CORE Coastal Region MPO

ATMS STRATEGIC PLAN

CORE COASTAL REGION MPO

Phase I

TRAFFIC CONTROL CENTER NEEDS ASSESSMENT

August 2014

CDM Smith

COASTAL REGION MPO

Phase 1 Technical Memorandum

SAVANNAH REGIONAL TRAFFIC MANAGEMENT CENTER NEEDS ASSESSMENT

Prepared by:

Chatham County – Savannah Metropolitan Planning Commission
in cooperation with the
Federal Highway Administration
and the
Georgia Department of Transportation

August 2014

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CORE MPO is the Metropolitan Planning Organization (MPO) responsible for Chatham County transportation planning. The CORE MPO is comprised of the representatives of local, state and federal government and transportation authorities and ensures federal spending on transportation for urbanized areas of over 50,000 people occurs through a comprehensive, cooperative and continuing process involving both the public and policy-makers. The MPC provides staff services to the CORE MPO Board, which is chaired by the chairman of the Chatham County Board of County Commissioners.

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Glossary

Adaptive signal control – Adaptive traffic control works by continuously adjusting the parameters of signal timing along a corridor based on information the system receives about current traffic conditions. This provides a quick response to fluctuations in traffic demand and unexpected impacts resulting from normal changes in demand, special events, incidents, weather etc., which increases the efficiency of intersection operations.

Advanced Traffic Management System (ATMS) – ATMS uses traffic monitoring, communications, traffic signal control, highway-rail crossing interfaces (HRI), and freeway and incident management systems to manage the demand, operations, safety, and security of the transportation system.

Advanced Traffic Information System (ATIS) – ATIS provides information to travelers using both highway and transit systems. Transportation network performance before and during travel is transmitted to the traveler using infrastructure-provided equipment as well as personal and vehicle-based devices. En route and pre-trip driver information, route guidance, ride matching, and emergency notifications are examples of ATIS type systems

Coordinated signal timing – The purpose of coordinated signal timing is to promote smooth flow (progression) between signalized intersections. The quality of progression is based on spacing of traffic signals, speed of traffic, and cycle length.

Emergency Operations Center (EOC) - During transportation-related emergencies, the use of ITS technologies can result in improved management of the emergency. ITS technologies provide transportation service and public safety agencies with the ability to communicate and coordinate operations and resources in real time from a central location (EOC). They support the data collection required for effective coordination of changing transportation system conditions and allow for the real-time implementation of operational and logistical strategies in cooperation with many partners. Efficient and reliable voice, data, and video communications further provide agencies with the ability to share information related to the status of the emergency, the operational conditions of the transportation facilities, and the location of emergency response resources.

Emergency vehicle preemption (EVP) – EVP systems are designed to increase response time for emergency vehicles (EV) while reducing the possibility of an EV crash. EVP represents the transferring of normal control of an intersection to a special signal control mode for EVs. EVP systems provide a special green phase for EVs as they approach intersections while the opposing approaches receive a red indication. EVs are fitted with special devices that transmit signals to intersection preemption equipment, which communicates with a device in the controller cabinet that changes the signal.

Fully-actuated signal timing –Traffic signal operation at a signalized intersection where traffic detection is placed on each approach to the intersection allowing for more efficient signal operation.

Georgia Navigator 511 – an advanced traffic management center headquartered in Atlanta. It features traffic cameras, changeable message signs, ramp meters, and speed sensors to monitor traffic speeds. In addition to providing critical information to local officials, much of this information is

accessible to the public via a website (http://www.georgia511.org) and by dialing "511" anywhere in Georgia. Other resources for monitoring traffic during evacuations include GDOT's traffic counter network, aerial reconnaissance, and field reports.

Global Positioning System (GPS) - The Global Positioning System (GPS) is a U.S. - owned utility that provides users with positioning, navigation, and timing (PNT) services. This system consists of three segments: the space segment, the control segment, and the user segment. The U.S. Air Force develops, maintains, and operates the space and control segments.

