzTech MDI incorporated the integration of traffic control centers in seven jurisdictions, paid for the installation of loop detectors and CCTV's

along arterial streets, and created eight Smart Corridors. All of these efforts are part of an arterial traffic management system.

The Smart Corridor operating philosophy is based on a "peer to peer permissive control" plan. All cooperating jurisdictions retain control of their signals. However

> …coordinated timing signal plans for various pre-determined scenarios can be implemented based on consensus between participating jurisdictions. (Zimmerman, et. al., 2000: 5-1)

The Scottsdale/Rural Road Corridor was one of the first established and the only one evaluated by the MDI National evaluation team. The results of the test were positive, and further lent credibility to ITS deployment.

There are 21 traffic lights along this corridor: five in Scottsdale and 16 in Tempe. Prior to the MDI, the cycle lengths of those in Scottsdale were 102 seconds, while those in Tempe operated at 110 seconds. As a result, traffic did not progress smoothly as it traveled across jurisdictional boundaries.

The first test of cooperation involved changing the signal cycle length to 102 seconds for three signals in Tempe nearest the Scottsdale boundary. In addition, the phase split (the amount of time the traffic signal stays green) was reduced for the Corridor roads, while the phase split for side streets was kept the same. The intent was to discover if signal timing changes along the corridor could increase traffic speed while not affecting the ability of local travelers to access the corridor roads from the side streets.

Using a floating car approach with GPS second by second measurements, before and after tests were run for three periods—AM peak, midday and PM peak—for two time periods during January and February 1999. The results were positive, as corridor speed increased 6%, vehicle stops were reduced by 3.6%, fuel consumption was reduced by 1.6%, and crash risk was reduced by 6.7% (Rahka, et. al., 2000). In addition, there were reductions in delays for selected cross streets affected by the signal timing changes. The use of a simulation model affecting all 21 signals along the corridor indicated a potential 21% delay reduction if all signals were set at the 102 cycle length.

6.3.2 The Seattle Experience

In Seattle under the auspices of SmarTrek, similar tests were run. The North Seattle ATMS (NSATMS) corridor was selected to evaluate. The NSATMS provided interconnection with traffic control centers for nine cities, two counties, three transit agencies, the Puget Sound Regional Council and WSDOT's arterial and ramp metering systems. These efforts allow traffic managers in each jurisdiction to monitor traffic and alter traffic signals as appropriate. The subsequent goal was to induce greater interjurisdictional cooperation to implement coordinated traffic signal plans. To counter initial concerns that integrating signal timing would increase congestion rather than reduce it, modeling was performed along two major arterials in North Seattle.

Three different sets of timing effects were modeled during morning peak travel time using thirty scenarios involving variables such as incidents, accidents, and inclement weather. Three measures were used to gauge results: system traffic flow impacts, energy and emissions and safety (Jensen, et. al., 2000). For traffic flow impacts, results included a 7% reduction in delay and a 2.7% reduction in traffic stops. There was no negative impact on cross streets because the phase split was the same as if no signal timing was changed. Change in vehicle emissions was negligible, while expected crashes were reduced by 2.5%. Furthermore, the greatest positive impact occurred under models when traffic demand was higher than normal or capacity limited by weather conditions.

6.3.3. Conclusion: Orlando Applications

The positive results reflected by these studies can be replicated in other metropolitan areas to build support among traffic managers from neighboring jurisdictions to create partnerships involving signal timing changes. These partnerships in turn can help to increase ITS acceptance among professionals in a given metropolitan region, as well as convince political leaders and the traveling public.

With the deployment of signal control devices that can be controlled from one central point, cooperation among traffic engineers and other local officials concerning signal timing is much more feasible. Forming "teams" of local representatives from jurisdictions that govern traffic lights that are in

place along a key arterial, for example, can help to strengthen support for ITS deployment.

In Phoenix, actions necessary to coordinate traffic signal control operations were instrumental in building inter agency cooperation. These actions were initiated by an MPO study that focused on this need and began to encourage cooperation. The existence of an ADOT TMC, in the works for 10 years, also helped.

Both Phoenix and Seattle report no adverse effect on cross street traffic due to coordination of signals across jurisdictions. Similar studies could be performed in Central Florida. If the results are the same here, this information would help convince political leaders that signal timing agreements should occur more so than they do now.

Perhaps one of the best ways to help deploy ITS in Orlando is to identify "smart corridors", similar to the way in which AZTECH did in the Phoenix area. These corridors consist of both freeways and major arterial roadways. One obvious corridor is I-4, building upon the work already started by the I-4 Corridor Coalition. Another is the East-West Expressway. Key along these routes is signal coordination from among cities/counties that offer arterial alternatives. As the RCSS develops, perhaps these signal coordination agreements can come to fruition.

6.4 Incident Management

6.4.1 Evaluation of Incident Management Programs

Incident Management (IM) Programs have existed in metropolitan areas since the 1960's (Grenzeback, 1990). IM can be defined as

> An operational strategy for a transportation network that involves a coordinated and planned inter-jurisdictional, cross-functional, multidisciplinary, and ongoing approach to restore traffic to normal conditions after an incident occurs, and to minimize delay caused by the resulting disruption to traffic flow (ITS Program Office, 2001)

Evaluations of these programs (e.g., Maas, 1998) focus on the reduction of delay due to IM efforts that restore traffic to a normal flow after the

clearance of an incident. There has been little evaluation of the IM process, of the partnerships that have been formed, and of the resulting policies and coordinated efforts.

6.4.2 Incident Management: Effective Partnerships

Congestion occurs when the number of travelers that wishes to travel on a highway exceeds the traffic-carrying capabilities of that highway. There are two types of congestion: recurring and non-recurring. Recurring occurs when the demand is normal, predictable and constant over a given time period. Congestion of this type often occurs during peak or rush traffic hours. Non-recurring is caused by incidents or work congestion. Incidents include vehicle breakdowns, accidents, abandoned vehicles and debris. Work related congestion can be predicted by travelers, while incidents cannot be anticipated nor predicted. Of the two types of congestion, studies have suggested that non-recurring congestion causes 50-70% of all congestion.

As a result, incident caused congestion is often the most frustrating for the traveling public, and the one that will become the most salient political issue. Incident management (IM) programs, created as partnerships among traffic management centers, law enforcement personnel from various jurisdictions, and service patrols, have become increasingly important as a publicly recognized way to limit recurring congestion.

IM is not established to create a response to an incident, but to create opportunities for more effective responses by appropriate agencies. IM programs add a traffic management perspective to legacy agreements that result in responses to incidents. The result is a much more efficient and effective system, with faster response time by appropriate agencies the likely result.

6.4.2.a IM Program Challenges

The challenges facing effective IM programs include institutional barriers. Law enforcement and fire agencies may not be overly receptive to the inclusion of the traffic management operators as partners in responding to incidents. Legacy agreements may not be effective, if appropriate agencies are not responding quickly.

One method to increase effectiveness is to create formal IM Programs. These involve the commitment of upper management as well as the participation of mid-management and personnel from a variety of law enforcement, fire and emergency, transportation and other interested organizations. Although more difficult to achieve, the process of establishing a formal program, involving agreement regarding goals, objectives, policies and protocols, is likely to produce a more long-lasting program (ITS Joint Program Office, 2001).

In the process of creating a formal program, participants may gradually realize its value. They are more likely to identify those roadways that are particularly sensitive, either politically or in terms of accident frequency. They will identify whether normal operations are adversely affected by incident investigations that are not carried out effectively. They will identify the specific goals and objectives relevant to the program. Also:

> Individual jurisdictions may not like specific aspects of the management system (or would prefer alternatives to the selected options), but they may willingly accept those aspects when given a complete understanding of the context of procedures within the scope of the entire incident management process and the benefits that will accrue from that system (Mannering, et. al., 1995: 1-38).

Whether or not an IM Program is formalized, it faces the same kind of challenges. IM is not a high priority for most organizations involved, and is not likely to be separately funded. Pearce's (2000) assessment of IM programs is that they are only moderately deployed nationwide in the 78 cities of the ITS Tracking Project. To the extent that transportation agencies can offer incentives, such as the funding of Total Station equipment as has occurred in AzTech and Artemis, involvement can be encouraged.

Interjurisdictional boundaries can pose barriers as well. If local law enforcement have jurisdiction along freeway sections that run through their cities or counties, they may be unwilling to agree to work with law enforcement agencies that have jurisdiction along neighboring sections, or with state police or highway patrols. Jurisdictional issues such as these arise when responses are made by personnel from more than one city or county, especially when there is disagreement over immediate objectives of those onsite (Manning, et. al., 1995).

