Using Metropolitan ITS Deployment Tracking For Regional ITS Planning

Telling The Deployment Story In Tucson, Arizona

The "Should" Case vs. The "Could" Case

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Preface

This report evaluates the use of ITS Metropolitan Deployment Tracking concepts for transportation planning in the Tucson, Arizona metropolitan area. The ITS Metropolitan Deployment Tracking Project is an ongoing effort aimed at measuring the extent of ITS deployment in 78 of the largest metropolitan areas. The overall goal of this work is to express the level of deployment and integration in clear and understandable terms through a methodology that can be consistently applied to all metropolitan areas. A large body of information concerning ITS deployment in these metropolitan areas has been assembled, gathered through surveys sent to major agencies within each area. These data have been applied to common measures for deployment and integration, consisting of a set of numerical indicators tracked for each of the metropolitan areas. Using this methodology, progress in the deployment of integrated ITS within the major metropolitan areas has been tracked through a series of nationwide surveys carried out in 1997, 1999, and 2000. In addition to tracking national progress, an important goal of this work has been to make the information gathered generally available, particularly to transportation agencies to assist in local ITS deployment planning.

This report evaluates the utility of deployment tracking data and indicators to local planners by evaluating the ITS deployment planning experience in Tucson, Arizona. It traces the development of deployment goals in Tucson using a network-based methodology and demonstrates the use of deployment tracking indicators in creating an accurate picture of the metropolitan-wide planning goals resulting from this planning methodology.

Background

Metropolitan Deployment Tracking

Deployment tracking is an ongoing effort to gather data about the deployment and integration of ITS technology in the ITS infrastructure in the largest metropolitan areas. This effort uses the nine components of metropolitan ITS infrastructure defined by the U.S. DOT in 1996. The nine components are the following: Freeway Management, Incident Management, Arterial Management, Transit Management, Electronic Toll Collection, Electronic Fare Payment, Highway Rail Intersection, Emergency Management, and Regional Multimodal Traveler Information.

To create a measurement for deployment and integration that can be consistently applied to all metropolitan areas, a set of tracking indicators was developed for each of these ITS infrastructure components. The indicators developed for the deployment tracking effort are necessarily simplistic. They are surrogates that do not necessarily reflect the full breadth of metropolitan ITS deployment activity. They have been chosen to provide simple and intuitive measures of deployment that can be counted and tracked over time. Indicators are tied to key functions for each component and are designed to provide a comprehensive picture of the level of deployment in a small number of calculations. For example, the Freeway Management infrastructure component is defined as having three main functions: surveillance, control, and information dissemination. The indicator for the first of these, surveillance, is the percentage of freeway mileage under electronic surveillance. Control is tracked using the percentage of ramps under ramp metering, and information dissemination by the extent that variable message signs are employed. Integration indicators have also been developed and are expressed in terms of a set of defined links between agencies and calculated by comparing the number of agencies that interact as defined by the link compared to the total number of agencies involved.

The Problem of the “Could” Case

The methodology incorporated into Metropolitan ITS Deployment Tracking as it is currently employed has one important drawback: the deployment indicators are calculated by comparing actual deployment to the maximum possible, rather than what is required to meet the transportation needs of an individual metropolitan area. For example, in the case of the surveillance example mentioned above, the extent of freeway surveillance is measured by comparing the number of freeway miles under surveillance to the total freeway mileage within the planning area of the Metropolitan Planning Organization. This is the “could” case–measuring deployment against the maximum that “could” be deployed. The advantage of the “could” case is that using the total mileage for all metropolitan areas as a basis for the measurement creates a common framework for measuring all metropolitan areas. This advantage is offset by the problem that, in many cases, local conditions do not warrant deployment on the entire freeway system. As a result, the “could” case measure may significantly understate the effective level of deployment, creating a false impression of local or national conditions.