Highway Emergency Response Operators (HERO) – The HERO program is part of the Georgia 511 Navigator system. By dialing 511 from any phone a request to HERO motorist assistance can be made. The GDOT Transportation Management Center (TMC) then dispatches HEROs to traffic-related incidents. A HERO is a state employee paid by GDOT and is primarily responsible for incident management and roadway clearance. At the present time HERO vehicles only operate in the Atlanta region.

Intelligent Transportation Systems (ITS) - ITS improves transportation safety and mobility and enhances American productivity through the integration of advanced communications technologies into the transportation infrastructure and in vehicles. Intelligent transportation systems (ITS) encompass a broad range of wireless and wire line communications-based information and electronics technologies - See more at: http://www.its.dot.gov/faqs.htm#sthash.POyHyNiz.dpuf

Isolated signal control – A form of traffic signal control for a single intersection through which the flow of traffic is controlled without any consideration to the operation of adjacent signalized intersections.

Multi-mode fiber – Multimode fiber optic cable has a large diameter core that allows multiple modes of light to propagate. Because of this, the number of light reflections created as the light passes through the core increases, creating the ability for more data to pass through at a given time. Because of the high dispersion and attenuation rate with this type of fiber, the quality of the signal is reduced over long distances. This application is typically used for short distance, data and audio/video applications in LANs. RF broadband signals, such as those commonly used by cable companies, cannot be transmitted over multimode fiber. See more at: http://www.multicominc.com/active/manufacturer/multicom/Fiber%20Optics/singlemode-multimode.html

Railroad preemption - At intersections with railroad preemption the traffic signal controller may respond to operation of the crossing gates and other railroad safety equipment by automatically illuminating signs and/or implementing special phasing and timings to warn motorists and optimize traffic flow while one of the intersection approaches is blocked by train movements.

RouteMatch software - This software is used in the transit industry and provides end-to-end passenger transportation technologies, such as GPS vehicle location, to help public transit agencies and private organizations improve operations. The Chatham Area Transit (CAT) agency uses RouteMatch for demand response operation.

Semi-actuated signal timing – Traffic signal operation at a signalized intersection where traffic detection is placed on some but not all approaches to the intersection. For example, detection may be placed on the minor street and/or in the major street left turn lanes allowing for more efficient signal operation.

Single-mode fiber – Single mode fiber optic cable has a small diameter core that allows only one mode of light to propagate. Because of this, the number of light reflections created as the light passes through the core decreases, lowering attenuation and creating the ability for the signal to travel faster, further. This application is typically used in long distance, higher bandwidth runs by Telcos, CATV companies, and Colleges and Universities. See more at: http://www.multicominc.com/active/manufacturer/multicom/Fiber%20Optics/singlemode-multimode.html

State Operating Conditions (OPCONs) - The State Operating Conditions (OPCONs) are designed to provide time-delineated and action-based trigger points for requisite and remedial protective actions including the deployment of key evacuation support resources, the staging and forward deployment of critical life supportive commodities, and the broad-reaching coordination efforts that occur before and after impacts are realized.

TACTICS Traffic Management software – TACTICS is a traffic control system package developed by Siemens that is used in traffic management centers (TMC) to support the operation of traffic signals and ITS devices such as DMS and CCTV.

Traffic Management Center (TMC), Traffic Operations Center (TOC), Traffic Control Center (TCC) – The key function of the TMC (sometimes also called a Traffic Operation Center, TOC, or Traffic Control Center, TCC) is to provide traffic management staff with the capability to interface with the traffic control equipment / system and to monitor traffic information from a central location. The TMC can vary in complexity from a single desktop computer with the management software to an elaborate room with large video monitors for viewing CCTV images, workstation displays with space dedicated for communication, and other traffic related equipment.