Partnerships that comprise IM programs are based upon the recognition that varying agencies can benefit from communication and cooperation from each other. This realization may not be readily apparent. Traffic operators may identify and verify incidents, increasing response time of law enforcement agencies, as well as sending the most appropriate vehicle to the scene. In return, however, police and fire agencies must also notify operators of incidents so that motorists may receive timely information. Police that are managing an accident site, for example, should give a best estimate of clearance time to the TMC operator. They must also work to clear the incident as soon as possible so that traffic congestion is minimized. IM partnerships fail if this "two-way" communication does not occur.

6.4.3 IM Program Evaluation Criteria and Measures

In assessing or evaluating an IM program, several factors must be considered. Measures such as response time, clearance time, and motorist delay savings reflect the results or impacts of several related IM activities. The standards used in interpreting the performance reflected by these measures must include the incident type and severity, the frequency of the incidents, the time of day and day of the week, the highway location, the potential accuracy of relevant information about the incident, the existence of service patrols, and the existence of any secondary accidents.

The existence of agreed upon management protocols and the communication networks that underlie these influence both the resulting performance and evaluative standards. If law enforcement fails to notify traffic operators about an accident on a freeway segment that is not monitored by CCTV's or loop detectors, for example, an increase in secondary accidents is a likely result.

Effectiveness of IM Programs may also be impacted by the existence of relevant technology or infrastructure. A real-time traffic map accessible by a state DOT website, for example, as is the case in over two dozen cities nationwide, may mean more motorists will obtain information about an incident in a timely manner and choose routes that avoid the incident. As a result, less congestion may result with fewer additional incidents compared to a similar situation in another metropolitan area without real-time traffic maps.

The steps that comprise IM include: detection, verification, response, site management, clearance, and communication to motorists. A review of each step more clearly identifies the role of traffic management in responding to incidents along with other partners.

6.4.4 IM Steps: Detection and Verification

Partnerships that are a part of IM begin with detection. As identified by PB Faradyne (2000), there are several ways that an incident can be detected. The most frequent of these are:

1) motorist calls via cellular telephone;
2) motorist aid telephones or call boxes;
3) police patrols,
4) closed circuit TV cameras viewed by operators in a Traffic Management Center (TMC);
5) electronic measuring devices such as loop detectors combined with algorithms that measure traffic abnormalities; and
6) roaming service patrols.

The first two would constitute the majority of detections under a response that does not include traffic management. The latter three are contributed by transportation agencies.

Each source can be analyzed in terms of the nature of the incident; the accuracy of the information and subsequent verification; operational issues such as the closeness of an SP to the incident; the relationship or partnership one has with other sources, including the initiation of the detection and the response to it. Once this information is established, protocols can be developed to establish ideal procedures.

6.4.4.a Nature of the incident

Incidents are usually classified as

1) crashes, including those that cause property damage and/or injuries;
2) disabled vehicles;

3) fires; and
4) debris.

Ideally, response to these incidents should be made by different agencies. Disabled vehicles, for example, should be responded to by SP's, as they have the authority and equipment to assist motorists. Police should not be expected to carry water, gasoline, or fix a flat tire. SP's can also be the first to arrive at an incident scene, contacting police for assistance if there is a crash involved.

The frequency and types of incidents are vital in determining the ideal response. A 1984 FHWA study reported that 80% of incidents were disabled vehicles, 10% were abandoned vehicles and debris, while only 10% were crashes. A 1998 study by Pal, et. al. of Hoosier Helper log recorded data regarding incidents (1991 to 1996) on the Borman Highway in Northern Indiana reports that disablements totaled 67.8%, abandonments were 18.7%, debris clearance 7.7%, and crashes constituted 5.3% of the more than 26,000 incidents reported over a five year period.

Moreover, 35% of all crashes involved multiple vehicles. This is because of secondary crashes. The existence of trucks in a crash increases the clearance time, as the overall average for all crashes was over 23 minutes, while for trucks it is 39 minutes. Crashes involving trucks constituted over 32% of all crashes (Pal, 1998).

Clearance times were influenced by the shoulder in which the crash occurred and the time of day and weekday versus weekend occurrence. Clearance times were higher for incidents that occurred in lane or on a ramp than on a shoulder. Clearance times were higher during peak periods than off peak periods.

Communication between police and SP's is crucial, in that both can assist each other. Most important, the SP can relieve the police of tasks that are not crucial to the law enforcement mission, e.g., assisting motorists whose vehicle has become disabled.

Historically, the importance of managing traffic at an incident scene has not been appreciated by law enforcement personnel. With the existence of TMC's and the concurrent growth in SP's, this appreciation has grown. Traffic operations personnel can assist police in a number of ways. First,

incidents can be verified much more quickly. Cameras can zoom into an incident to more clearly identify whether it is a major crash or a disabled vehicle. Second, SP's can be sent to the incident scene if they are closest. SP personnel can assist in managing traffic by preventing secondary accidents caused by motorists stopping suddenly because of a queue caused by an incident.

6.4.4.b Detection: Issues Influencing Accuracy

Each means of detection faces challenges in terms of accuracy and reliability, no matter what type of incident occurs. Cellular phone calls may have problems in identifying exactly where the incident has occurred, especially if there are no nearby road markers. Travelers passing by an accident may call 911, overloading the switchboard with redundant calls or with calls providing conflicting information. Call boxes provide the exact location, but may not be available, especially on arterial roads. The probability of a police patrol passing by an accident may be remote, especially if law enforcement agencies are understaffed and busy with other activities.

Traffic management adds to the accuracy and frequency of detection, but these means are relevant primarily to freeways. Also, they are found more along freeways in urban areas, and not in rural areas. Service patrols, for example, may be available only during peak traffic hours along only certain road segments.

Effective detection means incidents are identified as soon after they occur as possible. Potentially, using CCTV and loop detectors, traffic management operators can detect an incident faster than by any other means. This information can then be communicated to law enforcement and other agencies. CCTV's also have the value of accurately communicating the nature of the incident, thereby ensuring that the responding agencies are the most appropriate. If there is an accident with injuries, emergency medical services need to be called immediately. If traffic is delayed because a vehicle has become disabled, a service patrol may be the only response necessary.

If CCTV is not available, information flowing from loop detectors along with the detection algorithm chosen can help traffic operators in detecting

incidents. The choice of the most appropriate algorithm must be balanced with the false alarm rate:

> With most incident detection algorithms, the false alarm rate increases as the detection rate increases. Also, the false alarm rate increases as the detection time decreases (Carvell, et. al., 1997: 8-19).

If the algorithm is set to detect minor variations in traffic speed, the potential that it will detect increased recurring congestion rather than an incident occurrence increases.[18]

The balance between detection rate and false alarm rate depends upon a number of factors, mostly involving the operational procedures established to identify whether an incident has occurred (verification). If CCTV exists, it is relatively easy to see an incident. Otherwise, if service patrols are in the area, the traffic operator can communicate with them to verify an incident.

Historical data and traffic modeling procedures can be used to set the alarm rate for a section of roadway at a given time of day. This would allow the traffic operator to minimize the chance that the algorithm would not detect an incident that has occurred.

Without service patrols, detection must rely upon other means to confirm the incident and verify its type and magnitude of severity. Law enforcement personnel can be sent to the area. This option may be limited if the incident is not an accident or blocking any traffic lanes. In this case, if understaffing exists or other activities are given higher priority by local police, response may be less. Alternatively, the traffic operator must wait for calls from call boxes or cellular phones from travelers to confirm the type and nature of the incident.

The frequency of traffic operator detection that occurs prior to other means, however, may be minimal. A 1997 study in the State of Washington determined that 80% of all incidents were first reported by motorist calls (PB Farradyne, 2000: 2-32).

6.4.4.c Verification

Verification, the next step, is where the value of IM partnerships may be significant. With CCTV, detection and verification by traffic operators is simultaneous. When motorist calls come into 911 centers, though, the incident can be verified by CCTV and/or service patrols. The location of the incident can be specified. Law enforcement personnel could respond only if accidents/injuries were involved and/or any traffic lanes were blocked. Since accidents comprise only 10% of all incidents (Grenzeback, 1990), the value of traffic operator verification is greatest in preventing law enforcement from responding to an incident that can be more appropriately handled by service patrols. Also, verification can assist law enforcement in prioritizing responses when there are several incidents reported within a short timeframe, such as may occur during peak hour traffic.

Partnerships are less than effective when law enforcement personnel such as dispatchers do not interact with transportation officials regarding incidents. This is especially relevant when major incidents on arterials or on freeway sections not surveyed by CCTV's or loop detectors occur. If transportation operators are not informed of these incidents, secondary accidents are likely to occur that could have been prevented with information displayed on CMS for travelers on other sections of the freeway.

