How Do I Manage and Staff for Intelligent Transportation Systems?

Thinking Outside of the Box

A Cross-Cutting Study

Maximizing Project Resources and Advancing Coordination

August 2000

Foreword

Dear Reader,

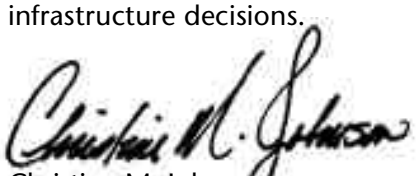
We have scanned the country and brought together the collective wisdom and expertise of transportation professionals implementing Intelligent Transportation Systems (ITS) projects across the United States. This information will prove helpful as you set out to plan, design, and deploy ITS in your communities.

This document is one in a series of products designed to help you provide ITS solutions that meet your local and regional transportation needs. The series contains a variety of formats to communicate with people at various levels within your organization and among your community stakeholders:

- **Benefits Brochures** let experienced community leaders explain in their own words how specific ITS technologies have benefited their areas;
- **Cross-Cutting Studies** examine various ITS approaches that can be taken to meet your community's goals;
- **Case Studies** provide in-depth coverage of specific approaches taken in real-life communities across the United States; and
- **Implementation Guides** serve as "how to" manuals to assist your project staff in the technical details of implementing ITS.

ITS has matured to the point that you are not alone as you move toward deployment. We have gained experience and are committed to providing our state and local partners with the knowledge they need to lead their communities into the next century.

The inside back cover contains details on the documents in this series, as well as sources to obtain additional information. We hope you find these documents useful tools for making important transportation infrastructure decisions.



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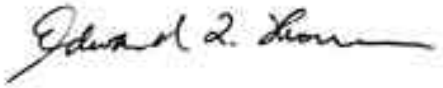

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Taking the First Steps

When embarking on an ITS project, public sector developers must grapple with the issue of staffing early in the planning process.

Intelligent transportation systems (ITS) projects often need staff with skills that are not resident in traditional transportation organizations. Therefore, project administrators must sometimes look beyond the usual staffing methods to fill these positions. Although staff adjustments are not cost-free, if addressed proactively and early on, they facilitate the project and contribute to its ongoing success beyond implementation.

Staff changes made to accommodate ITS tests and deployments occur most often within state and county departments of transportation. This cross-cutting study discusses the major changes that were made to the staffs at two metropolitan model deployment initiative (MDI) sites to facilitate the deployment of ITS. By considering the steps taken by these project participants to staff for ITS, developers of new ITS projects may identify ways to build the most effective and highly skilled staff available to support their ITS activities.

Administrators of both the Phoenix ***AZTech*** and Seattle ***Smart Trek*** MDIs performed similar assessments in identifying staffing and skill requirements for their projects. They looked outside the "practice-as-usual," sought both internal and external assistance, and drew from various, nontraditional sources to staff the project. In both projects, the project organizers opted not to use the popular contracting practice of hiring a prime contractor and allowing that contractor to hire subcontractors. Instead, making use of in-house expertise, participants from both projects assumed the role of prime contractor. To accomplish this role, they recognized that they must identify ITS functional areas of development, deployment, operations, and maintenance and then staff the projects according to the requisite specialized skills.

At both MDI sites, the project participants followed a similar approach to determine staffing needs:

- They assessed carefully the project details outlined in the project proposal.
- They designed a regional management structure to support these project elements.
- They analyzed what skills were needed to fill this structure and hypothesized how these skills could be obtained.
- Using several different methods, they acquired those skills.

As Pierré Pretorius, former Program Manager for *AZTech*, stated: "Identification of the skills needed to implement the MDI involved analyzing the proposal and determining how the requirements of the proposal could be achieved. Deciding which agency and who within the agency would be responsible for the various aspects of the MDI was largely dependent on the resources available. The process included generating and analyzing the proposal and discussing it at the *AZTech* Technical Oversight and Executive Committee Meetings." These committees consisted of management of the participating agencies who could commit staff to the MDI.

Creating a Management Structure

The two projects developed differing management structures. Consisting of participants from different agencies, the *AZTech* management team exists as a separate entity from its contributing organizations. According to the former *AZTech* Chief Administrator Dan Powell, the benefit of making *AZTech* a separate organization is the ability to have a "full-time staff who can concentrate on the project."