The Solution: the “Should” Case

Clearly, if the intent is to present a picture of the effective level of deployment, it is preferable to measure deployment against what is needed as the basis for deployment tracking measures rather than the one-size-fits-all "could" case. Continuing the surveillance example, consider a metropolitan area with 100 freeway miles. If 20 miles are under surveillance, the "could" measure is 20/100 or 20 percent. However, based on local traffic conditions, the maximum surveillance needed might be only 30 miles, in which case a better indicator for the level of deployment is 20 miles divided by 30 miles, or 67 percent of the total that "should" be deployed. The 20 percent "could" indicator is misleading in making it appear that deployment is only one-fifth complete, when, as the "should" indicator shows, it is nearly finished. This illustrates the advantage of using the "should" case in describing local deployment. The difficulty with universal adoption of the "should" case, however, is the need for local deployment goals that can be expressed in terms compatible with the deployment tracking methodology. These goals can only be credible if they are locally produced based on traffic needs and local institutional and jurisdictional realities.

Tucson Deployment Planning

One metropolitan area that has succeeded in developing deployment goals compatible with the deployment tracking methodology is Tucson, Arizona. The reason for its success can be found in an examination of the goal-setting process followed in Tucson. In addition to being inclusive and comprehensive, this methodology includes the definition of a specific ITS network, a subset of the freeways and arterial roadway network, which serves as the focus for ITS deployment. This makes the resulting deployment goals directly transferable to the network-based deployment tracking indicators. As a result, the Tucson ITS network serves as the basis for defining the locally derived "should" case.

In Tucson, the deployment tracking methodology served as the basis for developing a "should" case, capable of being expressed by the deployment tracking indicators. The urban transportation planning process followed in Tucson provides a framework within the metropolitan area for systematically establishing transportation goals, analyzing needs, evaluating choices, and programming projects. In Tucson, planners were successful in bringing all of the important stakeholders together to jointly decide on a subset of the road network that would be the basis for ITS deployment.

PIMA Association of Governments ITS Planning Process

In 1973, the Governor of Arizona designated the Pima Association of Governments (PAG) as the Metropolitan Planning Organization (MPO) for the Tucson metropolitan area. PAG is comprised of unincorporated Pima County, the City of Tucson, the City of South Tucson, and the Towns of Marana, Sahuarita, and Oro Valley. An Arizona Department of Transportation (ADOT) voting member sits on the Regional Council with voting rights on transportation issues.

In developing the Tucson ITS Strategic Deployment Plan, the PAG employed the following:

Assembly of a Coalition of Stakeholders

The PAG formed a Study Advisory Committee, including representatives from City of Tucson Transportation Department, FHWA, ADOT, City of Tucson Traffic Engineering, Pima County Traffic Engineering, University of Arizona, Pima Association of Governments, the Sun Tran transit agency, and adjoining communities.

Identification of Problems That Can Be Addressed by ITS

Input from stakeholders and the general public was obtained from a broad range of transportation users, including sectors with specific needs, such as commercial transportation services, trucking, and emergency services. User input was acquired through focus groups and a telephone survey. Eight focus groups were identified: citizens advisory committee; emergency service providers; commercial vehicle operations (trucking); major employers/tourism; commercial vehicle operations (non-trucking); general public; commercial vehicle drivers; and transportation agencies. Existing transportation plans, projects, and studies were also reviewed to obtain information on transportation needs.

Inventory of Current and Future Projects

Roadway and infrastructure conditions were reviewed, as were projects, plans, and intergovernmental agreements.

Goal-Setting

In carrying out the first three steps–building a coalition, identifying problems, and producing an inventory–the PAG established the framework for goal-setting. As mentioned earlier, goal-setting in Tucson was network-based and therefore particularly compatible with the deployment tracking indicators.

Network-Based Goal-Setting in Tucson

The result of Tucson's goal-setting process was an ITS network consisting of the road network segments judged appropriate for deployment of ITS technology. Written in terms of deployment-tracking goals, this network becomes the basis for the "should" case.