Transyt 1880 controller – An older model traffic signal controller that is often still used in downtown areas. Many have been replaced over the years by more advanced technology controllers, such as the 2070.

Trapeze software – This software is used in the transit industry for demand response management and scheduling. The Chatham Area Transit (CAT) agency uses Trapeze for fixed-route operation.

2070 traffic controller –The 2070 is an advanced transportation controller (ATC) for traffic signals. It was designed to be more user-friendly and to handle more complex intersection signal operations.

1 Introduction

The Traffic Control Needs Assessment Report summarizes an inventory and high level needs assessment of existing traffic control infrastructure in the city of Savannah, Georgia and in the surrounding region.

1.1 Background

The needs assessment is the first step toward development of the Chatham County Intelligent Transportation System (ITS) and Traffic Management Center (TMC) Strategic Plan. The Plan is being developed under a task order of GDOT funding contract 00010027.

In this report the abbreviation ITS is used when the system referred to provides or may provide functionality from more than one of the major components of Intelligent Transportation Systems, such as Advanced Traffic Management System (ATMS), Advanced Traveler Information System **(**ATIS), Commercial Vehicle Operations (CVO), etc. It is also used when a referenced documents uses the term. Of the above terms, ATMS is used most frequently in the report as it most closely aligns to the majority of the subject matter. ATMS uses traffic monitoring, communications, traffic signal control, highway-rail crossing interfaces (HRI), and freeway and incident management systems to manage the demand, operations, safety, and security of the transportation system in an area.

1.1.1 Study Structure

The work effort to develop the Strategic Plan is divided into two phases:

- Phase 1 – Traffic Control Center and Surveillance Needs Assessment
- Phase 2 – Alternatives Evaluation and Implementation Plan

Work commenced on Phase 1 in January 2013. In addition to the work activities documented in this report, Phase 1 included gathering information and visiting operational traffic control centers in Jacksonville, Valdosta, and Atlanta. There were several purposes for the visits. These included a regional "state of the practice" review and an opportunity for the site visit team to learn from the experience of others in similar sized centers. In addition, it is important for the site visit team to apply the lessons learned from the other locations to ensure they are able to properly define the needs of Chatham County. The site visit team included representatives of the Georgia Department of Transportation (GDOT), city of Savannah, Chatham County, and the CORE MPO, among others.

1.1.2 Previous Studies

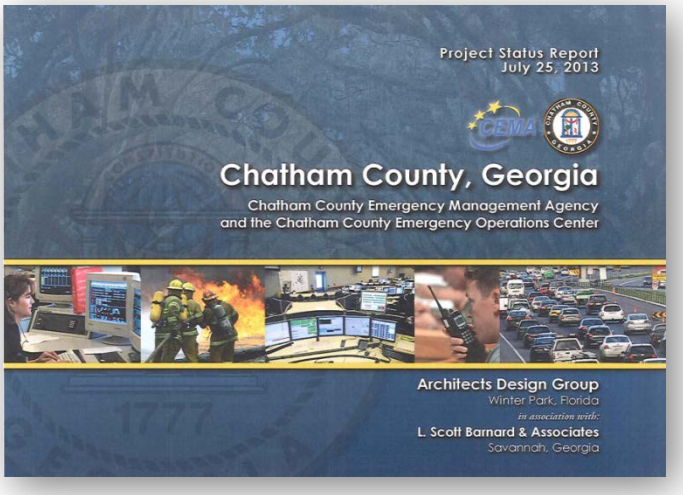
A number of previous studies and plans identified the need for improved traffic operations and management in the Savannah region, including:

- Tricentennial Plan – Comprehensive Plan
  - Goal E. Objective f. – Optimize the operations of transportation systems
- CORE MPO 2030 Long-Range Transportation Plan
  - Goal 5 Objectives – Maximize efficiency of signalized intersections and expand use of ITS

- Congestion Management Plan - 2004
  - Updated signal timing would improve 15-23 percent of congested roadways and improve constrained corridors

The purpose of this study is to build upon the goals and recommendations of previous studies to develop a Strategic Plan to implement improvements in traffic operations and related infrastructure.

