Metropolitan Transportation Management Center

A Case Study

Georgia NaviGAtor

Accurate and Timely Information to Navigation Georgia Roads

October 1999

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Foreword

Dear Reader,

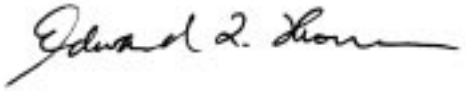
We have scanned the country and brought together the collective wisdom and expertise of transportation professionals implementing Intelligent Transportation Systems (ITS) projects across the United States. This information will prove helpful as you set out to plan, design, and deploy ITS in your communities.

This document is one in a series of products designed to help you provide ITS solutions that meet your local and regional transportation needs. We have developed 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 don't have to go it alone. 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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Preface

The following case study provides a snapshot of Atlanta's NaviGAtor transportation management center. It follows the outline provided in the companion document, *Metropolitan Transportation Management Center Concepts of Operation — A Cross Cutting Study,* which describes operations and management successful practices and lessons learned from eight transportation management centers in the United States and Canada.

This case study reflects information gathered from interviews and observations at the NaviGAtor transportation management center. The authors appreciate the cooperation and support of the Georgia Department of Transportation and its partners in the development of this document.

Contents

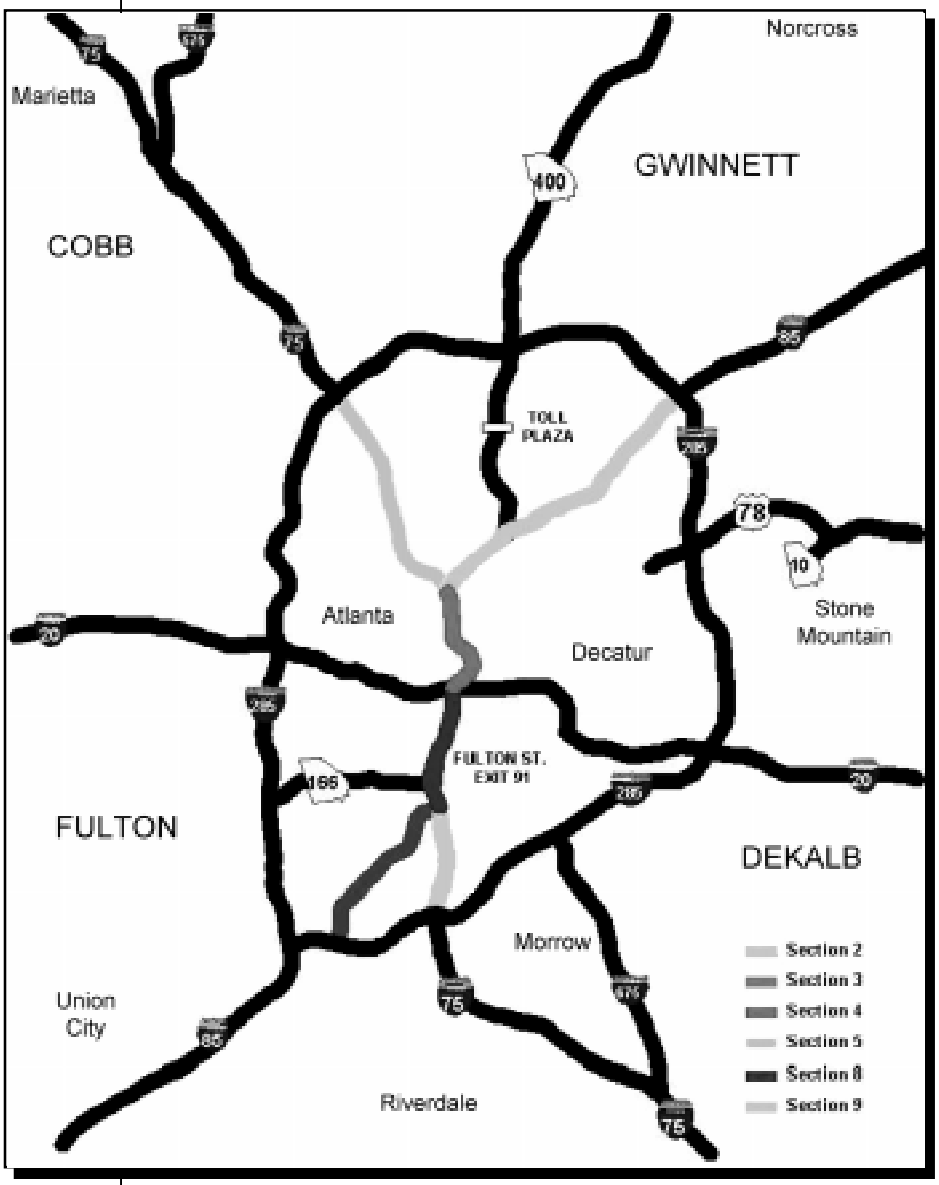
Background

The system was originally conceived to address incident management, congestion management, and motorist assistance needs for the 1996 Olympic Games in Atlanta.

