Transportation Planning in the Era of Smart Cities

GPA Fall Conference
September 23, 2020
Key Questions

1. What does transportation planning look like in the context of Smart Cities?

2. How does this planning differ from other forms of transportation planning?
Case Studies

• Sandy Springs’ “Intelligent Transportation Systems (ITS) Master Plan”

• Gwinnett County’s “Connected Vehicle Technology Master Plan”

• Atlanta Regional Commission’s “Regional Transportation Systems Management and Operations (TSMO) Strategic Plan”

• Georgia Department of Transportation’s “Planning within Operations”
City of Sandy Springs
ITS Master Plan

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What is ITS?

- Using technology to improve efficiency and safety of the transportation system
- New Devices (traffic signals, CCTV cameras, travel time devices, school zone beacons)
- Advanced Traffic Signal Timing
- Emerging Technology
- Transportation Management Center (TMC) Communications Network (Fiber)
Why an ITS Master Plan?

• Develop ITS Inventory

• Determine how to protect ITS infrastructure

• Prepare for the future
Public Outreach

• Nontraditional Approach
  • Informational Fact Sheets
    • Existing System
    • Advanced Signal Timing
    • Connected/Automated Vehicles
    • Project Recommendations

• Internal Stakeholder Workshops

• Partner Agency Input
  • One on One Interviews
  • Meeting with all partners
Existing Conditions

• Inventory of Devices

• Existing Plan Review

• Interoperability

• Collaboration Opportunities
Needs Assessment

• Safety and Mobility

• High-Level Bandwidth/Network Evaluation

• Emerging Technologies Consideration

Infrastructure to Users: The traffic signal "talks" to the vehicle or smartphone application and offers information about the traffic signal timing, potential pedestrians present, and other location specific information. For example, the traffic signal may tell you that an emergency vehicle is approaching.

Emergency Vehicle Preemption (EVP): The emergency vehicles "talk" to the traffic signals which adjusts signal timings to clear traffic in the direction of travel before the emergency vehicle reaches the intersection. Providing faster response times and safer travel for all motorists.

Transit Signal Priority (TSP): The transit vehicle "talks" to the traffic signal to ask if the traffic signal can provide additional green time for the transit vehicle to progress through the signal. Providing more efficient and reliable transit services.

Advanced Pedestrian and Bicycle Detection: Advanced pedestrian and bicycle detection can initiate a message to a device to "talk" to on-coming vehicles, warning that there is a pedestrian in the crosswalk or cyclist in the bike lane. In addition, the flashing 'don't walk' time can be extended to clear pedestrians from the intersection which may need additional time. Providing additional safety for pedestrians and bicyclists.
Plan Recommendations

• Initiatives
  • Develop and Implement Standard Operating Procedures
  • Biannual Partner Agency Meetings

• Network
  • Redundancy and Scalability

• System
  • Upgrading all analog cameras
  • Advanced Signal Timing
  • Emerging Technologies: Emergency Vehicle Preemption, Transit Signal Priority
ITS Master Plan

Final ITS Master Plan
http://www.sandyspringsga.gov/home/showdocument?id=21913

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Gwinnett County CVTMP & TSMAP

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• Over **740** Traffic Signals
• **75%** communicate with TCC
• Over **230** miles of fiber optic cable
• More than **260** CCTV cameras
• Over **220** flashing beacon locations
• Continued Expansion of Advanced Traffic Management System
Why create the CVTMP?

• Supplement Gwinnett County’s existing Comprehensive Transportation Plan and ITS Master Plans by focusing on CV infrastructure
• Identify the potential safety and mobility benefits available with deployment of CV infrastructure
• Understand the current state of the industry and technology
• Prepare for the Smart Corridor pilot project located in western Gwinnett County
CVTMP Overview

• Funded by both the Georgia Smart Communities Grant and County SPLOST
• Included safety benefit research conducted by Georgia Tech faculty
• Provided County staff additional guidance for the Smart Corridor pilot project
• Identified developmental needs for further expansion of connected vehicle technology and applications
CVTMP Results

• Learned about transportation challenges from stakeholders
• Provided overview of industry trends and opportunities
• Developed a 5 year deployment plan for CV technologies
• Refined the focus of the Smart Corridor
  - Status of desired CV applications
  - Expansion of project from PIB to all of western Gwinnett
Traffic Signal Maintenance Action Plan (TSMAP)
Why create the TSMAP?