6.4.4.d Response

Effective response means reaching the scene of the incident as quickly as possible, both in terms of first arrivals as well as the most appropriate response units. Response time depends upon a number of operational factors, many of them also relevant to detection and verification. Without verification from transportation operators, law enforcement personnel may send vehicles that are inappropriate for an incident, e.g. fire department personnel when there are no casualties or fatalities. If a large trailer has overturned, towing companies need to send the appropriate vehicles to remove it.

Response also means preparation and training by the appropriate agency. If these preparations can be standardized, the IM program will benefit.

If service patrols are operational, they can often be the first to arrive on the scene of an incident. They can be contacted by traffic operators and/or law enforcement personnel. In turn, they need to contact appropriate members of the IM team. Protocols involving SP initiating information should be established.

For both detection and verification, the role of the service patrol may be significant. An evaluation of the Bay Area Service Patrol (San Francisco) in 1996 reported that 92% of all incidents were detected by service patrols (PB Farradyne, 2000, p. 2-38)

6.4.4.e Site Management

Site management involves coordinating all activities at the scene of an incident. It involves activities such as :

> Accurately assessing incidents
> Properly establishing priorities
> Notifying and coordinating with
> appropriate agencies/organizations
> Using effective liaisons with other responders
> (PB Farradyne, 2000)

Proposer site management depends upon the first respondent and the nature of the incident. If the SP is the first respondent, and there is no accident, the vehicle can be pushed to the side of the road and tow companies called. Site management remains in the hands of the SP under this scenario.

If an accident is involved, and the SP is the first at the scene, then he/she can place flares, cones and other traffic directional devices on the roadway and begin to direct traffic while waiting the arrival of the police and/or emergency management.

A key aspect of site management should be the facilitation of traffic flow, and the decision to involve diversion plans. Responding vehicles should be parked to minimize the disruption to traffic. In addition

> A triage of the scene should be performed to determine
> task priorities and needs for additional response
> (Raub and Shofer).

As soon as it is determined that tow services are needed, a call should be made.

A key aspect of policy should be the identification of what conditions need to exist before diversionary plans are deployed. The decision criteria should include the number of traffic lanes blocked—reduction in highway capacity—and the length of time needed for highway clearance.

6.4.4.f Clearance

Closely related to site management is the site clearance step. Ideally, the site should be cleared as quickly as possible in line with decisions made by the response units in charge of the site. If the SP arrives and can push the disabled vehicle to the side of the road, he/she should be trained to do so. If the site requires tow trucks, these should be called as soon as possible. If the site requires public works crews, these must be part of the IM team and trained to respond appropriately.

6.4.4.g Motorist Information

Getting information to motorists should occur throughout the management of an incident. Through the efforts of the traffic operator, information can be posted on variable message signs; broadcasted through highway advisory radio (HAR), and commercial radio and television reports, and distributed via various dissemination means by information service providers (PB Farradyne, 2000).

Effective partnerships result in information provided in a timely manner so that motorists can make informed choices to seek alternative routes. Depending upon whether the motorist is enroute or has the discretion to choose a route before travel, the effectiveness of the information can vary with mode of dissemination as well as the nature and duration of the incident.

For the enroute motorist, each of the information dissemination modes has weaknesses. Commercial radio may not broadcast information frequently enough for the motorist to receive the information. HAR communication also needs to be updated frequently. Plus, motorists have a tendency to tune

into the HAR station only when faced with traffic congestion. Many times this is too late for them to choose an alternative route.

6.4.5 Service Patrols

6.4.5.a Characteristics

Although first established in the early 1900's, the first regularized service patrol, the Chicago Emergency Traffic Patrol, began operation in 1960[19] As of 1997, over 50 metropolitan areas had established service patrols, with almost two thirds of them established in the last decade. More than half of these are funded by state DOT's, with joint sponsorship from law enforcement agencies in some cases.

Frequency of coverage is primarily during peak rush hour times in the morning and afternoon, while more than one-quarter of SP's also provide service during weekend hours. Route coverage is primarily 10-20 miles for each vehicle. Most SP's have also instituted policies that limit the time spend helping each motorist, with over half indicating no more than 10-20 minutes per stop.

The type of services provided included helping motorists by changing a flat tire, providing fuel, extinguishing a car fire, minor engine repair, providing directions and traffic information, and push the vehicle out of traffic lanes. Assistance was also provided during accidents. There was no cost to motorists for these services.

Abandoned vehicles are handled differently depending whether they are blocking traffic or left on the roadside. If blocking traffic, tow trucks are dispatched to immediately remove them. If on the side, the vehicles are tagged. Removal of these vehicles varies according to state law, although many IM teams have reported establishing policies and making efforts to change laws to allow for fast removal.

Since up to 80% of all incidents are disabled vehicles, and 80% of these are found on the right shoulder of the roadway, the importance of service patrols is significant (PB Farradyne, 2000). They comprise a crucial part of the IM team.

6.4.5.b Evaluation/Analysis

Countless examples now exist of highly successful service patrol operations. Thousands of motorists have been helped. In a 16 mile stretch of freeway in northern Indiana, known as the Borman Expressway, over 28,000 motorists were helped from August 1991 to January 1996, an average of 17.8 per day (Pal, et. al. 1998). In metropolitan Los Angeles, with 150 vehicles covering 650 centerline miles, approximately 100,000 motorists are assisted annually (Fenno and Ogden, 1998).

Benefit cost studies have shown similar positive results. Studies performed between 1991 and 1995, using $10 per hour in terms of time savings, concluded benefits outweighed costs by a ratio of 2:1 (Norfolk) at the low end of the range to 36.2:1 (Dallas) at the high end. Furthermore, most of these studies do not take into account savings from lessened fuel consumption and lower levels of pollution resulting from lower levels of congestion. In addition, surveys of travelers indicated a reaction from that is uniformly positive.

The impact of SP's on law enforcement has not been studied. Nor have there been studies of delays before and after implementation or expansion of SP's. Clearly additional evaluations of service patrol impacts will reflect even greater benefits.

6.4.5.c Challenges and Recommendations

The challenges for service patrols remain in the area of effective interactions with other members of a regional IM team. They should be viewed as one of the contributions by transportation agencies to IM. Along with TMC operators, their value must be recognized by law enforcement and other agencies that have traditionally responded to incidents/accidents. Protocols and policies must be established to ensure that there is timely communication between SP operators and other members of the IM team.

Other challenges are more operational. The frequency of coverage remains an issue that should have consistent monitoring. Decisions to expand coverage by adding vehicles, by expanding coverage hours, or by shortening route length should be based on accident/incident frequency as well as average time needed to clear the incident. In addition, the impact of SP's on law enforcement staffing and response times must be considered, as the SP

represents the civilianization of a function otherwise performed by law enforcement and other public safety officials.

With the increase in the use of cellular telephones, the likelihood of motorists calling AAA or tow truck services without assistance from SP's or other IM personnel is also increasing. Any changes in operations must identify and assess the number of motorists not helped by the IM team. Alternatively, the response time of the SP to the motorist after the vehicle breakdown/incident occurs must be taken into account.

IM efforts in a given metropolitan area must be regionally based. The institutional barriers that prevent regionalization can be overcome in a number of ways.

Incentives must be provided to law enforcement and EMS personnel to become involved in regional IM efforts. Deployment of equipment such as Total Station, accompanied by sufficient training opportunities, is one example of an incentive.

6.5 Partnership Formation Issues

6.5.1 Organizational Structure/Institutional Issues

The need for a formal organizational structure to implement the activities identified in an MOU depends on a variety of factors. First, the greater the complexity of the problem or problems to be solved or the range of activities undertaken, the more success is likely with a formal organization. Complexity may be caused by a large number of public partners, as has been demonstrated in the case of Partners in Motion. Second, the more there is a need for a regional commitment to solve the problems, the greater the likelihood of success with a formal organization. Third, the need for decision making procedures that govern the adoption of policies may require a formal organization if the consensus is that the lead agency should not make all decisions without input from other public agencies.

The case of TranStar is representative of the structures and decision making procedures that is found in many of the new government organizations that oversee ITS deployment activities in metropolitan areas.

6.5.2 Organizational Structure: TranStar--Houston

Much of ITS deployment success has come from public agencies and governments coordinating efforts to solve problems by agreeing to share data and information, by identifying roles and establishing procedures and protocols, and by agreeing to share costs to support existing ITS projects. This effort is likely to begin as a natural evolution from the creation of the EDP; or from the process by which the regional ITS architecture is formed. Partnerships may evolve from informal relationships built through meetings to more formal agreements that are based upon MOU's or MOA's. In many cases, new regional organizations have been formed to deploy ITS components. In other instances, the state DOT or local MPO may lead the effort without an extensive organizational structure.