The *AZTech* project divides the lead responsibilities between a Chief Administrator and a Program Manager. In the original management structure there were six task coordinators who were responsible for different areas of the project: traffic signal coordination, communication, transit coordination, outreach, corridor, and advanced traveler information systems (ATIS) implementation. Other significant *AZTech* positions were the incident management coordinator, contracting officer, transit implementation task leader, and evaluation coordinator. The administrators and coordinators oversaw ten working groups: public relations, interagency coordination, emergency management, evaluation, contract administration, system integration, smart corridors, traffic signal systems, ATIS, and transit. Pretorius noted, "There were no barriers in determining the management structure. The main concern was making sure we adequately covered the project without having too many meetings or too many layers of management."

While the *AZTech* project exists as a distinct entity that draws from the staffs of various organizations, the functions of the *Smart Trek* MDI reside largely within the Washington State Department of Transportation (WSDOT) with extensive support from the private sector. In developing the proposal, WSDOT staff and representatives of the private sector examined all the gaps in the existing traveler information system. Through an extensive process of meetings to develop the proposal, the participants decided what the system should look like, who would develop and operate it, and who needed to be involved.

In the *Smart Trek* project, the Project Manager has the final responsibility for all decisions in the MDI program, including decisions regarding what projects within the program to add, drop, or modify. However, all project management decisions are shared with two Deputy Project Managers, one for System Integration and one for Operations and Maintenance. In addition, the *Smart Trek* project is divided into five components, or "bundles:" Transportation Management Systems; Regional, Multi-modal Traveler Information Services; Transit Management and Electronic Commerce; Emergency Services and Incident Management; and Public Involvement, Outreach and Marketing. Each bundle has a manager who oversees that element of the project.

Representatives of the *AZTech* and *Smart Trek* projects took a similar approach to the task of staffing; they assigned staff members according to their strengths. At both MDI sites, developers made a conscious effort to build on existing relationships, experience, and talents.

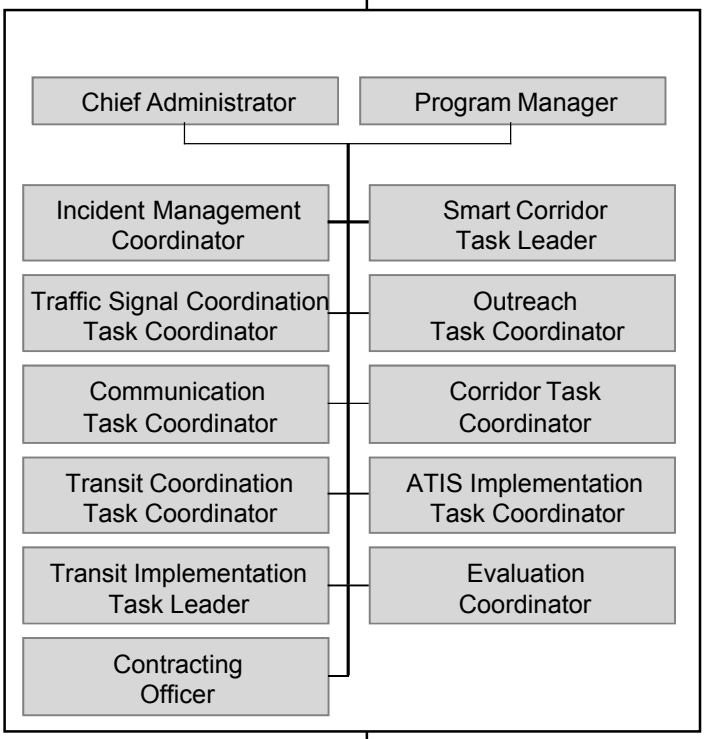
"The management structure of the MDI was formed by taking all the expertise and abilities represented by the participants and putting them on paper. It became obvious how to manage the project."
—Former AZTech Chief Administrator Dan Powell

Filling the Positions

AZTECH

The staff who made up the *AZTech* team brought the most appropriate skills and experience possible to the project . Pretorius stated that project developers "identified people within the Maricopa Department of Transportation (MCDOT) and the Arizona Department of Transportation (ADOT) who had certain needed skills." Both the ADOT and MCDOT provided six positions to the *AZTech* team. Powell, the ADOT District Engineer for the Phoenix area, was appointed the Chief Administrator. He had been involved in ITS for ten years and was instrumental in bringing the Phoenix freeway management system on line. He reported directly to the ADOT State Engineer. A new District Engineer was assigned to the Phoenix area to replace Powell. Pretorius, the ITS coordinator for the MCDOT, was named the Program Manager. He had been involved in ITS-related work as a traffic engineer for 15 years. He reported directly to the County's Director of Transportation. Pretorius's former responsibilities were assigned to other MCDOT employees.