While the need for improved traffic operations and infrastructure has been recognized for some time, the need for an overall Strategic Plan has been highlighted by the ongoing planning for an Emergency Operations Center in Savannah. The development of such a center would provide a unique opportunity to collocate a future Traffic Management Center (TMC) for the Savannah Region with the Chatham County Emergency Operations Center (EOC) within a purpose built, hardened, building. Initial space planning for the building by the County Emergency Management Agency (CEMA) identifies a 2,450 sf. space for a future TMC on the second floor[1].



CEMA is the umbrella agency for Chatham County and the city of Savannah. The EOC is planned to be located on Hunter Army Airfield, southwest of the city center. Funding for the EOC has been secured and construction is scheduled to start in the summer of 2015.

1.2 Stakeholder Meetings

Two Stakeholder Meetings were held during the course of Phase 1 to obtain information, guidance and input from representatives of a number of governmental organizations in the Savannah Region.

The first meeting was held on July 17, 2013. In addition to members of the consultant team, this meeting was attended by:

- Cynthia Phillips, Georgia DOT
- Greg Wasdin, Georgia DOT
- Mike Weiner, City of Savannah
- Stephen Henry, City of Savannah
- Don Sullens, Chatham Emergency Management Agency (Chatham County)
- Enoch Dumas, Chatham Area Transit
- Toss Allen, Effingham County
- Tom Thomson, Coastal Region MPO

[1] Chatham County Emergency Management Agency and the Chatham County Emergency Operations Center, Project Status Report, July 25, 2013, prepared for Chatham County, Georgia by Architects Design Group.

- Mark Wilkes, Coastal Region MPO
- Wykoda Wang, Coastal Region MPO

In addition to discussions on the purpose and objectives of the study, the first meeting provided a valuable exchange of views and information on the state of existing systems and operations, including the city of Savannah, Chatham Area Transit, the Emergency Management Agency and Georgia DOT.

The second meeting was held on March 20, 2014. In addition to members of the consultant team, this meeting was attended by:

- Tom Thomson, Coastal Region MPO
- Wykoda Wang, Coastal Region MPO
- Mark Wilkes, Coastal Region MPO
- Don Sullens, Chatham Emergency Management Agency (Chatham County)
- Stephen Henry, Savannah TE
- Mike Weiner, Savannah TE
- David Castle, CDM Smith
- Adam Ivory, CDM Smith
- Jeff Hochmuth, CDM Smith
- Eric Tripi, ITERIS

1.3 Contents of Report

This report is divided into seven chapters, as follows:

- **Chapter 1 – Introduction** – provides background information on the study, documents stakeholder meetings held during Phase 1 of the study, and summarizes report contents.
- **Chapter 2 – Existing Traffic Signal Systems** – documents the inventory of traffic signal and other similar arterial roadway devices/systems owned by the city of Savannah, city of Pooler, Chatham County and Georgia DOT.
- **Chapter 3 – Other Related Systems** – describes other existing traffic management devices/systems in the region, including freeway traffic management, transit, parking management, emergency vehicle preemption, school flasher signals, and controlled at-grade railroad crossings.
- **Chapter 4 – Evacuation** – discusses the region's hurricane evacuation plans and resources.
- **Chapter 5 – Assessment of Needs** – provides an assessment of infrastructure and operational needs in the region based on the findings of the inventory and input from stakeholders.
- **Chapter 6 – Typical Benefits from ATMS Improvements** – summarizes the published benefits of signal systems and related devices on congestion, fuel savings, and reduced emissions, as well as documenting visits to traffic management centers in the region.
- **Chapter 7 – Next Steps** – identifies the principal activities planned for Phase 2 of the Chatham County Intelligent Transportation System (ATMS) and Traffic Management Center (TMC) Strategic Plan.