The MOA that serves as the basis for TranStar in Houston is one example. Signed in the summer of 1994, it is an agreement among the City of Houston, Harris County, the Metropolitan Transit Authority of Harris County (METRO), and TxDot. The purpose of the agreement is to:

> establish the organizational structure and allocation of responsibilities for the creation, funding and operation of a Regional Transportation Management Program Consortium…it shall provide for the operation and maintenance of the following program elements:
>
> 1) Freeway Traffic Management System; 2) HOV Lane Surveillance, Communications and Control System; 3) Frontage Road Signal Coordination System; 4) Regional Computerized Traffic Signal System; and 5) Central Control Facility (Interlocal Agreement, 1994: 3-4)

The purpose of the agreement is clearly stated, including the programs or projects that fall under the responsibility of the Consortium.

One key characteristic of an effective partnership is flexibility: the ability of the partners to allow for agencies to leave the partnership, to add new partners, and to adjust the organizational structure and related policies as needed. The TranStar agreement incorporates this flexibility by indicating that partners may leave by giving 90 days notice (after the first 12 months of the agreement).

The organizational structure of TranStar is identified as composing of an Executive Committee comprised of the Chief Executive or designee from each of the partners. This Committee elects a Chairman, whose responsibilities include calling meetings. Each partner has one vote on all matters; a quorum of three of the four members must be established before any actions are taken.

The day-to-day operation is administered by an Executive Director and additional staff, all who are considered employees of the City of Houston. The major duties of the Executive Director are identified, including: 1) serving as a Secretary to the Executive Committee; 2) making recommendations regarding the design, construction, operations and maintenance of the various program elements or projects; 3) and coordinating a series of related functions including the role of enforcement in support of the TMC, responses to special events, the motorist assistance program, regional traffic activities with other public agencies, and the development and implementation of an ITS. In addition, the Executive Director will prepare an annual budget, an operating procedures manual, and maintain all accounting records (Interlocal Agreement, 1994: 8-10.).

In order to provide additional flexibility, and to assure equality among partners, it is recognized that the Executive Director does not have the authority to enter into contracts on behalf of the Board. Furthermore, financial support from the partners is not assumed unless authorized by usual legislative approval procedures.

The roles and responsibilities of each partner in building and supporting each program element or project are spelled out in the agreement. For the "Computerized Traffic Management System" (CTMS), for example, the State is charged with designing and constructing the portion of the CTMS under its control—on freeways and frontage roads. METRO will design and construct the portion outside the State's right of way. Both shall be compatible. METRO will have the right to participate in the design of the segment for which it is funding.

Unique to TranStar, the agreement also identifies the cost of building a central control facility, outlining the contribution made by each partner. Also, there is a commitment from all that cooperation will occur in attempts to obtain federal funding for any part of the Consortium's activities.

Since the time of the agreement, TranStar has formed two additional committees, adding a Leadership Team comprised of upper management, and an Agency Managers committee composed of mid management. This structure provides the necessary structure to ensure daily operations.

In some ways the TranStar agreement provides characteristics of a model public-public partnership. It reviews in broad outline

1) the goals of the partnership;
2) the general organizational structure;
3) the responsibilities of the management staff, and
4) the general roles and responsibilities of all partners.

It provides flexibility vital to maintaining a partnership by allowing the details of program element or project deployment to be worked out by the committee structure. It indicates that separate contracts or agreements may be forthcoming for specific efforts. By not specifying in great detail roles and procedures for each project in the MOA, more timely responsiveness to unanticipated occurrences may occur.

The TranStar MOA may not be appropriate for all jurisdictions. It does not identify smaller partners such as suburban cities or agencies such as fire or police departments. Other metropolitan areas will not have a central control facility housing one TMC, for example, for an entire region. An alternative model may be more decentralized, with several TMC's or Traffic Control Centers (TCC's) in a larger region, with relevant data shared among all participants (Amodei, et. al., 1998). This model may more easily allow for expansion into other neighboring metropolitan areas.

There are also alternative organizational structures. The three committee organizational structure that is part of TranStar may not be appropriate. Other metropolitan areas have employed an executive or steering committee structure, with several technical sub- committees that are relevant to each ITS component (Blythe and DeBlasio, 1995).

The existence of a formal MOA is only one indication of partnership success. It is important not only to view ITS deployment as evolving over time, the progress of each of the various components must be considered. Even though in a given jurisdiction incident management and ATIS services

will overlap considerably, as both rely on much the same data source, integration and success of incident management must be measured and evaluated separately from ATIS services. Without the overarching framework such as that provided by the TranStar MOA, there may be component based agreements that vary considerably in their integration and effectiveness.

6.5.3 Procurement

It has been recognized for some time that procurement policies and practices need in the context of ITS deployment need to be different from those surrounding traditional vendor-customer relationships. Such practices need to be more flexible to successfully 1) choose private partners and create a public-private partnership; and 2) obtain necessary products and services, often software related, after a partnership has been established. Although practices in both cases have many similarities, it is important to discuss the different applications since they vary in the degree of flexibility and in the scope of products and services obtained.

Since flexibility is a term commonly applied in these contexts, it is important to begin with a discussion of its various meanings in the ITS deployment context. With reference to the public agency's request for private response to providing ATIS services, for example, flexibility is inherent in the methods and technology chosen to achieve those services. The request, then, must be very general in outlining goals and objectives, e.g. creation of a real-time traffic website, without specifying these methods.

This flexibility is needed for several reasons. There is no generally accepted "industry standard" for providing ATIS services. Given the fast advancing state of the technology that serves as the basis for ITS, there is more than one acceptable method to provide ATIS services. More specifically, data collection can be accomplished by a variety of devices, data fusion can employ different software, and dissemination can occur through various means.

Second, the complexity of the required ITS services means that public agency personnel are likely to have less knowledge about methods and technology than do private vendors. The process of choosing private partners must be flexible enough to allow public agency personnel the

opportunity to learn about what the private sector can produce. This is true for both management and procurement staff.

Flexibility also means the ability of the public agencies to choose partners that do not necessarily provide the lowest price. Since the methods used to deliver a service may be different, it is almost impossible to claim that the public is buying a comparable service if it bases its choice primarily on lower price. Other criteria, such as the best technically qualified and the long-term financial stability of the private vendor, should be given more weight.

Similarly, flexibility means the absence of restrictions that hinder the procurement process. Often federal and state regulations can establish barriers to what can be included in the proposals and how they can be evaluated. Furthermore, the private vendor that designs specifications for an ATIS project may be prohibited from bidding on the deployment of the same project, thereby preventing the public agency from partnering with the most qualified vendor (Johnson, 2000).

6.5.3.a Flexible Procurement Methods

Various methods have been proposed to choose private partners that represent greater flexibility than traditional procurement practices. They all keep the general framework of separating price from technical considerations, but allow for expansion of the negotiation aspect of the procurement/contractual process. In doing so, both price and methodologies can be negotiated while ensuring that the private vendor is qualified to perform needed services. Flexibility is also inherent in that there may be not judgment concerning to what degree one firm is more qualified than another. As long as the process has judged them to be qualified, all private vendors are able to negotiate.

The Commonwealth of Kentucky has established a pre-qualification process for obtaining agreements with information technology firms that could be successfully adapted for ITS. Currently, 15 IT vendors have pre-qualified: five are “full-service” while the other ten fill specific niches. Once private vendors are qualified, then any state agency sends a letter to all vendors outlining the problem that needs to be solved, and inviting vendor to propose solutions. The final result is a fixed price contract, with specific deliverables

identified. If there is an interest, negotiations begin. Agency personnel may undertake site visits to vendors' home offices as part of the negotiation.

The Invitation to Negotiate (ITN) process, used by Florida DOT to acquire ATIS services in South Florida, also allows flexibility through negotiation. An ITN is distributed in much the same manner as an RFP or ITB, inviting vendors to provide technical proposals describing how they would meet goals outlined in the ITN. After a review panel qualifies vendors based upon the information in the technical proposal, a negotiation process begins between the public agency and all vendors. Both price and revisions in items proposed can be negotiated. At the conclusion of all interactions, vendors are asked to provide their "last best offer". Vendors can be ranked and negotiations will occur with only the top ranked vendor, not reaching other vendors unless the public agency is dissatisfied with negotiations; or, negotiations can proceed with all qualified vendors concurrently, with or without ranking their technical proposals.[20]

Many public agencies are also employing a design-build (DB) or design-build-operate (DBO) contract that has the goal of saving deployment time and providing an output or product at a lower cost. In the latter case, there are built in incentives for the private vendor to provide quality workmanship during the design and build phases, since operational and maintenance costs are likely to be lower. DBO's often involve a long-term commitment, such as 20-30 years, a length of time that seems too long for many ITS deployment efforts.