ADOT personnel staffed the public outreach and ATIS task lead positions, while MCDOT personnel staffed the transit coordinator, communication task lead, and the traffic signal coordinator positions. The MCDOT Traffic Engineering Branch Manager also spent 10% to 20% of his time working on the MDI and other ITS-related activities. Because, as Powell described it, the MCDOT procurement process was "the most efficient," the County was selected as the lead procurement agency and, therefore, the chief procurement officer for the *AZTech* MDI is a MCDOT employee.



Other *AZTech* staff members were also identified from agencies outside of the MCDOT and ADOT. For example, project representatives recognized the need for an incident management coordinator for the program. The project required this staff person to coordinate with agencies and consultants, teach courses, train public works agencies regarding incident management and incident command, and act as liaison with state and local police and fire agencies related to incidents on freeways and arterial streets. The person in this position needed skills in several areas: knowledge of new incident management developments and guidelines, changes in the emergency 911 system, and geographic information systems. In short, Powell identified the need for someone to "coordinate with emergency management system personnel using 'their terms' and to continue to work with public works personnel to provide a public safety perspective." He predicted that this will "permit the quick identification and resolution of incidents."

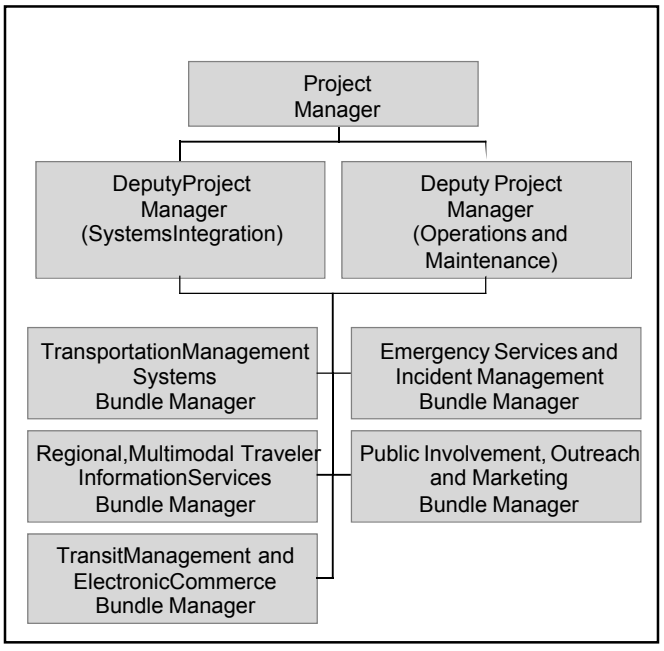
Filling the Positions

The right person for the job was Charles R. Manuel, a City of Phoenix firefighter who had been involved in incident management for 24 years. Manuel described his role in the project as one that "helps the project come to fruition, due in part to my understanding of the language of incident management and connection with other 'key players.'" *AZTech* representatives have arranged for his participation during the project's implementation, in order to maximize Manuel's unique skills.

In addition, the City of Tempe temporarily provided the Smart Corridor implementation task lead, Jim Decker, who has been involved in ITS for 10 years. He is a systems analyst for the city and is responsible for the administration of the signal system, including day-to-day operations and strategic planning. Through an inter-agency agreement, Decker spent 90% of his time on the *AZTech* project while the project was being developed and implemented. While Decker worked at the *AZTech* Traffic Operations Center, another City of Tempe staff member was moved to fill his old position. Arizona State University has provided the *AZTech* evaluation coordinator, and Phoenix Transit has provided the transit implementation task lead. In the words of Pretorius, the methodology used to staff the *AZTech* MDI "improved and streamlined the process to accomplish ITS activities."

SMART TREK

According to *Smart Trek* Project Manager Peter Briglia, WSDOT management "made a conscious decision to fit the MDI into the existing organizational structure." To facilitate the project, WSDOT management transferred existing staff into MDI positions whenever possible. WSDOT staff assigned to the Washington State Transportation Center (TRAC) are responsible for project management, and WSDOT regional managers are responsible for the major tasks associated with implementing the MDI. To gain expertise in areas not prevalent within the WSDOT, participants identified resources from the private sector.



Briglia was named as the Project Manager. He is a member of the Advanced Technology

A testament for the effectiveness of the AZTech organization structure is that it has remained stable even though some key managers left. The ADOT and MCDOT still share management responsibilities. Tim White, ADOT, is the Principal Administrator and Dale Thompson, MCDOT is the Program Manager. The organizational structure will change in the future, however, as the project's emphasis moves from implementation to operations.