2 Existing Traffic Signal Systems

The first step in determining the traffic management needs of the region is to identify current traffic conditions, the amount of traffic signal technology available, and inventory Advanced Traffic Management System (ATMS) components that exist in the region. This information was collected from all agencies that currently maintain traffic signals in the region and from transit operators. These agencies included the city of Savannah, the Georgia Department of Transportation (GDOT), Chatham County, city of Pooler and Chatham Area Transit. City and county boundaries in the region are illustrated in **Figure 2-1**. Specific traffic data was obtained from the GDOT website[2].

There are a total of about 407 traffic signals in the region. The next sections provide an overview of traffic signal systems equipment and operations for the following jurisdictions:

- City of Savannah;
- Georgia DOT;
- Chatham County; and
- Pooler.

2.1 City of Savannah

2.1.1 Existing Traffic Conditions in Savannah

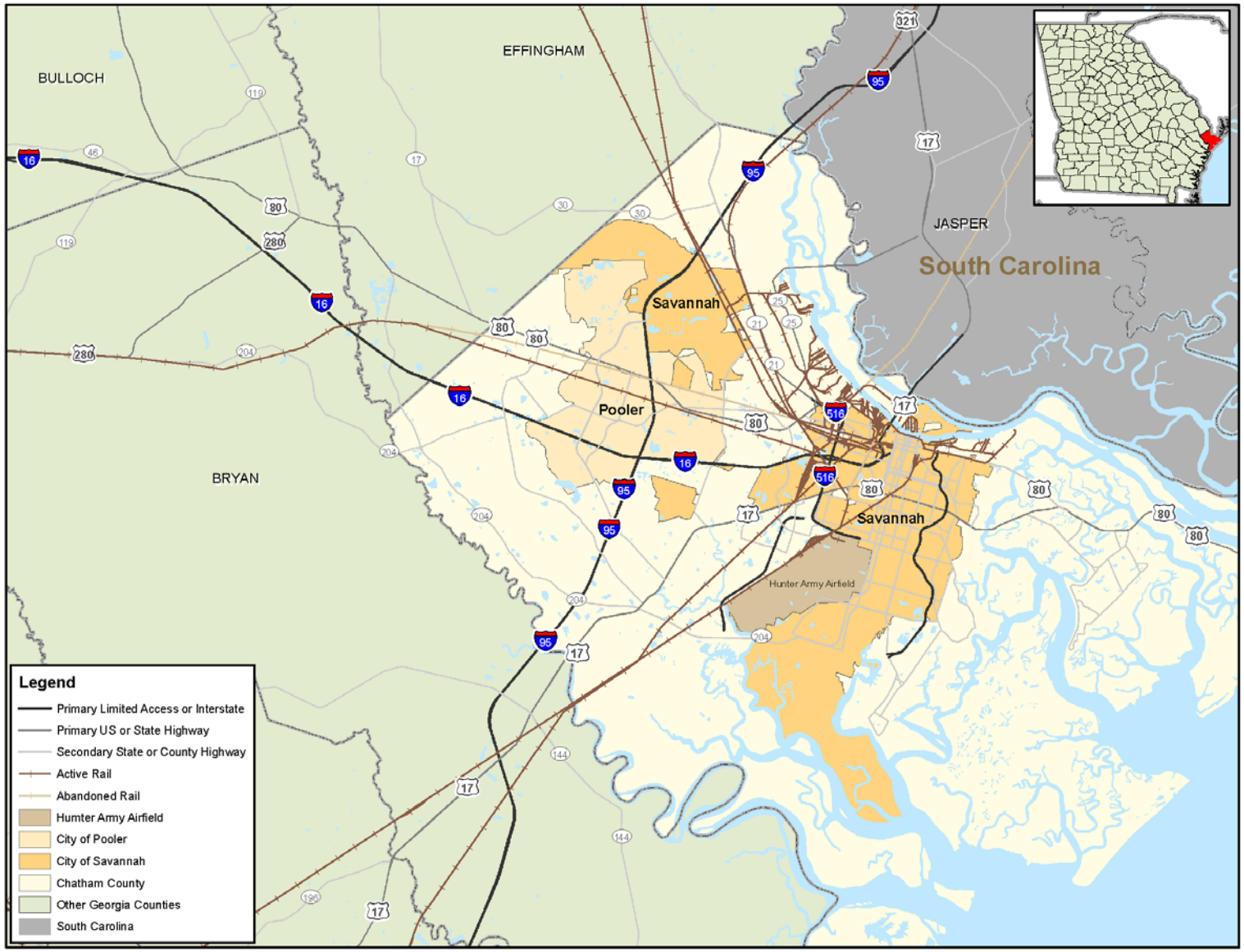
Savannah is both an employment center and a major tourist attraction. It is also home to the fourth busiest port in the nation. On an average day, there is competition between commuters, freight movements, and tourists. Some of the major roadways in the city are Bay Street, Montgomery Street, Oglethorpe Avenue, Louisville Road, Montgomery Cross Road, East DeRenne, Abercorn Street, and Truman Parkway.