The goal-setting process employed in Tucson followed four steps:

1. Selection of a Preliminary ITS Planning Network
2. Evaluation of the ITS Planning Network
3. Selection of a Final ITS Network
4. Identification of Coverage Goals

Selection of a Preliminary ITS Planning Network

In this step, transportation assets that were to be considered for ITS deployment were defined. These included both freeways and major arterials in addition to public transit vehicles and stations. The first step in defining the desired geographic coverage of ITS in the PAG region was to identify candidate roadway segments on which deployment would improve the efficiency and productivity of the transportation system. Based on input from the focus groups and within the Study Advisory Committee, 21 routes (206.9 miles) in the metropolitan area were identified as candidates.

Evaluation of the ITS Planning Network

Criteria were established to evaluate the performance of the ITS network. These measures included congestion and travel time, accidents, ridership characteristics, and accessibility. Table 1 contains a summary of the factors that were considered in this qualitative evaluation.

Table 1. Factors Used in Evaluation of Candidate Routes for ITS Deployment

Factor	Description	Criteria
Traffic Characteristics	Current and forecasted traffic volume and congestion	Roadways with highest traffic volumes of vehicle and passenger (i.e., transit) trips and levels of congestion
Travel Characteristics	Predominant type of travel carried by route, i.e., "local" or "regional"	Roadways predominately carrying regional travel (trips greater than 5 miles)
Transit Route	Transit service on a route	Roadways with fixed route transit service
National Route Designation	National Highway System (NHS) designation	Roadways with NHS designation
Existing and Committed Levels of ITS Infrastructure	Presence of core elements of ITS providing opportunities for implementation of ITS at a lower cost	Roadways where core elements exist or are planned, e.g., interconnected or centrally monitored traffic signals, vehicle detection, and communications
Jurisdictional Coverage	Jurisdictional location or responsibility	Maximize jurisdictional coverage
Interactions between Routes	Ability of routes to complement each other by providing travel alternatives	Identification of most desirable alternative routes based on expected travel patterns