Filling the Positions

"The region has allocated time from in-house experts to review, implement, and evaluate the MDI tasks."
—Smart Trek Design Engineer Michael Forbis

Branch, which represents the WSDOT in the TRAC and was the ITS Program Manager. He is a former freeway operations engineer and has been involved with ITS for 10 years. In addition to Briglia, Eldon Jacobson, a WSDOT engineer assigned to the TRAC, was transferred to the MDI and dedicated three quarters of his time to the project. Two employees were hired through TRAC to handle work formerly performed by Briglia and Jacobson. Briglia also uses a consultant on a part-time basis to assist in program management; other consultants may be brought in as needed.

Both Smart Trek Deputy Project Managers are from the private sector. Bart Cima oversees the operations and maintenance area of the project. Originally, Joyce Wenger oversaw the system integration; Don Creighton now serves in that role. In addition, four of the five bundle managers are from the private sector. The only public sector bundle manager is a King County Metro employee, who heads the Transit Management and Electronic Commerce Bundle.

Staff at the WSDOT Northwest Region are responsible for implementing five *Smart Trek* projects, as well as handling most of the operations and maintenance work for the MDI. To fill these roles, three full-time positions have been funded from the MDI. According to Michael Forbis, design engineer for the project, rather than hiring staff to fill these positions, project developers opted to use existing staff who possessed the needed skills "because it was quicker." The positions of the transferred employees were then "backfilled" from within the agency. Also, one contract programmer was hired, and a college student is supporting the data retrieval system. After the MDI, staff in positions funded by the project will return to their original functions.

Building Professional Capacity

As evidenced by the two management structures in place at the *AZTech* and *Smart Trek* MDI sites, the role of the project manager can be successfully filled a number of different ways. At the *AZTech* site, project manager responsibilities are split between the Chief Administrator and the Program Manager. At the *Smart Trek* site, the Project Manager is accountable for all final decisions, but shares these decisions with his two Deputy Project Managers. Regardless of how the ITS project manager role is filled, it is widely acknowledged that project management responsibilities are extensive. They begin in the planning and design phase, continue through the selection of staff and contractors, procurement, deployment and installation activities, and conclude when the system is deployed. System and project management responsibilities transition into an operations management role.

The report, Building Professional Capacity in ITS: Documentation and Analysis of Training and Education Needs in Support of ITS Deployment (EDL #8964), identifies the wide-ranging knowledge, skills, and competencies needed by

transportation professionals involved in ITS. The information was compiled from a series of nearly 200 interviews conducted in 1998 at ITS deployment sites across the nation. The interviews covered federal, state, and local transportation agencies, universities, and the private sector. The interviews included highway, arterial, transit, and planning agencies that were involved in twelve different ITS deployment projects.

The interviews revealed that in deploying ITS, the most effective performance resulted when deployment roles were divided among a team of people so that no one person has to know everything, and team members can develop those competencies that are most important for their job responsibilities. The interviews also revealed that ITS professionals frequently play more than one role as part of their jobs. Both of these insights are consistent with the experience documented at the *AZTech* and *Smart Trek* MDI sites.

The *Documentation and Analysis* report provides definitions for 20 functional roles required for an "ideal" ITS deployment team. The roles do not directly correspond to staff positions, but rather imply important skill sets that should be brought to a project. Some of the roles belong to "core" staff on ITS projects; some are "support" roles. The report then identifies 27 ITS competencies and identifies which are needed for each role. As part of this report, three sets of guidelines are included to help decision makers and project managers:

- *Guidelines for Staffing, Hiring, and Designing Ideal Project Teams* (EDL #8966),
- *Guidelines for Designing an Individualized Training and Education Plan* (EDL #8965),
- *Guidelines for Developing the Future Professional* (EDL #8967).

Two additional reports are also available that focus specifically on the needs of transit agencies and commercial vehicle agencies:

- *Building Professional Capacity in ITS: An Assessment of ITS Training and Education Needs—The Transit Perspective* (EDL #8968)
- *Building Professional Capacity in ITS: An Assessment of ITS Training and Education Needs—The CVO Perspective* (EDL #10824)

Other reports that provide information on staffing procedures include *Successful Approaches to Deploying a Metropolitan Intelligent Transportation System* (EDL #8483) and *The Road to Successful ITS Software Acquisition: Volumes I and II* (EDL #4130 and 4131).

All of these reports are available on the Electronic Document Library (EDL) at http://www.its.dot.gov/welcome.htm. This document, *How Do I Manage and Staff for Intelligent Transportation Systems? Thinking Outside of the Box,* is available on the EDL as document number 11489.

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For a current listing of available documents, please visit our Web site at:
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—Former AZTech Chief Administrator Dan Powell

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