More flexible procurement processes are not without risk. They depend upon the public review and rating team to be sufficiently knowledgeable and able to learn throughout the negotiation process to choose the best qualified vendor. Given the newness of many ITS services and the advancing technology, it may be more difficult to identify through contacts with comparable public agencies elsewhere to learn from the previous experience of a given vendor. In any case there is the risk that the vendor may not be able to deliver what is promised, especially if customization of software and adaptation of other procedures is required.

For the purchase of more specific goods and services, often determined in conjunction with choosing private vendors to perform a variety of ITS deployment tasks, the lessons in flexibility are the same. Without standards for specific products that can easily be identified and evaluated as part of the

usual procurement process, the expertise of staff in these efforts is key. Also, the need to obtain telecommunication hardware and software, for example, in a timely fashion means that normal review procedures may have to be discarded if maximum flexibility is to be obtained. Experience from AzTech and TranStar is that it may be more acceptable to have an agency other than the lead agency provide procurement services for the public-private partnership. In Phoenix, e.g., Maricopa County purchases goods and services for AzTech.

Flexibility in payment under contracts with private vendors may be important. If software, for example, must be custom made for Orlando, then it may be best to follow Seattle and pay private vendors for achievement of each task or milestone without committing the entire amount of the contract. The challenge under this strategy would be how to recoup investments made if it is decided to change private vendors before the end of the contract. If software can be bought "off the shelf" however, then standard contracts may be best.

6.5.4 Legal Issues

A letter from FHWA regarding intellectual property rights policy helped speed contract negotiations with private sector vendors. The policy states that the US government has no interest in copyrighting any product developed during the implementation of the MMDI. This helped quicken negotiations between the AzTech public and private partners.

Other partnerships, including TravInfo, have successfully worked out IPR issues to the satisfaction of all partners. Licensing by the owner of the software or hardware in question to the other partners has been a generally accepted approach. The degree to which "off the shelf" software can be applied to a given metropolitan area lessens the gravity of this issue.

Other applicable legal issues include product liability and right of way issues. Both have different implications for the development of ITS partnerships. In many areas, though, these issues have been successfully overcome to the satisfaction of both public and private partners.

7.0 Lessons to be Learned--Public-Public Partnerships

There must be sensitivity to legacy agreements (or the lack of them).

Successful deployment does require efforts to build upon past legacy agreements (DeBlasio, et. al., 1999). The more significant challenge comes when there are few such agreements, or there is a history of non-cooperation. If the latter more accurately reflects public agency relationships, then ITS deployment efforts must start with demonstration projects, on a piecemeal basis, and with those areas such as Incident Management and traffic signal coordination that are likely to be engender the most public support and favorable publicity.

The goal in all cases is a formal MOA/MOU.

With or without a high degree of legacy coordination and cooperation, the metropolitan area needs to work towards formality in steps that help achieve the goal of greater ITS deployment. If the partnership goals are being achieved without a formal agreement because key partners are interacting effectively on an informal basis, the necessity for a formal agreement may be delayed. The danger is that the informal agreement may not be sufficient to retain the partnership if there is conflict or disagreement among those partners. The MOU reflects a degree of commitment that serves as the basis for a PubP and/or PPP. Even with the clause that allows public partners to withdraw, the initial formal agreement is vital to ITS deployment success.

Incentives must be found or demonstrated for those public agencies that do not become partners initially.

This theme is present for all ITS deployment. Not all agencies will understand the benefits of participating when the MOU is first signed, responding that a lack of staff or resources will prohibit them from participating.

In this situation, ITS deployment will require incentives in the form of 1) funds for equipment or operations and maintenance; 2) “strings” attached to State DOT aid; 3) funds resulting from integrating ITS into transportation planning efforts; and 4) studies that demonstrate the benefit of initial ITS deployment efforts. Otherwise, those who champion ITS proceed with deployment in the hopes that success will naturally lead to other public

partners wanting to join. This may be a risky strategy as ITS deployment matures and evolves in a given metropolitan area. The lack of participation by some cities, for example, in the initial ITS deployment activities may not have any impact on early successes. Their participation, however, will be crucial to the success of later deployment activities.

Public cooperation is more likely if there is an identifiable problem to be solved.

Briggs (1999) and others have accurately made this point. It can not be assumed that the general goal of lessening traffic congestion is enough to elicit cooperation necessarily, especially if there is a lack of legacy agreements. If there is a specific problem such as lessening accidents on specific segments of a busy freeway, then the likelihood of gaining support from local and state political leaders is greater.

Formal organizations are not necessarily required in all cases.

It is true that the greater the regional effort, the greater the value of a formal organization. Otherwise, small demonstration projects can be "monitored" by a committee of partner representatives, with a lead agency providing a project manager. When a PPP is created, however, the value of a "brand name" in increasing ATIS service awareness may necessitate the creation of a new regional organization.

8.0 Lessons to be Learned—Incident Management Programs

Communication among all IM team members must be two way, especially the interaction of law enforcement and EMS personnel with transportation operators.

If there is not two-way communication, several aspects of the IM process will not work as well as possible. Getting information concerning clearance time to motorists in a timely fashion may not occur if the TMC operators are not contacted by those at the accident site. Service patrols may not respond as quickly as possible to incidents if they do not contact TMC operators

Protocols must be developed so that TMC operators communicate directly with service patrol operators.

If there is a third party, such as a dispatcher, that communicates exclusively with the SP operators, then there is a risk that information about incidents detected and verified by transportation operators will not reach the incident victim in a timely fashion.

Incentives must be present to encourage participation by those agencies for which IM is not a high priority.

To the extent that state DOT's can fund equipment, such as Total Station surveying equipment used by law enforcement to measure distances at accident scenes, or fund service patrols, commitment from public partners may gradually increase.

Training in proper response procedures should be standardized among all appropriate agencies in a metropolitan area.

If all agencies receive the same training as part of standardizing response procedures across jurisdictions in a metropolitan area, then not only will response times be lessened, greater commitment for a regionwide IM Program will grow.

Service Patrols should be given maximum route coverage and publicity to build public support for ITS deployment.

These patrols have been universally well-received by the traveling public. With identifiable markings or logos painted on the vehicles, travelers feel that the assistance offered by SP's is legitimate. Studies have found without exception that the benefits far outweigh the costs.

IM Programs can be built piecemeal.

There is value to developing an IM program even though all potentially impacted parties have chosen not to participate. If the IM program involves state Law Enforcement and a state DOT, with not all local law enforcement and EMS agencies participating, the demonstrated success of a program involving only a few public agencies may encourage other local agencies to participate in the future. To the extent that other aspects of ITS, such as ATIS services, over time extend beyond freeways to arterial roadways, local agencies who have responsibility for incidents on those arterials may be

more willing to participate in the IM program when arterial coverage is more extensive.

As much as possible, agencies should share resources to the benefit of each other.

For example, if one agency owns a crane that can be used to occasionally clean up large accidents, and another agency responsible for clearance on a freeway does not own a crane, both can share this resource. For example, he latter agency could help pay for the cost of maintaining the crane (Manning, et. al., 1995).

This works if there is a more formal plan with specified goals and objectives.

9.0 Lessons to be Learned—Public-Private Partnerships

The following lessons are applicable to all PPP's, but most relevant to those models that are public controlled.

The role of the public partners must be more active than that of a contract manager.

The public partners need to act proactively on behalf of the partnership. This is different from the more passive, reactive role of contract manager. As experience with some of the FOT's has shown, developing a workplan that identifies the tasks and duties of all partners may be helpful. To effectively play this role, the public partners may have to commit more resources in terms of staff time and expenses than would be true in the traditional vendor-customer relationship.

The public partner also has a duty, as part of its role, to communicate frequently with the private partner. One lesson that came from the AzTech Phase I experience is that you can't assume the private partner is working on the project if you don't hear from him. In an ideal partnership, there cannot be a situation in which the public partner simply tells the private partner to "go away and make your product" and not communicate often until the product is completed. There must be continual interaction concerning product development as the project progresses.

Trust and flexibility must be continually maintained by all partners.

Both public and private partners must be open and honest with each other, especially if there must be changes in originally promised efforts, activities or services. If, for example, the private partner agrees to place 24 cameras in locations around the city and finds that it is more expensive than originally thought or cannot easily overcome right of way issues, then the public partners must either accept this change and revise expectations, or find ways to assist the private partner in meeting the increased costs.