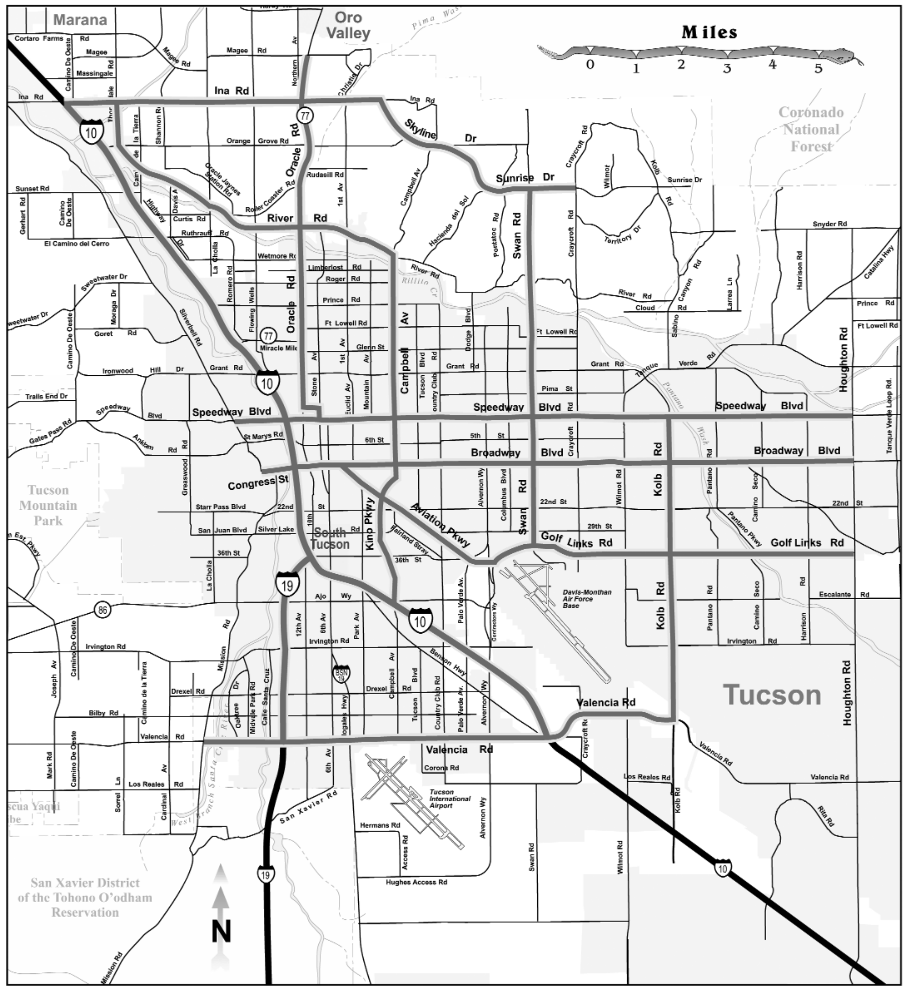
Selection of the Final ITS Network

The criteria in Table 1 were applied to the preliminary ITS network to define a final ITS network meeting essential needs. The candidate list of routes was scaled down to 12 routes (128.5 miles) in the metropolitan area based on a review of existing and future traffic and roadway characteristics on each route. The recommended ITS routes, as shown in Figure 1, provide broad regional coverage of the metropolitan area and focus on deployment of advanced detection, monitoring, and communications on major carriers of regional traffic. It is important to note that this recommended coverage is considered to define a realistic target for deployment of ITS in the region, and for the purposes of this project, provides a basis for estimating probable deployment costs. In the near term, the 1996 Strategic Deployment Plan and its 1999 and 2001 updates provide the framework for regional ITS deployment goals in the Tucson metropolitan area.[1]

Identification of Coverage Goals

The deployment of ITS infrastructure components on the ITS network was planned in phases. The intention was to establish the basis for near-term deployment and to create opportunities for later widespread deployment. Three phases were defined, centering on elements of the following infrastructure components: Freeway Management, Arterial Management, Transit, and Regional Multimodal Traveler Information Center.

Figure 1. Recommended ITS Route Coverage in Pima County



[1] In February 1998, a progress update of the 1996 Strategic Deployment Plan was issued by the Pima Association of Governments Transportation Planning Division (PAGTPD). In addition, in the summer of 1999, the PAGTPD began a major revision to the Strategic Deployment Plan that should be released in fall 2002.

Coverage Goals as Deployment Tracking Indicators

Deployment Goals

The ITS network that results from the Tucson planning process is the focus for ITS deployment planning. By the inclusion of both freeways and arterials, and including consideration of the needs of all stakeholders, the network provides a clear picture of the consensus position of the transportation community concerning ITS deployment. The following tables present the results of the Tucson deployment planning expressed in terms of the deployment tracking indicators. The first column is the description of the indicator followed by two versions of the deployment opportunities that serve as the denominator for the indicator calculation. The first of these are the unconstrained "could" case figures and the second are the "should" case numbers based on the Tucson network analysis. The actual deployment from the 2000 data gathering is shown in the next column. The next column shows the variation in the indicator when using the "could" and "should" case deployment opportunities. Finally, a column for recording criteria for making the deployment decisions or other information is included.

These results reflect the 1999 ITS deployment plan. It is important to note that the Tucson metropolitan area is in the process of updating its ITS Strategic Deployment Plan and deployment goals will likely change as the plan is updated.

Table 2. Coverage Goals for Freeway Management

Indicator	Deployment Opportunity		2000 Deployment	Indicators	Comments
	"Could Case"	"Should Case"			
% Freeway miles under electronic surveillance for traffic monitoring	132 miles	30 miles	0 miles	Could: 0% Should: 0%	Planned, but deployment deferred pending major freeway reconstruction
% Freeway entrance ramps controlled by ramp metering	55 entrance ramps	0 entrance ramps	0 entrance ramps	Could: 0% Should: N/A	Traffic conditions do not currently justify deployment
% Freeway miles controlled by lane control	132 miles	0 miles	0 miles	Could: 0% Should: N/A	Little used by ADOT, but advocated by some in Tucson and under consideration
% Freeway centerline miles controlled by permanent DMS	132 miles	50 miles	20 miles	Could: 15% Should: 40%	Coordinated with ADOT for entry/exit points to metro area
% Freeway centerline miles covered by HAR	132 miles	0 miles	0 miles	Could: 0% Should: N/A	Commercial ISP providing traveler information
% Freeway centerline miles covered by IVS	132 miles	0 miles	0 miles	Could: 0% Should: N/A	

