Montgomery ITS Phase 1a– Local Evaluation Report

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Executive Summary

The Local Evaluation Report presented herein describes the progress achieved during Phase 1A of the Montgomery ITS project. Phase 1A consisted of the installation of fiber optic cable over a 22.25 km. stretch of U.S. 80. The hypothesis of the evaluation states that the use of in-house forces (state personnel) to install the fiber optic cable was less costly than letting the work out as a construction contract to a private firm. As the scope of the Montgomery ITS was rather limited, the items reported on in addition to the unit costs include a statement of lessons learned and a brief discussion of institutional issues. The unit cost for the aerial 36 strand fiber optic cable installation was $8,083.28 per km. The data in the ITS Unit Costs Database was insufficient to draw any meaningful comparison with the unit costs associated with the Montgomery Phase 1A project. With no cost comparison possible, the most apparent lesson learned from the Montgomery Phase 1A project is the success that the performing agency feels is associated with the project. The use of state forces to build the foundation of the Montgomery ITS has created a sense of ownership that should result in a confidence in the system as additional project phases are implemented. Through the knowledge and experience gained by installing the fiber optic cable (and initiating the Montgomery ITS), the 6th Division of ALDOT can share its experience and technical abilities with other ALDOT divisions as well as with the City of Montgomery as they begin to implement their portions of the Montgomery ITS.

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Project Description

The principal objective of the Montgomery ITS project is the creation of a communications infrastructure to support the phased development of the Montgomery area ITS. The communications infrastructure is intended to facilitate the integration of highway, emergency services, and transit agencies in the Montgomery area. The project will connect CCTV cameras, vehicle detection systems, dynamic message signs and control software, advanced traffic signal controllers, incident/congestion tracking and management systems, and automatic vehicle locations systems for paratransit vehicles. Although a Regional ITS Plan has not yet been developed, preliminary plans for the Montgomery ITS project indicate the final system will consist of:

1. Communications links (fiber optic network) among all project stakeholders;[1]
2. Communication of real time information regarding congestion and incidents to stakeholders;
3. Development and facilitation of an incident response/diversion plan beneficial to all primary stakeholders; and
4. Eventual utilization of incident/congestion information and vehicle location data to more efficiently manage the demand responsive transit system in and around Montgomery.[2]

The Local Evaluation Report presented herein describes the progress achieved during Phase 1a of the project. The infrastructure installed under Phase 1A will serve as the foundation for the phased development of the overall Montgomery area ITS. A description of the various phases of the Montgomery ITS project are presented in Table 1.

[1] At this stage of the project, the Alabama Department of Transportation 6th Division is the only official stakeholder.
[2] Adapted from the official project description available at the http://www.itsevaluation.net/.

Table 1. Description and Status of Montgomery ITS.

Phase	Description	Status
1a	Install fiber optic trunk cable (aerial) along Eastern Bypass (U.S. 80) from Mobile Highway & S. Bypass east to Plantation Boulevard	Complete
1b	Install fiber optic drops controllers on Southern Bypass and Eastern Bypass. Upgrade traffic signal controller communication equipment to fiber optic compatible (e.g., f/o drops to (3) masters within the (3) closed loop systems).	Fiber purchased, not installed
2	Extend fiber optic cable from Plantation Way along Northern Bypass and down Coliseum Boulevard to ALDOT TMC. Interconnect ALDOT TMC and City of Montgomery TCC.	Fiber purchased, not installed
3	ITS network integration: control center population (i.e., hardware, software, misc. equipment), software integration, graphics production (e.g., real-time traffic maps), camera control integration, signal control software integration, diversion route study, its justification study, fiber network management software integration/as built.	Planned
4	Bell/Holt Project: install fiber optic interconnect from I-65 through Civic Center (future drop), through City Hall (future drop), through Police HQ, to Montgomery TCC. Install (3) CCTV and (3) VDS units (Radar) at key interchanges.	Planned
4a	Modify signal timings and upgrade controllers along Southern, Eastern and Northern Bypasses	Planned
5	Install (3) Dynamic Message Signs: I-65 SB North of Prattville Exit; I-65 SB South of Southern Blvd Exit; and I-85 SB North of Mitylene Exit (Atlanta Hwy.). Integration of DMS software, sign message inventory production	Planned
6	Install (10) CCTV and (10) VDS locations along Southern Bypass	Planned
7	Install fiber optic trunk from along I-85 from Exit 6 to I-65. Install (6) CCTV and (6) VDS at key locations along I-85.	Planned

Project Background

The Montgomery ITS Project, Phase 1a began April 7, 1999 and was completed on September 9, 1999. Phase 1a of the project consisted of fiber optic cable installation along U.S Highway 80 from the Mobile Highway (U.S. Hwy 31) to the intersection at Plantation Way. Under Phase 1a, fiber optic cable was installed aerially over a 22.25 km. stretch of U.S. 80.

