Intelligent Transportation Systems

2018

ATLANTA'S TRANSPORTATION PLAN

The Access Strategy for Atlanta City Design

TABLE OF CONTENTS

TABLE OF FIGURES

INTRODUCTION

Atlanta's Transportation Plan is the access strategy for Atlanta City Design. The Plan is divided into a concise final report and a series of detailed technical appendices. The final report summarizes Atlanta's Transportation Plan in an easily digestible manner using infographics, maps, and images and is intended for the general public and elected officials. The technical memorandums are intended for planners, City staff, and implementation partners that require a higher level of detail.

As part of Atlanta's Transportation Plan, this Technical Appendix focuses on the City's Intelligent Transportation System (ITS) and the use of technology to manage traffic. ITS is the industry term for the computerized systems which monitor traffic conditions and allow for the control of traffic signals, driver message signs, or other traffic controls. ITS typically includes infrastructure such as cameras and/or detectors to monitor conditions, computerized controllers to regulate traffic signals, and communications equipment to connect those devices to some point of central monitoring or control. It may also involve staff who monitor and actively manage the transportation system in real time, providing up-to-date travel information for driving, riding transit, or parking.

BACKGROUND

This document provides an overview of the City's current ITS infrastructure and practices, summary of best practices in peer cities, identification of key needs for improvement, and specific recommendations. This analysis draws from available local data as well as from the current best practices throughout the transportation industry. For additional background research into ITS, the USDOT's Intelligent Transportation Systems Joint Program Office is an excellent resource. Their web site (https://www.its.dot.gov) provides resources on the history, state of the practice and potential future of ITS. Some other entities which are involved in research and training in this area include the Institute of Transportation Engineers, National Highway Institute, National Transit Institute and Intelligent Transportation Society of America.

Intelligent Transportation Systems (ITS) are electronics, communications or information processing used singly or in combination to improve the efficiency or safety of a surface transportation system.

Source: US Department of Transportation

EXISTING CONDITIONS

The City's ITS infrastructure was recently documented and assessed in a report prepared for the Renew Atlanta Infrastructure Program – *Atlanta Traffic Control Center (ATCC), Assessment, Peer Review & Recommendations, April 8, 2016*. The following summary of existing infrastructure was developed from this report and other available data from the City and from Georgia DOT.

FIGURE 1: TRANSPORTATION MANAGEMENT CENTER

It should be noted that the Georgia DOT has installed and operates extensive ITS capabilities in Atlanta. This system includes hundreds of traffic sensors and traffic observation cameras, variable message signs, ramp meters and a central information and control center – the Transportation Management Center (TMC). This system operates throughout Atlanta's interstate system, SR 400, and on select principle arterials such as Peachtree Road in Buckhead, Donald Lee Hollowell Parkway, Ponce de Leon Avenue, Moreland Avenue and Langford Parkway. This robust system works in concert with the Georgia DOT's Highway Emergency Response Officers (HERO) units, HOV lane enforcement units, towing and recovery systems, and communication and coordination mechanisms to keep Atlanta's interstate system moving.

The following inventory and analysis focuses on the City's ITS system, including traffic signals, transit, parking, and staffing.

TRAFFIC SIGNALS

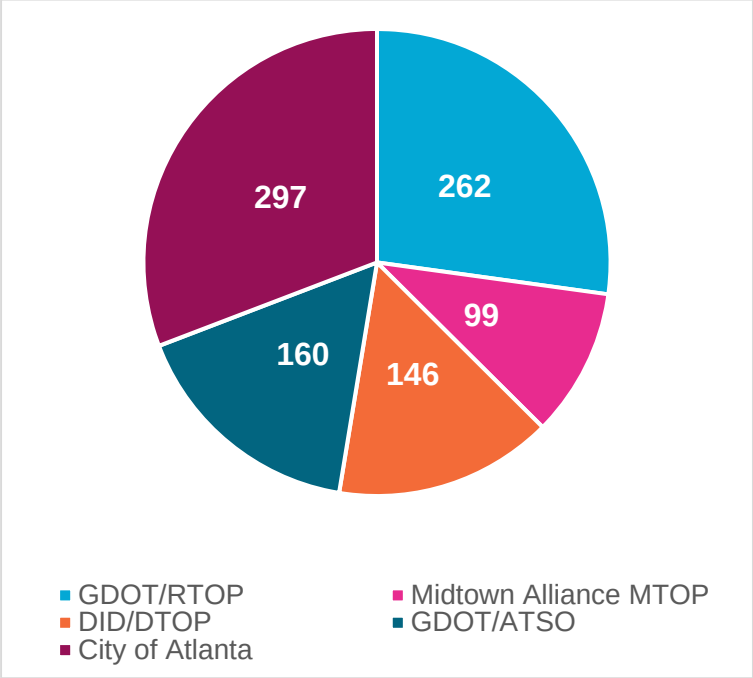
The active management of traffic begins with monitoring and controlling the traffic signals. Traffic signals are devices for allocating green time between intersecting traffic flows – busier approaches get more green time and less busy approaches get less green time. However, the flow of traffic at an intersection is not consistent throughout the day or even from one day to the next – it can and does change often. Therefore, traffic signal timing can't simply be set once and forgotten, but needs to be monitored and updated frequently to reduce unnecessary driver delays and maximize system efficiency. This can be accomplished with proper ITS infrastructure and staffing to keep signals running efficiently. Alternately, recent advancements in "adaptive" signal timing allow traffic signal to update their own timing plans in real time. Additionally, connection to and remote monitoring of traffic signals

allows the agency to know of and respond to outages or issues quickly; rather than relying on visual observations or reports and dispatching of personnel, which could take hours or days to respond to an issue.