- Traffic congestion is directly impacted by how well traffic signal infrastructure functions
- Preserve and improve the performance of the existing signal infrastructure in Gwinnett County
- Develop a set of criteria for determining recommended upgrades based on industry best practices and local agency interviews
- Provide an estimation for upgrade costs
Local Agency Life Expectancy Estimate Survey Results

<table>
<thead>
<tr>
<th>Structural Components</th>
<th>Controller System Components</th>
<th>Signal Display Components</th>
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</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td><strong>Life span (years)</strong></td>
<td><strong>Type</strong></td>
</tr>
<tr>
<td>Steel mast arm</td>
<td>20-30</td>
<td>Loop detector</td>
</tr>
<tr>
<td>Aluminum mast arm</td>
<td>20-30</td>
<td>Non-invasive detector</td>
</tr>
<tr>
<td>Wood pole (and span wire)</td>
<td>10-15</td>
<td>Traffic controller</td>
</tr>
<tr>
<td>Concrete pole (and span wire)</td>
<td>20-30</td>
<td>Traffic controller Cabinet</td>
</tr>
<tr>
<td>Steel pole (and span wire)</td>
<td>50</td>
<td>Fiber-optic cable</td>
</tr>
<tr>
<td>Galvanized pole and mast arm</td>
<td>50</td>
<td>Conflict monitor</td>
</tr>
<tr>
<td>Battery Backup System</td>
<td>15</td>
<td>Pedestrian push buttons</td>
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<tr>
<td>Digital PTZ camera</td>
<td>3.5</td>
<td>Overhead street name signs</td>
</tr>
<tr>
<td>Lead-Acid Battery</td>
<td>5-7</td>
<td></td>
</tr>
</tbody>
</table>
GWINNETT COUNTY
Traffic Signals
All Signals Installed
Signal Map
GWINNETT COUNTY

Flasher Signals
All Flashers Installed

Signal Map
Thank you

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Regional Transportation Systems Management and Operations (TSMO) Strategic Plan

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TSMO Goals

Goals / Key Outcomes

OPTIMIZING SAFETY

RELIABLE TRAVEL TIMES

EFFICIENT, SEAMLESS TRAVEL

EQUITABLE ACCESS

ENVIRONMENTAL BENEFITS

Foundational Elements

Collaboration

Philosophy focused on moving people and goods

Data sharing

Culture of innovation
Supporting Resources

➤ Regional Inventory
➤ Data Governance
➤ ITS Architecture Update
  ▪ http://itsarchitecture.atlantaregional.org/
➤ Pilot Project Screening Assessment
➤ Local Agency Deployment Guide
Creating a Regional TSMO Strategic Plan

Win the Future

Strategic Vision
- Goals and objectives
- Institutional drivers
- Guiding principles

Creating a plan to proactively advance the region’s vision for ITS/TSMO

Current Assessment 2020
- Compare to best practices and vision
- Assess gaps

5-Yr Action Plan 2025

10-Yr Action Plan 2030
Strategic Initiatives

Foundational Elements
- Strengthen TSMO Planning & Institutions
- Enhance Data Sharing & Management
- Encourage TSMO Innovation

Deployment Focused Initiatives
- Deploy Connected & Automated Vehicle Technologies
- Advance Regional Coordination & Network Communications
- Strengthen Work Zone & Event Management
- Enhance Transit Operations
- Advance Mobility as a Service
Format for Presenting Actions in the Plan

➤ Description and Benefits to the Atlanta Region
➤ Support for:
  - Goals
  - Foundational Elements
➤ Stakeholders
➤ Action Checklist

ACTION 1.1: ESTABLISH AND SUSTAIN A DIVERSE REGIONAL TSMO COMMITTEE

Description and Benefit to the Atlanta Region:
The Atlanta region has a wide array of organizations that are responsible for TSMO, yet the region does not currently have an established ongoing working group or committee focused on TSMO coordination and collaboration. Several other metropolitan planning organizations (MPOs) around the country have TSMO-focused committees that bring together diverse regional stakeholders to ensure coordination of activities, to advance information sharing, and advance deployment of ITS solutions. A regional TSMO steering/implementation committee with representatives from public agencies, as well as the private and academic sectors, will serve as forum for advancing the region’s TSMO vision by guiding the implementation of stated initiatives, supporting funding decisions, enhancing collaboration and information sharing, and tracking progress. This committee can coordinate with existing organizations such as ITS Georgia and events such as ConnectATL to support information sharing on TSMO and technology innovations.