DMS - Dynamic Message Signs
HAR - Highway Advisory Radio
ISP - Information Service Provider
IVS - In-Vehicle Signing

Table 3. Coverage Goals for Freeway Incident Management

Indicator	Deployment Opportunity		2000 Deployment	Indicators	Comments
	"Could Case"	"Should Case"			
% Freeway miles covered by incident detection algorithms	132 miles	30 miles	0 miles	Could: 0% Should: 0%	Will be implemented with deployment of surveillance
% Freeway miles covered by free cellular phone calls to a dedicated number	132 miles	97 miles	97 miles	Could: 73% Should: 100%	Free *JAM call being replaced by 511
% Freeway miles covered by surveillance cameras	132 miles	30 miles	13 miles	Could: 10% Should: 43%	12 cameras with half-mile range either direction
% Freeway miles covered by on-call publicly sponsored service patrol or towing	132 miles	0 miles	0 miles	Could: 0% Should: N/A	Private towing services in place, public freeway service patrols under consideration

Table 4. Coverage Goals for Arterial Management

Indicator	Deployment Opportunity		2000 Deployment	Indicators	Comments
	"Could Case"	"Should Case"			
% Signalized intersections covered by electronic surveillance for monitoring traffic flow	413 intersections	413 intersections	320 intersections	Could: 77% Should: 77%	Cameras at intersections (loops in place at approaches to all major intersections)
% Arterial signalized intersections under centralized or close loop control	413 intersections	413 intersections	413 intersections	Could: 100% Should: 100%	Includes all city, county, and state signals within metro area
% Arterial centerline miles affected or influenced by DMS	623 miles	132.5 miles	35 miles	Could: 6% Should: 26%	Aimed at making arterial corridors "smart"; will include freeway info
% Arterial centerline miles affected or influenced by HAR	623 miles	0 miles	0 miles	Could: 0% Should: N/A	Information provided to commercial ISP
% Arterial centerline miles affected or influenced by IVS	623 miles	0 miles	0 miles	Could: 0% Should: N/A	

DMS - Dynamic Message Signs
HAR - Highway Advisory Radio
ISP - Information Service Provider
IVS - In-Vehicle Signing

Table 5. Coverage Goals for Arterial Incident Management

Indicator	Deployment Opportunity "Could Case"	Deployment Opportunity "Should Case"	2000 Deployment	Indicators	Comments
% Arterial centerline miles covered by incident detection algorithms	623 miles	0 miles	0 miles	Could: 0% Should: N/A	Cameras at intersections and cellular calls detect incidents
% Arterial centerline miles covered by free cellular phone calls to a dedicated number	623 miles	392 miles	392 miles	Could: 62% Should: 100%	Free *JAM converting to 511
% Arterial centerline miles covered by surveillance cameras	623 miles	75 miles	13 miles	Could: 2% Should:17%	Intersection cameras used (based on fact that 90% of collisions occur at intersections)
% Arterial centerline miles covered by on-call service patrol or towing services	623 miles	392 miles	0 miles	Could: 0% Should: 0%	Emergency service providers provide incident response