Likewise, the private partner must be honest about cost sharing, for example, and other financial aspects of the organization. To maintain trust, the private partner must document all in kind and dollar contributions in ways that are satisfactory to the public partners.

The partnership must seek to find the balance between flexibility that means lowered expectations or changes from original goals, and insisting that partners follow through on original promises even if costs are higher than expected. It may be that this balance depends upon the priority given to the item at issue, requiring a reallocation of funds and plans. For example, the partnership may agree to revise the private cost sharing amount for marketing downward in order to ensure an optimum number of cameras will be deployed for data collection. Depending on the model chosen, this balance will be more difficult to find the greater the dependency on the private partner.

Again, the public partner can not simply allow the private partner to not meet contractual obligations/partnership goals without interaction leading to a revision or reestablishment of the partnership. Each change from the originally partnership agreement must be considered a new agreement, even if the formal contractual documents are not amended, and the new agreement is documented in minutes of a partnership meeting.

Otherwise, the partnership risks “sliding back” into a vendor-customer relationship, and ultimately will face failure. If the public partners are paying the private partners, and decide that payments must be withheld because there is no agreement from the private partner on an issue, then the partnership is not likely to be successful.

Marketing efforts need to be expanded, with all parties agreeing to their roles early in the PPP existence. Coordination between what may be viewed as outreach by the public agencies and market strategies to generate revenue by the private partners needs to be closely coordinated.

In AzTech Phase I, a public outreach committee worked diligently to communicate plans and efforts at national and international meetings and conferences. Videos and power point presentations were created for key personnel to provide at meetings of city councils, chambers of commerce and other local groups. Novelty items with the AzTech logo were created and distributed.

Yet committee minutes indicate there was no interaction with marketing efforts by ETAK nor with Fastline, a specialty ISP that was to work closely with ETAK. Fastline worked with ETAK to first develop software. But, by September 28, 1998, almost two years after the beginning Phase I efforts and with the national project operation kick-off to be held, Fastline had not yet completed its marketing plan.

Other than the language in the Scope of Work that stated Etak was to pursue ISP's, and a resulting ETAK report there seem to be no attempts beyond the reports made at the Technical Oversight and Executive Committee meetings. In addition, other than the language in the Scope of Work that stated Etak was to pursue ISP's, and a resulting ETAK report there seem to be no attempts beyond the reports made at the Technical Oversight and Executive Committee meetings to discover how well Etak was implementing its proposed market strategies.

The marketing plan from the private partners needs to be finalized early in the partnership timeframe. There must be greater efforts to ensure that the private partner has allocated sufficient resources to achieve the marketing plan and/or identify a longer timeline for marketing efforts, subscription services and subsequent self-sufficiency. Since the technology to providing traveler information to hand held personal computers and PDA's is still in its infancy, the marketing strategy to increase public awareness of the product is a key factor in meeting the goals of getting as much information to as many travelers as soon as possible.

It seems as though AzTech may have learned this lesson, as a marketing plan from PBS&J/Traffic Station, one of the Phase II partnerships was required within the first 90 days of the agreement. This plan, however, concentrates on Traffic Station's efforts to expand private partnerships in an effort to increase national visibility. It is unclear what efforts it is making in the greater Phoenix area, or how they are coordinated with AzTech public outreach efforts.

Public partners should develop a business plan, recognizing that it is an evolving, changing document.

The advantage of creating a business plan is that it assists public partners in identifying the importance of privately provided ATIS services in terms of meeting the public transportation goals of a given metropolitan area. The choice of which partnership model to pursue can logically follow from the goals and objectives spelled out in the business plan.

Once accomplished, however, there must be the understanding that the business plan must be modified periodically as experiences with ATIS PPP's dictate a change in policy in a given region. If a metropolitan area wishes to move from a publicly controlled model, for example, to one where the private partner plays a more predominant role, the business plan should be updated.

Long-term commitments have to be made.

The contracts of many of the ATIS PPP's indicate a five-year period, with potential for renewal. Most agreements also contain language that gives partners an option to leave the PPP. Given that many of the ATIS projects are DBO in nature, and realizing that significant revenue generation may be more than five years in the future, agreements should be for longer timeperiods. DBO projects involving tollway road construction, for example, are typically for 20-30 timeperiods.

With a longer time commitment, it may be possible to attract ISP's who will agree to invest funds in deployment of ATIS without expecting significant returns within the short term. From the private partner perspective, a shift in thinking would have to occur from making a short-term profit to a longer-term investment with a "fair" return.

Longer time commitment for one PPP would not necessarily preclude public agencies creating separate PPP's for different ATIS services at any time. The concern that a long-term commitment does not allow for sufficient competition from other private vendors could be met by establishing partnerships with a variety of ISP's that provide different--if not competing--ATIS services.

Expectations in terms of Time Frame have to be lowered, or be more realistic.

If the ITS deployment is in the initial stages, there may not be the expectation that a short time frame will lead to the required results. There needs to be better understanding of a more realistic time frame so that the public agency won't feel the private partner is reneging on a promise in terms of deliverables according to a schedule. The private partner needs to state that a specific deadline cannot be met, even if there is a change in the schedule from that promised in the original response to the RFP.

Otherwise, there is a larger risk that threatens the PPP. If a missed deadline leads to a recognition that the private partner is not fulfilling its committed agreement, then the relationship may slide back into traditional contractual relationships and trust may erode. Ideally, if the reasons for deadline slippage are beyond control of the private partner, then it should be recognized that the partnership agreement is evolving and needs to be re-constituted.

If there are problems because of federal financial support or a public funding timeframe that requires products by a non-flexible specific schedule, there is a real risk that the PPP will not succeed. Unrealistic time frames and schedules, e.g., those required by a public partner, can lead to project speed up or slowdown and resulting uneven project quality.

Alternatively, if a variety of ATIS PPP's are established, then the public partners need to accept that different timeframes may be realistic. If the public partner has identified a high priority ATIS objective in its business plan, such as dissemination by broadcasts on cable TV to reach a higher number of potential users more quickly, then the timeframe to finalize a product or service from the more specialized ATIS partners could be greater along with lower expectations in terms of usage or adoption rates.

A private partner acting as a systems manager has advantages and risks.

In many cases, a private firm acts as a systems or project manager, sub-contracting with other private firms to provide part of the system or product. In contrast, the public agency contracts with a variety of these firms that must interact with the private partner as well. From a public partner viewpoint, this may be advantageous because it lessens the amount of contract management required. It also increases ease of coordination and is likely to ensure greater adherence to deadlines.

If the private partner is expected to partner with other private firms, as opposed to sub-contracting with them, with the public partner playing a lessened role, the partnership may not achieve its goals as easily. The key issue that must be satisfied is nature of the incentives that the system manager to develop the additional private-private partnerships. If there are no incentives, then the system manager may concentrate on other efforts, e.g., developing a traffic work station rather than on the success of the private partners. Ultimately, the public partners should be very concerned with the success of the private partners. A systems manager approach may not be the most appropriate if there are concerns early in the life of the PPP that these private partners may not be successful.

Traveling public needs and wants need to be identified early in the deployment process

Information concerning usage/potential users of the products needs to be identified early in the project. There needs to be a market analysis early in the project, plus there should be input from potential users throughout the project. This would allow private partners to contribute higher quality products and software with greater assurance of a viable market. The lack of this knowledge about user potential led to the perception that IBM contributed personal computers to the SWIFT project that were lower quality, thus wasting project time and money on a product that was ultimately discarded as unworkable.

For those areas in Model A (Publicly Controlled) who wish to move to Model B (Publicly Stimulated/Funded), it may be best to start with a cable television partnership, since these partnerships have proven to be the most

successful. The tendency in the past, especially with MDI's, was to create PPP's with those private firms that responded to RFP's. As long as funds are available, either through MDI grants (in the past) or CMAQ (in the past and present), there may be a tendency to fund a number of PPP's without sufficient forethought and study as to which are the most appropriate.

The ease of data fusion from all public data sources should be assessed early in the deployment process.

As learned by the Partners in Motion partnership, it is a mistake to assume that all publicly collected data can easily be fused by a server established as part of providing ATIS services. If agencies have different operating systems, e.g. Unix versus Windows, time and effort must be spent in making data from these systems compatible so that fusion can occur. Likewise, if public agencies are undergoing changes in data collection systems, or plan to update existing systems, all of these plans should be known and assessed as part of the ITS deployment effort.

A related issue is the extent of coverage that results from data fusion ease. A survey of data collected by all public partners may reveal that some agencies have no data collection system, or have one that would require a great deal of effort to ensure that it can contribute accurate and reliable data to the server. This is likely to produce "holes" in the data coverage that were initially unanticipated, leading to incomplete dissemination early in the deployment process.