There are approximately 964 traffic signals in the City of Atlanta. The ongoing operation, maintenance and timing of these signals is shared among four entities:

- The City of Atlanta Public Works staff operates and maintains approximately 297 of these signals
- The Georgia DOT, through the Regional Traffic Operations Program (RTOP) and the Atlanta Traffic Signals Operations Program (ATSO) together maintain about 422 signals
- Midtown Improvement District maintains approximately 99 signals through the Midtown Traffic Operations Program (MTOP)
- The Atlanta Downtown Improvement District maintains approximately 146 signals through the Downtown Traffic Operations Program (DTOP)

FIGURE 2: TRAFFIC SIGNAL MANAGEMENT



The City has an advanced traffic control center – the Atlanta Traffic Control Center (ATCC) – where systems are in place to facilitate the monitoring and management of the City's traffic signals. The ATCC was originally constructed in preparation for the 1996 Olympic Games, and is still pretty much a state-of-the-practice facility. However, the ATCC is currently largely unused and ineffective for two primary reasons:

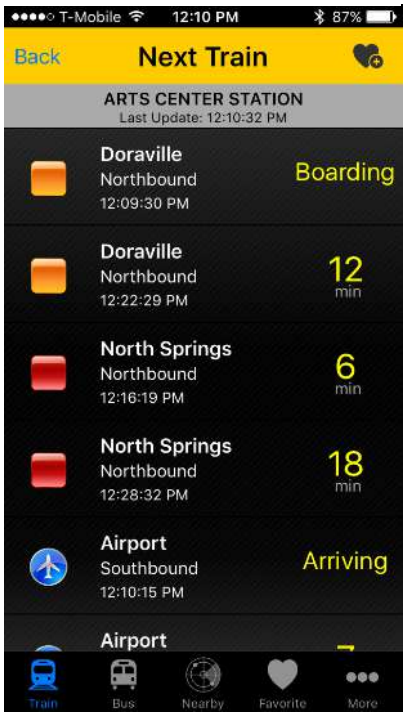
1. The majority of traffic signals are not communicating with the ATCC (only about 130 are currently communicating back to the ATCC).
2. Traffic signal staffing is inadequate to keep up with signal maintenance or to manage the ATCC. The ATCC report cites industry standards for staffing needs per signalized intersection and contains a peer cities staffing comparison and recommendations for staffing levels.

In summary, roughly 2/3 of the City's traffic signals are being managed through one of the partnership "TOP" programs. But, most of the 297 signals under the City's responsibility are not being monitored nor managed due to a lack of communication capability and lack of staff resources.

TRANSIT

Many urban areas are also using ITS capabilities to manage their transit services and provide useful rider information. MARTA currently operates ITS capabilities on the rail system and has invested in tools for improved user maintenance. For example, users can view the location and anticipated arrival for both trains and buses. Most rail stations display this information on variable message signs located on the platforms. This information is available for both trains and busses through the *MARTA On The Go* mobile app, shown in Figure to the right. These technologies serve to provide very useful passenger information and also to allow MARTA to monitor and manage service in a real-time manner. Initiatives are also underway to improve bus stop signage and information.

FIGURE 3: MARTA ON THE GO



While similar systems are not currently deployed for the Atlanta Streetcar system, they are probably not necessary for the current streetcar network. However, as this system expands to additional corridors, ITS will be extremely beneficial both to system operation as well as passenger information. It will become increasingly important to monitor and manage the positions of trains as the system increases in length and more trains are on the system.