The installation of the fiber optic cable for the Phase 1a project was conducted using "in-house" resources in lieu of letting the installation to a private contractor. The materials and labor required for Phase 1a included:

- 22.25 km of 36 fiber single mode cable;
- a cable lasher;
- two bucket trucks; and
- seven technicians.

The total cost for Phase 1a was $179,853.04. The unit cost for the aerial fiber optic cable installation was $8,083.28 per km. It was estimated that roughly $50,000 was invested in fiber optic installation equipment.

Level and Types of Integration

This section of the Local Evaluation Report is not applicable at this time.

Institutional Involvement

As the project description for Phase 1a indicates, the ALDOT was the only agency involved in the installation of the fiber optic trunk system.

Evaluation Plan

Goals, Objectives, and Measures of Effectiveness

The primary measure of effectiveness (MOE) is the unit cost of the fiber optic cable installation performed under Phase 1a of the Montgomery ITS project. The unit costs recorded for the current project will be compared to other values reported in the ITS Unit Costs database to determine whether or not the use of in-house forces to install resulted in any costs savings.

Hypotheses

The simple hypothesis of the current evaluation states that the use of in-house forces to install the fiber optic was less costly than letting the work out as a construction contract to a private firm.

Additional Activities

As the scope of the Montgomery ITS was rather limited, the items reported on in addition to the unit costs include a statement of lessons learned and a brief discussion of institutional issues.

Evaluation Findings

Project Outcome

As indicated above, the unit costs of the Phase 1a fiber optic cable installation was approximately $8,000 per km.[3] The most recent unit cost data published in the ITS Unit

[3] The $50k invested in installation equipment was not included in the calculated unit cost as it can be used on future projects and considered a department resource.

Cost Database indicated a value of $20k per km.[4] The ITS Unit Cost Database did not specify whether the reported fiber optic cable installation prices were for underground (in conduit) or aerial installations. Additional fiber optic installation unit cost data was obtained from the Institute of Transportation Engineers (ITE) internet listserver. Although not official data, the only response for aerial installation from the ITE listserver indicated a unit cost of roughly $13,000/km. for 36 fiber single mode cable.[5] Unit costs for 29,000 meters of 36 strand fiber optic cable (some underground) for an ITS project in the Birmingham, Alabama area were determined to be over $10k per km[6]

At the time of this report, there is insufficient unit cost data in the database to draw any meaningful comparisons. Anecdotal information gathered during the course of the study indicated unit costs generally higher than those reported for the Montgomery Phase 1a project. Again, no substantive conclusion can be drawn regarding the cost effectiveness of ALDOT's use of state forces as the costs indicated by officials from other agencies may have included items not considered in the ALDOT unit cost (e.g., installation equipment, utility pole make-ready work).

Lessons Learned

With no cost comparison possible, the most apparent lesson learned from the Montgomery Phase 1a project is the success that the performing agency feels is associated with the project. The use of state forces to build the foundation of the Montgomery ITS has created a sense of ownership that should result in a confidence in the system as additional project phases are implemented.

Institutional Issues

Through the knowledge and experience gained by installing the fiber optic cable (and initiating the Montgomery ITS), the 6th Division of ALDOT can share its experience and technical abilities with other ALDOT divisions as well as with the City of Montgomery as they begin to implement their portions of the Montgomery ITS. The experience and training should also save costs associated with ITS maintenance activties once the systems are complete and operational.

[4] The ITS Unit Cost Database maintained available at http://www.mitretek.org/its/benecost.nsf/ (updated as of 6/23/00) indicated only one unit cost entry for finer optic cable installation. Mitretek indicated that, as of 9/4/2001, no additional fiber optic installation unit cost data was available.

[5] This information is presented for informational purposes only. No comparison or conclusions regarding the Montgomery Phase 1a project are based on the information obtained from the ITE listserver.

[6] Jefferson County, Project CMAQ9802 (100).