10.0 Conclusion

It will continue to be a challenge for public partners to define and refine their role in a PPP, as the tendency toward treating private partners as if they were in a traditional vendor customer relationship is very strong among long-time public employees. This role evolvement is heavily influenced by the process of choosing private partners and the resulting efforts that are made.

The choice of private partners in the context of whatever model is chosen is often complex and challenging. The key issues in PPP creation are 1) the quality and effectiveness of the technology (software and hardware) that is deployed to collect and fuse the data; 2) the delivery of the information to the traveling public in terms of dissemination mode choice and the reliability

and accuracy of that data; and 3) the private business plan or marketing efforts that will determine how diligent the private partners will be in pursuing subscribers and advertisers in a given region. For the PPP to be successful, efforts to resolve all of these three issues must succeed since activities in one area significantly impact the other two.

At present, there is no example of an ATIS PPP that can be judged successful or effective in terms of the number of users that have bought or adopted a customized, personalized service. Given this assessment, there is no one model of the six identified that can be identified as best. The adoption of one model or another by a given metropolitan area depends upon several factors, including the nature of the ITS deployment prior to the formation of ATIS PPP's, the underlying philosophy, tradition or culture that identifies the public attitude or perception toward privatization of service delivery, as well as the severity of the congestion, the public will to provide ATIS services, and the funds available to commit to transportation policy.

In many metropolitan areas, though, increasing numbers of travelers have accessed the information on publicly provided websites and/or telephone services. Although laudable, the increasing number of hits and calls may not be sufficient to meet the public policy goals of lessening congestion and increasing multi-modal transportation uses.

The major problem, supported by evaluative studies of existing ATIS deployment, is that the average traveler is not aware that the option of purchasing customized information is available. Few public websites identify private partners or provide linkages to their information. Success may only come when the role of the public partners is more fully based on the philosophy that it is in the public interest for private vendors to succeed—in terms of receiving a fair return on investment or making a profit.

Ultimately, as the customized market for ATIS evolves from an embryonic state to a more mature state, and greater numbers of travelers purchase these services, a private controlled model may be the best choice for many metropolitan areas. It is only in this way that some degree of control and direction in terms of using private data collection and fusion for public purposes will occur. In the extreme, as congestion becomes more severe, many areas may realize that the adoption of customized services, in addition

to the free publicly provided ATIS services, must become a public policy of higher priority. It seems unlikely that the will and expense to make customized services a freely provided public good will exist in any American metropolitan areas. A public private partnership in which the private partner plays a significant role in providing these services remains the only option.

Endnotes

[1] The private partners for Phase II have changed, and the results may be different.

[2] A review of the survey results found in Gordon and Trombley (2000) for the 75 metropolitan areas that are part of the Monitoring system supports this statement.

[3] See, for example, Jackson, Dreyser and DeBlasio, 2000, for a review of MPO roles in ten metropolitan areas.

[4] In the SWIFT operational test, for example, some public partners questioned whether other partners should make a profit as part of the project. See Perez and Whetherby, 1999.

[5] The need for these internal processes or mechanisms is discussed in the context of building public-public partnerships. See Jackson, Dreyser and DeBlasio, 2000.

[6] American public procurement regulations favor bidders with the lowest costs.

[7] The categorization of metropolitan areas in terms of their acceptance of ITS deployment made by Lappin, et. al., 1998, are useful in this context

[8] In other words, a state DOT could contract with a private vendor to develop ad implement software and hardware for data fusion. Although this relationship may be a PPP because the private vendor contributes the cost of software development to the PPP, in reality it is more similar to the traditional vendor-customer relationship.

[9] For example, the cities with less congestion, as measured by the TTI congestion index, are likely to fall into this category. See Schrank and Lomax, 1999.

[10] Data collection is almost completely publicly funded, with the exception of aerial surveillance reports from Metro One Network. Many of these reports are duplicated by collection from publicly supported sources and from information coming to 911 centers.

[11] This information and similar information for the other Phase II contracts was taken from letters written by Pierre Pretorious in February 1999, requesting FHWA approval of the public supported amount.

12 RFP inviting private vendors to identify means is issued, and the response accepted if the vendors meet minimum standards of technical capability, financial stability, etc.

13 It is assumed these activities are still occurring, even though this plan was most likely developed early in the MDI project

14 Since tourists are not mentioned, it is assumed that they are not included in the outreach plan.

15 An MOU or MOA serves as the basis for the NGO.

16 Steering Committees are formed that consist of membership from both public and private partners.

17 The MOU was signed before the final contract with SRS was signed.

18 Algorithms are much more difficult on arterials than on freeways. See, for example, Culip and Hall, 1996.

19 Much of this section taken from Fenno and Ogden, 1998.

20 More detailed discussion of the use of ITN is found in the section dealing with the South Florida ATIS PPP with Smart Route Systems.

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Appendix A

Draft Final report

Activities

Travel, Data Collection, Learning Experiences

March, 2000 Visit to Volpe National Transportation Center, Cambridge, MA

This action took place prior to the official start of the Project. No Project funds were used to make this trip. Discussions were held with two key members of the Volpe staff: Alan DeBlasio, an active participant in the National Evaluation of the MMDI's, and David Jackson, author of many relevant reports dealing with ITS. Relevant documents were also collected.

May 1-4, 2000 Attendance at the ITS America Annual Meeting, Boston, MA

Since this trip occurred before the formal start of the Project, no Project funds were used. Several workshops were attended to gather information about potential metropolitan sites. These sites included Atlanta, San Francisco, Portland, Salt Lake City, New York, Phoenix, Seattle, San Antonio, and Pittsburgh.

Specific workshops (number assigned to each workshop identified) attended included:

16 National ITS Deployment Strategy
25 ITS Architecture and Regional Planning
33 The Phases of an ITS Deployment Timeline
43 The Role of New Regional Organizations in ITS Development and Deployment
52 New Jersey, New York and Washington
57 Applications of the National Architecture
72 Technical/Business Models for Data Collection and Integration

84 ITS in 2008
91 Experiences in Deployment
100 Arizona and Oregon
107 Industry Leaders and Board Members Meet the Press

In addition, discussions were had with national ITS leaders, including Dr. Charles Wallace, Executive Director, Florida ITS; Dr. Harold Worrall, Executive Director, Orlando Orange County Expressway Authority; and Mr. Jeff Panati, JPO Staff. (Activities I.1, I.2, I.3, I.4)

June 1, 2000 Attendance at the Meeting of the Ad-Hoc Central Florida ITS Group, TWC, Orlando

At the invitation of George Gilhooley, I attended the second meeting of the "Ad Hoc Central Florida ITS Group". The meeting was hosted by Fred Ferrell. Representatives were present from the Florida Turnpike, FDOT District 5, OOCEA, PBS &J, Orlando, and Seminole County. Reports concerning current ITS projects from each were presented.

June 28-30, 2000 Attendance at ITS Florida Annual Meeting, Fort Lauderdale Beach

Various Workshops were attended, including:

Session IB: The I-4 ITS Master Planning Process
Session 2A: MPO Planning for ITS
Session 3B: The Implementation of SUNPASS
The Innovative Reversible Lanes on Leroy Selmon Expressway
Plenary Session: Houston Transtar
South Florida ATIS
What's Around the Bend

In addition, discussions were held with ITS professionals, including Lorin Kreuger, Jon Cheney, Arvind Kumbhojkar, and Jack Whalen, Transtar

July 12-13, 2000 Attendance at the National Architecture Workshop, Orlando

This two-day workshop was sponsored in part by Florida ITS and FDOT. A team of national consultants presented a detailed picture of the National Architecture. Attendees also performed application exercises. The experience was invaluable. Individual discussions were held with two instructors concerning the Project: Ron Jaffe, Jeng and Associates and Jesse Glazer, Iteris.

July 14, 2000 Attendance at the Florida ITS Champions Workshop, Orlando

Led by Bob McQueen, PBS&J, this workshop focused on the application of the National Architecture to Florida. A demonstration of the ITS turbo architecture was presented as part of the workshop.

Metroplan Orlando Monthly Meeting, September 11, 2000

Updates to the TIP were presented and discussed.

ITS Awareness Group—Central Florida Meeting, September 10, 2000

Coordinated by George Gilhooley and Fred Ferrell, Florida DOT, this meeting was attended by representatives from the Florida Turnpike, Orlando Orange County Expressway Authority, Lynx, City of Orlando, and Post Buckley, Shuh and Jernigan. After an update on ITS related activities, a presentation on the 511 national traveler information number was made by Rick Schumann from Post Buckley.