East DeRenne is one of the most congested roadways in the city as I-516 runs into West DeRenne Avenue just west of Abercorn Street. The prime reason for this congestion is related more to roadway geometry than signal timing, but improvements in signal operations and traffic flow through an actively managed traffic management center could significantly reduce delay.

The city is very proactive in designing and implementing traffic control for major public events, such as St. Patrick's Day and the Fourth of July. These events attract extremely large volumes of both traffic and pedestrians. In the past, the police had manually controlled individual intersections. However, in 2013 through improved coordination with the police, the city demonstrated improved operations through adjusting signal timings centrally using the Closed Circuit Television (CCTV) cameras as their guide while the police switched their focus to ensuring pedestrians obeyed pedestrian signals. The police were impressed with the city's capabilities with mutual collaboration and trust being critical to the successes achieved. In 2014, police and city traffic operations staff worked together in a temporary EOC during St. Patrick's Day events and again found that close coordination was mutually beneficial.

[2] http://www.dot.ga.gov/informationcenter/Statistics/stars/Pages/default.aspx

Figure 2-1: Jurisdictional Boundaries in the Chatham County Region



2.1.2 Inventory of Systems in Savannah

A meeting was held with the city of Savannah traffic engineering department to collect data on its existing signal system. The following information was obtained.

2.1.2.1 Traffic Signals

The city of Savannah provided a list of all traffic signals they maintain. At the time the latest data was collected (2013), the city was maintaining 257 traffic signals in Savannah with five new traffic signals proposed to be installed in the future. In addition, the city also responds to trouble calls for 48 traffic signals under Chatham County control. These signals include:

- Chatham County signals not located on Georgia State routes, and
- Chatham County signals in unincorporated areas.

As will be discussed later, Chatham County provides regular maintenance and timings for the signals in the unincorporated areas. The Georgia Department of Transportation (GDOT) maintains the Chatham County signals on Georgia State routes.

The city maintains 55 flashing signals and 56 school flashers in the city and 13 flashing signals and 16 school flashers in Chatham County.

Other statistics for the city traffic signals:

- 100 percent of the traffic signal controllers are model 2070s, which is the current standard controller used by GDOT.
- About 36 percent of the signals operate free, meaning they operate independently of other signals and their timings are not coordinated.
- About 17 percent of the signals are semi-actuated.
- About 66 percent of the signals are fully-actuated.
- There is no adaptive signal control in the city.

As will be discussed below, there are coordinated signal systems within the city that are connected via fiber, closed loop, time based, or wireless communication. However, coordinated signal timings on many arterials have not been updated for many years due to time and cost constraints.