Goals: 
- Icon showing goal-related image
- Icon showing goal-related image

Foundational Elements:

Stakeholders: ARC (Lead), GDOT, transit agencies, local agency stakeholders, academic institutions, and private service providers

<table>
<thead>
<tr>
<th>TERM</th>
<th>ID</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEAR</td>
<td>N1</td>
<td>Reach out to potential members of the Steering Committee and seek their participation</td>
</tr>
<tr>
<td>NEAR</td>
<td>N2</td>
<td>Establish rules of practice and operating procedures for the committee; this may become a collaboration effort with existing Committees rather than a traditional standing committee</td>
</tr>
<tr>
<td>NEAR</td>
<td>N3</td>
<td>Identify champions for each Initiative that will guide the implementation of the recommended actions</td>
</tr>
<tr>
<td>MEDIUM</td>
<td>M1</td>
<td>Hold meeting to assess impact of the committee and replace/add members if needed</td>
</tr>
<tr>
<td>LONG</td>
<td>L1</td>
<td>Continue to evolve the committee to meet current TSMO needs</td>
</tr>
</tbody>
</table>
1. Study and share the potential impacts of connected and automated vehicles.

2. Leverage connected vehicle technologies to improve safety and mobility for all travelers, especially vulnerable road users (e.g., pedestrians and bicyclists).

3. Leverage connected vehicle technologies to enhance safety through improved incident response.
Contact Information

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All documentation available at:
https://atlantaregional.org/TSMO/
Planning within Operations
Through pioneering technologies and seeking partnerships, GDOT will actively manage and operate all state-owned roadways to become the national leader in transportation technology practices.
Statewide Arterial Operations
Mission Statement (2019):

To proactively manage and maintain traffic signal statewide by leveraging existing and emerging technology

Goals
1. To provide a safe, efficient, and well-maintained statewide traffic signal system
2. To provide a flexible, accountable, scalable, and transparent traffic signal program
3. To promote collaboration and cooperation between statewide, regional and local partners
4. To facilitate informed data driven decision making through technology
5. To efficiently manage and allocate financial and contract resources
6. To provide a high level of customer satisfaction for traffic signal operations and maintenance
Checking the Boxes

☑ Design
  ☑ Complete RMS design for all interchanges in D7
  ☑ Complete RMS design for all warranted interchanges in statewide

☑ Construction
  ☑ CCTV coverage for Hurricane Evac
  ☑ RMS Quick Responses for deployment in D7

☑ Ramp Meter Design Manual

☐ ITS Design Manual Revision
  ☑ Update standards for AID
  ☑ Update standards for DSRC
  ☑ Arterial DMS criteria

☑ Traffic Ops Spec Revision

☒ Southeast regional ITS device testing standards

☐ New ATMS Software
  ☑ Procured
  ☑ Deployed

☐ Pilots, Research, and Testing
  ☑ AID I-475 Smart Corridor
  ☑ AID upgrade for I-85
  ☑ US-80 Expansion
  ☐ Managed Freeways
    ☑ Feasibility Study
    ☒ Algorithm-based metering
    ☒ Geometric enhancements
  ☑ SPAT Challenge
  ☑ Enhanced communication redundancy

☑ RAM Program

☑ Traffic Signals
  ☑ ATSPM to optimize arterial performance
  ☑ Statewide signal communication
  ☑ Complete statewide software upgrade

☐ Communications
  ☑ Statewide Broadband P3
  ☑ Map GDOT all owned fiber optic cable
  ☐ Direct network connection to all local TCCs

☑ Publicly available performance dashboards
Work to Do…

- Revamp of 2016 Plan - See ITS GA Presentation Next Week 😊
- Link to Incident Management?
- Link to Safety/Permitting?
- Bringing it all Together
Thanks!

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