The primary objectives for the transportation management center is to obtain and disseminate accurate and timely information for navigating Georgia roads.

In support of this mission, the system performs incident management and provides motorist assistance.

- The NaviGAtor TMC architecture includes the statewide control center working cooperatively with control centers for each city, county, or transit agency in the Atlanta metropolitan area, along with additional control centers elsewhere in the State.



Design and Implementation

General system design parameters for NaviGAtor include the following:

- The TMC is a 73,498 square-foot facility with four floors and a basement. The fourth floor houses Georgia Department of Transportation (GDOT) motor carrier and high occupancy vehicle enforcement. The TMC is in a State government complex in eastern Atlanta with access to I-20 via two arterials. The facility opened in 1996.
- The TMC has access to the fiber optic network, the public phone system, three radio systems (Highway Emergency Response Operators, high band, low band), and an aerial surveillance microwave link. The TMC is supported by an uninterruptable power supply and diesel generator, including dual power feeds. The building also offers an 11,000 square-foot garage, showers/locker room, and overnight facilities. Security includes swipe cards on all doors and elevators, a guard at the entrance, and security cameras outside. It cost $13 million to build the TMC, not including the Advanced Traffic Management System software and integration.
- The control room features two rows of consoles with three positions in the first row and five positions in second. The operations manager is in an office located behind the consoles. The control room measures 36 square feet, shaped roughly like a baseball diamond. Each operator position has a single monitor computer workstation, two 19-inch video monitors, and an integrated radio/telephone console. The front of the room has 9, 120-inch diagonal rear projection units that each display a matrix of screens 3 high and 3 wide. Six of the 120-inch units are shown below. The computer system controls all functions, including video.

On-site Georgia DOT public affairs staff contribute significantly to NaviGAtor image and outreach programs.

Design and Implementation

The use of training materials and hypertext in Help functions greatly improves the ease and speed of access to procedural information.

- The Advance Traveler Information System contains 48 miles of closed-circuit television, 63 miles of conduit, detectors of several types, variable message signs, and ramp metering on a small section of the metropolitan interstate network.
- The TMC provides text data and four cameras to the regional cable TV system. There are several cameras to which local media can link with communication equipment already installed in the TMC. A broadcast booth is provided for the media, with a view into the control room.

Method of Implementation

- Georgia DOT hired a system manager consultant to design the system, develop and provide the computer system and system documentation, and conduct testing, training, and systems integration. The system manager was chosen using a qualification-based selection and was awarded a cost plus fixed fee contract. Implementation was accomplished through multiple, low-bid, fixed price contracts with Georgia DOT inspection.

Testing

- System testing was performed by the system manager. Georgia DOT staff conducted testing, as did device installation contractors and "hookup" contractors who returned the connection to the TMC.

Training

- Georgia DOT has established a training group that prepared the operations procedures. New operators receive 2 weeks of training on console operation and use of the Advance Traveler Information System software. Operators are then trained on duties, procedures, and response planning (3 to 4 days per item). Trainees tour the project area and ride with Highway Emergency Response Operators. Georgia DOT estimates 6 months for an operator to become efficient.

Documentation

- Core documents provided to operators include standard operating procedures, incident management handbook, equipment manual, location guide, Advanced Traffic Management System users guide, signal listing, TMC equipment guide, and directory (points of contact). There is also an operations supervisors guide. Operations documents have been developed by TMC staff.
- The Georgia DOT-developed system Help function is available by subsystem or alphabetic search/index with hypertext links.

Operations

Workload and Performance

- The TMC is staffed 24 hours a day, 7 days a week in three shifts with four operators on prime shift, along with district/maintenance, Highway Emergency Response Operators, and two operators with a supervisor or manager on weekends and nights. Operator shifts overlap by 30 minutes. At shift change, supervisors update oncoming operators.
- System algorithms did not provide satisfactory automatic incident detection, so incidents are detected by calls from motorists, Highway Emergency Response Operators, and police, observed on video monitors or on the traffic speed maps.
- The operators are assigned duties focused on incident entry, notification, maintenance interface, or construction functions. The system recommends a response plan based on incident type, impact, and location. The operators also use a Web-based pager function. Operators also answer *DOT calls.
- Georgia DOT estimates five incidents per hour daily, with higher numbers during peak periods. A significantly greater number of motorists are assisted by Highway Emergency Response Operators.

Coordination

- All components of the Intelligent Transportation Systems program report to the Georgia DOT operations directorate. Planning, design, operations, and maintenance are housed in the TMC.
- Operators communicate verbally across consoles with one another, by radio with Highway Emergency Response Operators, and by phone with the fire department, emergency medical services, and law enforcement. The Highway Emergency Response Operator calls wrecker services contracted with local jurisdictions.
- The TMC shares information electronically with the traffic control centers at the city of Atlanta, the five area counties, Savannah, and Athens. Design is under way for traffic control centers for Macon and Augusta. Traffic control centers can enter reported incidents within the computer system. Both the traffic control centers and MARTA have video and computer access. The TMC also receives faxes on construction activity from local agencies.
- Transit is a vigorous partner with traffic management in Atlanta. MARTA, the regional transit authority, houses one of the NaviGAtor Transportation Control Centers in its bus control room, providing MARTA with full access to all traffic information contained within the NaviGAtor computer system. MARTA is also able to enter or modify incident, congestion, or other information into the center, based on reports received from its vehicle operators, with the same capability as if it were in the TMC.