Table 6. Coverage Goals for Transit Management and Electronic Fare Payment

Indicator	Deployment Opportunity "Could Case"	Deployment Opportunity "Should Case"	2000 Deployment	Indicators	Comments
% Fixed route transit vehicles equipped with AVL	199 vehicles	199 vehicles	173 vehicles	Could: 87% Should: 87%	System Purchased: Rockwell Transit Master
% Fixed route transit vehicles equipped with electronic monitoring of vehicle components	199 vehicles	199 vehicles	173 vehicles	Could: 87% Should: 87%	System Purchased: Rockwell Transit Master
% Para-transit vehicles operating under computer-aided dispatch	64 vehicles	64 vehicles	64 vehicles	Could: 100% Should: 100%	Purchased and installed in 2001
% Bus stops with electronic display of information	Not known	3 locations	3 locations	Could: N/A Should: 100%	Monitors located at each of three transit centers
% Fixed route buses and light rail vehicles that accept electronic payment	199 vehicles	199 vehicles	173 vehicles	Could: 87% Should: 87%	Magnetic stripe cards
% Rail transit stations that accept electronic payment	N/A	N/A	N/A	Could: N/A Should: N/A	

AVL - Automatic Vehicle Location

Table 7. Coverage Goals for Highway-Rail Intersections

Indicator	Deployment Opportunity "Could Case"	Deployment Opportunity "Should Case"	2000 Deployment	Indicators	Comments
% Highway-rail intersections under electronic surveillance	Not known	6 intersections	6 intersections	Could: N/A Should: 100%	

Table 8. Coverage Goals for Emergency Management

Indicator	Deployment Opportunity "Could Case"	Deployment Opportunity "Should Case"	2000 Deployment	Indicators	Comments
% Public sector emergency vehicles that operate under computer-aided dispatch	916 vehicles	916 vehicles	857 vehicles	Could: 94% Should: 94%	
% Public sector emergency vehicles with in-vehicle route guidance capability	916 vehicles	99 vehicles	0 vehicles	Could: 0% Should: 0%	

Table 9. Coverage Goals for Regional Multimodal Traveler Information

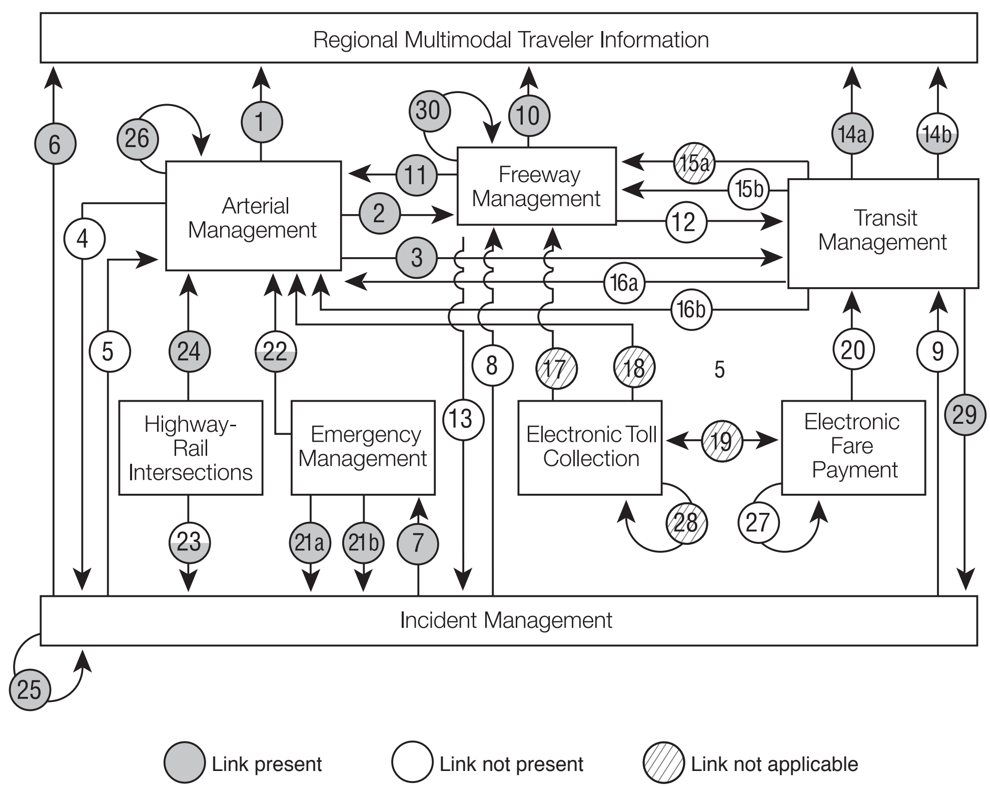
Indicator	Deployment Opportunity "Could Case"	Deployment Opportunity "Should Case"	2000 Deployment	Indicators	Comment
% Geographic coverage of surveillance data provided from freeway management	132 freeway miles	30 freeway miles	13 freeway miles	Could: 10% Should: 43%	One commercial ISP: Metro Networks
Possible RMTI media types used to display information to travelers	8 media types	8 media types	5 media types	Could: 63% Should: 63%	Cable TV, Internet web page, telephone information line, kiosks, and radio
Possible RMTI used to display information on two or more modes to travelers	8 media types	8 media types	4 media types	Could: 50% Should: 50%	Cable TV, Internet web page, telephone information line, and kiosks