PARKING

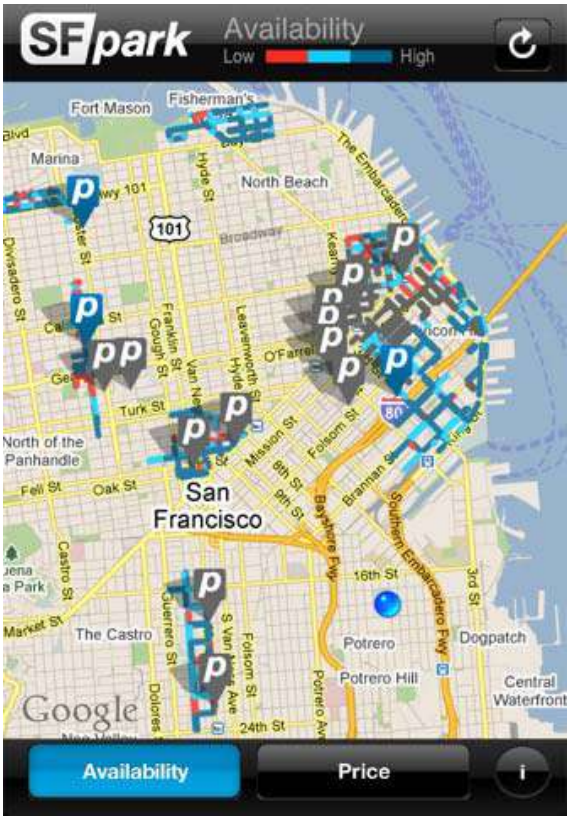
Much of the parking in the City is privately owned and managed; therefore, deploying ITS to monitor or manage much of the parking is not practicable. Publicly owned parking includes on-street as well as limited garage parking. The City manages much of the on-street parking through a residential permit system where this parking is restricted to use for City residents. On-street parking in commercial districts is publicly available and is mostly pay parking, time restricted, and managed and enforced through a public-private agreement.

Opportunities exist to better manage both existing and future parking. As available public parking becomes more limited, traveler information will be increasingly beneficial. Many studies have been done to quantify the impacts of vehicles circulating unnecessarily as the drivers seek available parking. These studies commonly quantify the impact to be anywhere from 20%-30% of congestion in the downtown core caused by drivers looking for parking. So, there is a significant potential benefit to better managing parking and sharing information about available

parking. Smartphone apps are available to help drives find parking; but, each relies on different sources of data or predictions of available parking. So, the availability of real-time parking availability data remains one of the challenges.

Several cities have implemented pilot programs where parking availability is monitored and shared in real time via the internet or mobile apps. San Francisco, California and Calgary, Canada are two such examples of cities which are demonstrating the benefits of this capability. San Francisco's SFPark initiative, shown in figure 4, monitors parking use and availability and varies parking pricing in real time. This information is shared in real time via a web site and a mobile app. One of their goals is to maintain 15% parking availability at all times, which reduces drivers' need to circulate while seeking available parking. This program includes garage parking as well as on-street parking, and provides a real-world test of this innovative type of parking management.

FIGURE 4: SAN FRANCISCO'S *SFPARK* MOBILE APP



STAFFING

As mentioned previously, the level of the City's traffic signal staffing is currently inadequate to keep up with signal issues in the field, let alone devote time to improving signal timing plans or staffing the ATCC. As compared to national best practices, the City currently has less than half the appropriate number of traffic signal engineers as necessary to adequately maintain and manage the City's traffic signals. And, traffic signals which are not communicating back to the ATCC are requiring significantly more staff time to monitor and fix. So, an investment to improve the signal communication capabilities will in fact reduce the staffing requirement to monitor and fix traffic signal issues.

BEST PRACTICES

Best practices in ITS can be found in numerous publications and case studies, as well as looking at other agencies in the Atlanta area. As mentioned, Georgia DOT has implemented and manages an extensive ITS system throughout the Atlanta metro area. The Traffic Management Center (TMC) is located in Atlanta, and is a state-of-the-practice model for other large cities. Some local governments also have ITS infrastructure and capabilities. Cobb County, for example, has communication capabilities to its' 542 traffic signals and 106 CCTV cameras via 182 miles of fiber optic cable. Cobb County staffs their management center during weekdays and 24 hours per day during inclement weather or special events. This capability becomes particularly valuable during weather events – allowing them to monitor conditions and dispatch crews where most needed. Other traffic management centers also exist in Gwinnett County and in Macon.

FIGURE 5: COBB COUNTY TRAFFIC MANAGEMENT CENTER

Source: ITS Georgia

Both literature and ongoing research cite those ITS practices that are seen as most beneficial and those that are evolving to be the next big ideas. Some of these include:

- Real-time traffic management and automated traffic management (including ramp metering, variable speed limits, variable lane use policies, and adaptive signal timing)
- Use of big data (such as GPS traffic and speed data) in concert with data coming from ITS hardware
- Real-time parking monitoring and management
- Sharing of live data and coordination between multiple operators
- Transit ITS, especially rider information and arterial rapid bus technologies

RECOMMENDATIONS

Traffic Signals: It is recommended that the City first conduct an inventory and evaluation of its' traffic control, communications and monitoring assets. Based on what is currently known about those assets, it is recommended that the City address the following needs with regard to its traffic signals:

1. Connect all traffic signals back to the ATCC so that City staff can monitor, update and often fix traffic signal issues from the ATCC. This should also include the installation of cameras to remotely monitor traffic conditions at each intersection.
2. Provide staffing of the ATCC to monitor and control traffic signal operations. (The City's ATCC Assessment report provides a breakdown on the appropriate number and categories of staff necessary.)
3. Increase signal maintenance resources or contract out signal maintenance to a level to keep the City's signals operating at peak efficiency.

Transit: It is recommended that ITS be added as an integral element to the streetcar system as that system grows. This system will provide the means for the City to best manage the streetcar system and will provide useful information to riders about the location and arrival time of trains.

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