ITS Arizona Annual Meeting, Phoenix, Arizona, October 3, 2000

Several Workshops were attended:

New Activities in ITS Operations and Management
General Session: National Operations and Management; Role of ITS in Public Safety
ITS Arizona Strategic Plan

Regionally Shared Operations and Management
National Innovative Deployments

AzTech MDI International Showcase, Phoenix, Arizona, October 4-5, 2000

Several Workshops/ Presentations were attended:

Executive Overview of ITS in Arizona
Report from FHWA
Maricopa Association of Governments ITS Report
Arizona DOT Rural ITS Statewide Program Overview
Tucson, Arizona ITS
AZtech Implementation and Critical Success Factors
Public Outreach Program
Practical Procurement
HighwayNet
System Integration/Architecture/Standards
ATIS/Emergency Management
ITS Strategic Plan 2000—Maricopa Association of Governments
ITS Mainstreaming at McDot
Deployment Lessons Learned and Program Success Stories

ITS and the Law, Chicago, Illinois, October 23-24, 2000

Several Workshops were attended:

Patent Process and Business Methods
ITS and Procurement
ITS and Shared Resources
ITS and Privacy
ITS and Liability

CATSS Board Meeting—November 21, 2000

A project update was presented at this meeting.

Metroplan Orlando Monthly Meeting---December 1, 2000

ITS Awareness Group—Central Florida Meeting—November 13, 2000

Tri-County Incident Management Meetings:

Two meetings were attended:

December 6, 2000
January 2, 2001

Public-Private Partnership Workshop—Ponte Vedra Beach, February 13, 2001

Documents Obtained and Reviewed

1.The Houston Smart Commuter Program: An Intelligent Transportation System Operational Test Project Agreement (July 1995)
2.The Houston ITS Priority Corridor (July, 1997)
3. Houston Tran Star Business Plan (Draft, February 1998)
4. Integrated Transportation Management and Traveler Information System for the Northwest Corridor (Houston, March 1997)
5. I-95 Corridor Coalition Business Plan 1998 Update
6. Texas State Purchasing Catalog Information
7. AZTech Contract and Licensing Agreements
8. AZTech Intergovernmental Agreement
9. Smart Trek Lump Sum Contract
10. Smart Trek Information Service Provider Contract
11. City of Bellevue, Washington, Equipment Rental Fund Policies
12. iTravel Subcontractor Request for Information
13. Smart Trek Letter of Understanding on Access to Video Images
14. Smart Trek Letter of Understanding on Access to Signal Systems
15. Copyright License Agreement for the Use of The Texas Department of Transportation's TransGuide Data (May 1999)
16. State of Washington DOT Business Plan
17. State of Oregon ITS Statewide Plan
18. TRANSPORT (Portland, Oregon) MOU
19. State of California ITS Statewide Plan (Draft)
20. Southern California Economic Partnership Business Plan—Executive Summary
21. I-95 Coalition Business Plan
22. AZTech Quarterly Reports, Committee reports, and other documentation
23. The MAGIC Study (precursor to Phoenix EDP)
24. Maricopa County, Arizona MPO ITS Rating System
25. Additional publications of the Metropolitan Transportation Commission (San Francisco)
26. The NITTEC (Buffalo, New York and Ontario, Canada) MOU
27. AZTech Phase I: ETAK Scope of Work
28. AZTech: ADOT/Cities IGA
29. AZTech Phase I: TRW Scope of Work
30. AZTech Phase I: ETAK Marketing/Business Strategy

31. AZTech Phase II: PBS&J Scope of Work
32. AZTech Phase II: Cue Corporation Scope of Work
33. AZTech Implementation Plan
34. AZTech RFP for Phase II:
35. ARTIMIS Ohio-Kentucky MOU
36. ARTIMIS TRW contract
37. Florida's ITS Strategic Plan
38. Florida ITS Business Plan
39. Florida's ITS Strategic Plan—ITS Cost Analysis Issue Paper
40. Florida's ITS Strategic Plan—Economic Impacts Issue Paper
41. Florida's ITS Strategic Plan—Operations, Management and Maintenance Issue Paper
42. Florida's ITS Strategic Plan—Integration of ITS in the MPO Transportation Planning Process Issue Paper
43. Florida's ITS Strategic Plan—Procurement Issue Paper
44. Florida's ITS Strategic Plan—Implementation Authority Review and Recommendations Issue Paper
45. Florida's ITS Strategic Plan—Rural/Inter-Urban Applications Issue Paper
46. Florida's ITS Strategic Plan—Summary of Survey Results
47. Florida's ITS Planning Guidelines Integration of ITS into the Transportation Planning Process
48. Interstate 4 ITS Corridor Framework Phase III Draft Business Plan
49. Interstate 4 ITS Corridor Framework Phase III Draft Implementation Plan
50. Interstate 4 ITS Corridor Framework Phase III Draft Concept of Operations
51. ATIS Memorandum of Understanding, South Florida Transportation public agencies

Interviews held with the following ITS leaders from Florida:

Essam Radwan, UCF
George Gilhooley, FDOT
Harold Worrall, OOCEA
Fred Ferrell, FDOT
Bob McQueen, PBS&J
Jorge Figueredo, OOCEA
Arvind Kumhojkar, FDOT
Lorin Krueger, FDOT
Jon Cheney, MPO, Volusia County
Jinsan Lee, MPO, Jacksonville
Charles White, MPO, Hillsborough County
Michael McCarthy, Traffic Services, Hillsborough County
Jack Brown, FDOT Traffic Operations and Coordinator, Road Ranger Program
Jennifer Heller, Incident Management Program Manager, Division of Traffic Operations, District Five, Florida DOT
Anne Joslin, Project Manager, Lynx Public Transportation System, Orlando
Captain Robert S. Duncan, District Commander, Florida Highway Patrol, Troop D, Orlando
Chester Chandler, ITS Statewide Coordinator, Florida DOT
David Grovdahl, Director of Transportation Planning, Metroplan Orlando
Eric Hill, ITS Coordinator, Metroplan Orlando
Jesus Martinez, FDOT ITS Coodinator, District 6
Patric Shortal, SmartRoute Systems, South Florida
David Fierro, SmartRoute Systems, South Florida
Christopher Cairnes, RTMC, Orlando
John Gilbert, RTMC, Orlando

Discussions/Interviews with ITS Leaders Outside of Florida

Alan DeBlasio, Volpe

David Jackson, Volpe

Peter Briglia, Seattle SmarTrek

Jack Whaley, Houston TranStar

Ron Jaffe, Jeng and Associates

Jesse Glazer, Iteris

Dr. Mark Hallenbeck, TRAC University of Washington, September 12, 2000

Craig Roberts, Attorney, ITS America, Washington, DC, August 27, 2000

Dennis Mitchell, District Traffic Engineer, Oregon Department of Transportation (Portland, Oregon)—September 20, 2000

Galen McGill, ITS Statewide Coordinator, Oregon Department of Transportation (Salem, Oregon)—September 21, 2000

Steven Roberts, Attorney, Nossaman, San Francisco, California—September 25, 2000

Janie Page, Metropolitan Transportation Commission, San Francisco/Oakland, California—September 26, 2000

Michael Berman, Metropolitan Transportation Commission, San Francisco/Oakland, California—September 26, 2000

John Cox, Jr., Executive Director, Southern California Economic Partnership, Diamond Bar, California (Los Angeles)---September 28, 2000

Robert Huddy, ITS Infrastructure Coordinator, Southern California Economic Partnership, Diamond Bar, California (Los Angeles)—September 28, 2000

Dan Powell, Post Buckley Shuh and Jernigan (formerly Project Manager, AzTech) Phoenix, Arizona---October 2, 2000

Dean Gustafson, New York Department of Transportation, Buffalo, New York---October 27, 2000

George Saylor, ITS Coordinator, Ohio Department of Transportation, Columbus, Ohio---October 30, 2000

Leon Walden, ITS Coordinator, Kentucky Transportation Commission, Frankfort, Kentucky---October 31, 2000

Scott Evans, ARTIMIS Project Coordinator, Cincinnati, Ohio---October 31, 2000

Dennis O'Neil, ITS Coordinator, Northern Ohio Area Council of Governments, Cleveland, Ohio, November 1, 2000

Abed Itani, Transportation Planner, Grand Valley Council of Governments, Grand Valley, Michigan, November 2, 2000

Paul Dennis, Transportation Safety and Traffic Engineer, Michigan Department of Transportation, Grand Valley District, Grand Valley, Michigan, November 3, 2000

Jim Snell, Senior Transportation Planner, Grand Valley Council of Governments, Grand Valley, Michigan, November 2, 2000

Karen Cavallo Miller, Program Director, Partners in Motion, Arlington Virginia, March 8, 2001