AVL - Automatic Vehicle Location
RMTI - Regional Multimodal Traveler Information
ISP - Information System Provider

Integration Goals

Integration is measured in deployment tracking by calculating the extent that agencies interact within the metropolitan infrastructure, using a set of defined interagency links. The calculation for each link is generally the number of agencies that are integrated divided by the total number of agencies that could integrate. Figure 2 shows the integration indicators for Tucson. This diagram shows the links between infrastructure components with a circle that is colored in to show the extent of integration on each link. In Tucson, for each of the applicable links, the goal is to have all agencies integrated; i.e., the "should" case is the same as the "could" case. However, one difference is that the "should" case takes into account the fact that some of the links are not applicable (for example, links involving electronic toll collection).

Figure 2. Integration Indicators



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

Conclusions

Telling the Tucson Story from the "Should" Case

The "should" case provides a much more accurate picture of the effective level of deployment and integration. The result of including goals in the indicators is that all the indicators reveal information, even if that information is that no deployment is required. This is not true for the "could" data, and an examination of the indicators for Tucson shows this phenomenon. A number of the "could" indicators are 0 percent where the real answer should have been that no deployment is planned, giving a false impression that no progress has been made. Additionally, a number of "could" case deployment indicators significantly underestimate the actual progress toward deployment goals. Because of the inclusion of deployment goals, it is possible to use the "should" indicators to accurately describe local conditions. All major deployments are covered by the indicators, and taken as a whole, the "should" case indicators go a long way toward telling the Tucson ITS story.

Freeway Management

The "should" case deployment indicators show that freeway control mechanisms, in the form of ramp metering or lane control, have been considered but rejected based on local traffic conditions. Traffic monitoring is planned for a portion of the freeway but is not yet in place, pending completion of freeway reconstruction. Highway advisory radio has not been employed based on the existence of commercial information service providers (ISPs). Travelers will be informed instead through dynamic message signs, the deployment of which is 40 percent complete.

Freeway Incident Management

Surveillance cameras are being deployed on 30 miles of the freeway system, a significant investment given that this constitutes the bulk of the freeways within the urbanized area of Tucson, with 43 percent of the deployment goal in place. Publicly sponsored incident management service patrols have been considered, but rejected so far in favor of private towing agencies. Tucson makes up for the lack of traffic sensors through the use of dedicated free cellular phone calls for freeway incident detection. This detection method will be augmented by electronic incident detection when sensors are in place.

The "should" case provides a much more accurate picture of the effective level of deployment and integration.

Deployment tracking methodology can be successfully combined with local ITS deployment planning to produce the "should" case.

Arterial Management

The map of the ITS network (Figure 1) clearly shows the importance of arterials to the Tucson metropolitan transportation system. The importance of arterials is driven home by an examination of the integration chart that shows the well-established links between arterial management and other infrastructure components and the close coordination between the different arterial management agencies. The deployment indicators show an extensive deployment of technology when compared to national averages from the deployment tracking database. All intersections are under closed loop control, double the national average, and surveillance camera coverage is widespread (over three times the national average). Tucson has deployed dynamic message signs on arterials at a rate six times the national average, and will increase this gap when deployment is complete. (In 2000, deployment was 26 percent of the goal.) This level of arterial deployment adds up to a mature, expanding, well-integrated arterial management capability in Tucson, clearly showing the importance of arterials in Tucson to the overall transportation system. When compared to national averages, these data indicate that Tucson places a greater level of emphasis on arterial traffic management than many other metropolitan areas.