Operations

Conflict Resolution

- Decision-making authority passes from the operator to the shift supervisor to the operations manager to the TMC manager. More senior levels of Intelligent Transportation Systems and Georgia DOT operations management are also on site. Key decision makers are available by telephone, cellular phone, and pager.

Nonstandard Operations

- A procedure for operations responsibilities during emergencies has been prepared. The Georgia Emergency Management Agency is located in an adjacent building.
- Jurisdictions notify Georgia DOT of road closures for special events. The TMC prepares plans for dealing with sporting event traffic congestion.

Maintenance

Fault Detection and Correction

- Operators perform equipment checks weekly, supplementing the automatic fault detection, reporting, and logging performed by the system. The system also detects and reports over-temperature conditions in equipment cabinets. The system map indicates failed equipment or communications by a change in icon color on the system map. A screen posts a listing of devices noted as failed by the system. Many failures are noted when operators attempt to use a device. The Web site system of video captures notes and reports when it is unable to acquire an image.

Configuration Management

- A configuration manager, supported by a configuration management engineer, has been added to the staff. Georgia DOT is documenting the system's configuration after the fact. Configuration management on software is provided by Georgia DOT information systems. The new system manager has been tasked with auditing the software and creating a configuration management baseline. The configuration management database will include not only the statewide TMC, but also the city, county, transit, and remote TMCs.
- Creation of the configuration management database is complicated given the numbers of contracts and contractors who were included in the system implementation.

Logistics

- Initial spares, tools, and test equipment were procured through the installation contracts. Georgia DOT can directly purchase these supplies below a certain value, but above that value Georgia DOT must obtain multiple bids. Installation contractors provided equipment support for 2 years after acceptance. For system expansions, Georgia DOT specified that warranties begin at system acceptance. Warranties are managed by the system support contractor.

Maintenance

- Georgia DOT emphasized the importance of having an internal information technology team. In addition to its own resources, Georgia DOT will use the system manager to continue debugging, expanding, and enhancing the computer system. Georgia DOT also retains specialist consultants in areas such as the Geographic Information System.
- Georgia DOT is increasing maintenance contracting. It recently initiated a contract for preventive maintenance of variable message signs. This contractor does preventive maintenance (bulbs and filters) every 6 months, according to a Georgia DOT-developed plan. The contractor also is required to report likely problem areas.

NaviGAtor implementation was the first significant demonstration of the system manager procurement approach in ITS.

For further information, contact:

Federal Highway Administration Resource Centers

Eastern Resource Center
10 S. Howard Street, Suite 4000 – HRA-EA
Baltimore, MD 21201
Telephone 410-962-0093

Southern Resource Center
61 Forsyth Street, SW
Suite 17T26 – HRA-SO
Atlanta, GA 30303-3104
Telephone 404-562-3570

Midwestern Resource Center
19900 Governors Highway
Suite 301 – HRA-MW
Olympia Fields, IL 60461-1021
Telephone 708-283-3510

Western Resource Center
201 Mission Street
Suite 2100 – HRA-WE
San Francisco, CA 94105
Telephone 415-744-3102

Federal Transit Administration Regional Offices

Region 1
Volpe National Transportation Systems Center
Kendall Square
55 Broadway, Suite 920
Cambridge, MA 02142-1093
Telephone 617-494-2055

Region 2
1 Bolling Green
Room 429
New York, NY 10004
Telephone 212-668-2170

Region 3
1760 Market Street, Suite 500
Philadelphia, PA 19103-4124
Telephone 215-656-7100

Region 4
Atlanta Federal Center
61 Forsyth Street, SW
Suite 17T50
Atlanta, GA 30303-3104
Telephone 404-562-3500

Region 5
200 West Adams Street
24th Floor, Suite 2410
Chicago, IL 60606-5232
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Region 6
819 Taylor Street
Room 8A36
Fort Worth, TX 76102
Telephone 817-978-0550

Region 7
6301 Rockhill Road, Suite 303
Kansas City, MO 64131-1117
Telephone 816-523-0204

Region 8
Columbine Place
216 16th Street, Suite 650
Denver, CO 80202-5120
Telephone 303-844-3242

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Seattle, WA 98174-1002
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For a current listing of available documents, please visit our Web site at:
www.its.dot.gov

ITS Web Resources

ITS Joint Program Office:

http://www.its.dot.gov

ITS Cooperative Deployment Network (ICDN):

http://www.nawgits.com/jpo/icdn.html

ITS Electronic Document Library (EDL):

http://www.its.fhwa.dot.gov/cyberdocs/welcome.htm

ITS Professional Capacity Building Program Catalogue:

http://www.its.dot.gov/pcb/98catalg.htm

Federal Transit Administration:

http://www.fta.dot.gov

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