Arterial Incident Management

Emergency service providers and commercial towing companies support incident response. Intersection cameras handle surveillance with coverage about twice the national average. As with freeways, an extensive free cellular phone call capability (62 percent of arterial mileage covered compared to a national average of 2 percent) exists for incident detection.

Transit Management

Transit ITS technology is widely deployed in Tucson. Automatic vehicle location (AVL), electronic fare payment, and electronic monitoring of vehicle components are planned for all fixed route buses, with 87 percent of that goal already achieved. These levels are well above national averages, which are less than one-third of buses for all three of these technologies. Information on transit routes and schedules is displayed on kiosks at all three transit centers. The entire paratransit fleet is under computer-aided dispatch, whereas the national average in 2000 was 31 percent.

The "Should" Case

The Tucson experience illustrates that the deployment tracking methodology can be successfully combined with local ITS deployment planning to produce the "should" case. This is an important finding, since it has been widely pointed out that basing deployment indicators on the maximum deployment possible produces misleading results. Nevertheless, the "could" case has been employed up to now in order to create indicators that are consistent between metropolitan areas. It is recognized by the project team that the "should" case must be locally derived–no external agency can decide what "should" be deployed in a particular metropolitan area. As a result, the success of the inclusion of a locally derived set of deployment opportunity values in Tucson indicates that a similar process could be conducted in other metropolitan areas. Once collected, the comparison of actual and planned deployment to the "should" case would provide an accurate picture of the true state of deployment, both within a metropolitan area and nationally.

Advantages of the Tucson ITS Network as an Aid to Goal-Setting

The network-based methodology followed by Tucson in setting deployment goals was successful and appears to be a sound method that could be successfully applied elsewhere. One of the major benefits of using this methodology is that it forces the transportation community to think regionally from the start. This approach helps to overcome institutional friction caused by individual agencies considering only part of the roadway in isolation; for example, state planners considering deployment on freeways, and local planners on the arterials, without a coordinated view. In jointly defining an ITS network, stakeholders establish buy-in to basic deployment planning concepts from the start of the program. The network is also valuable in serving as a basis for considering new requirements and supporting decision-making concerning additions or changes to the basic network as conditions change. Once derived, deployments on the network are directly relatable to deployment tracking indicators, which also makes them relatable to the tracking database. One potential benefit of such a methodology is that if it were widely adopted, the deployment tracking definitions, indicators, and database could help to standardize goal-setting and simplify the sharing of experience among local and state transportation officials nationally. As a result, planning for those areas following a similar methodology could be easily compared to each other or to national averages.

For More Information

The entire Metropolitan ITS Deployment Tracking Database is available online at *www.itsdeployment.its.dot.gov.* This website contains results of surveys of metropolitan areas taken in FY96, FY97, FY99 and FY00. Users can view survey results by metropolitan area, view blank surveys, and review the precise definitions used to determine how much ITS has been deployed in each metropolitan area. For FY00, detailed reports were prepared for each metropolitan area, as well as a national report, which can be downloaded from this website.

One of the major benefits of using this methodology is that it forces the transportation community to think regionally from the start.

ITS Web Resources

ITS Joint Program Office:
www.its.dot.gov

ITS Cooperative Deployment Network:
www.nawgits.com/icdn.html

ITS Electronic Document Library (EDL):
www.its.dot.gov/itsweb/welcome.htm

ITS Professional Capacity Building Program:
www.pcb.its.dot.gov

Federal Transit Administration
Transit ITS Program:
www.fta.dot.gov/research/fleet/its/its.htm

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Systems

U.S. Department of Transportation
400 7th Street, SW
Washington, DC 20590

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