City of Savannah Traffic Control Center

2.1.2.2 Existing Savannah Control Center

The city of Savannah has a small traffic control center that was constructed in conjunction with the 1996 Summer Olympics. While the Olympics were primarily held in Atlanta, Savannah served as the sailing venue for the Olympics. The traffic

control center is now 18 years old and in need of some upgrades. The city has noted that it is struggling to keep the system running due to its age. The city uses the Siemens TACTICS Traffic Management System.

The control center, which is operated by a signal technician eight hours a day, Monday-Friday, houses central computer and communications equipment, as well as operator workstations and a large video display.

2.1.2.3 Communications Infrastructure

The city uses multiple methods to communicate with traffic signals.

- About 44 percent of the traffic signals are connected via fiber.
- Less than 14 percent of the signals communicate using copper wire.
- Less than 4 percent of the signals communicate via wireless means.
- About 39 percent of the traffic signals have no communication.

The city currently has fiber connected to 113 signals; however, they are running out of capacity since most is multimode fiber; they are in need of more single mode fiber.

2.1.2.4 Existing ATMS-related devices

The city of Savannah uses a few ATMS devices. The city currently has:

- 15 video cameras for surveillance but has access to 66 cameras,
- 19 video cameras for detection at ten intersections,
- 1 Variable Message Sign (VMS)

The city has access to police cameras. The city acknowledges that the VMS is no longer operational due to its age.

2.1.2.5 Emergency or Evacuation Field Devices

The city has 80 intersections that have emergency vehicle preemption capabilities for fire, police and ambulances. Only one intersection in the city has railroad preemption.

The city does not have any evacuation field devices or signal timing plans developed for evacuation conditions.

2.1.3 Committed Traffic Management Improvement Projects in Savannah

At this time, the city does not have any major committed traffic management improvement projects primarily due to funding and staffing constraints.

2.2 Georgia DOT

2.2.1 State Maintained Roads in the Region

Georgia DOT maintains most of the major roadways in the tri-county region. The major freeways that traverse the region are I-95 and I-16. Arterials such as GA-21, GA-26 (US-80), and GA-204 also serve the region.

2.2.2 Inventory of GDOT Systems

GDOT provided the following information on its signal systems in the region.

2.2.2.1 Traffic Signals

GDOT provided a list of all traffic signals they maintain in the tri-county region of Chatham, Effingham, and Bryan counties. At the time the latest data was collected (2013), GDOT was maintaining 94 traffic signals in the region.

The GDOT maintains the Chatham County signals on Georgia State routes.

Other statistics for GDOT traffic signals:

- 100 percent of the traffic signal controllers are model 2070s.
- There is no adaptive signal control.

2.2.2.2 Existing GDOT Control Center

GDOT does not have a traffic control center to manage the traffic signals in the region. However, they use the TACTICS Traffic Management System to manage their wireless signals.

2.2.2.3 Communications Infrastructure

GDOT uses multiple methods to communicate with traffic signals:

- About 40 percent of the traffic signals are connected via fiber.
- About 25 percent of the signals communicate via wireless.
- About 95 percent of the traffic signals communicating via fiber or wireless are coordinated.

2.2.2.4 Existing ATMS-related devices

GDOT uses few ATMS devices. They currently have:

- 4 video cameras for freeway surveillance,
- 8 video cameras for intersection vehicle detection, and
- 6 Variable Message Sign (VMS) – the GDOT District office can control the messages sent to the signs.

GDOT notes that much of their video technology is outdated.

2.2.2.5 Emergency or Evacuation Field Devices

GDOT has two intersections with emergency vehicle preemption (push-button activated at fire stations) and 5 intersections with railroad preemption. GDOT does not have any control over evacuation field devices. The Georgia State Patrol is one of the entities that handle evacuations.

2.2.3 GDOT Committed Traffic Management Improvement Projects

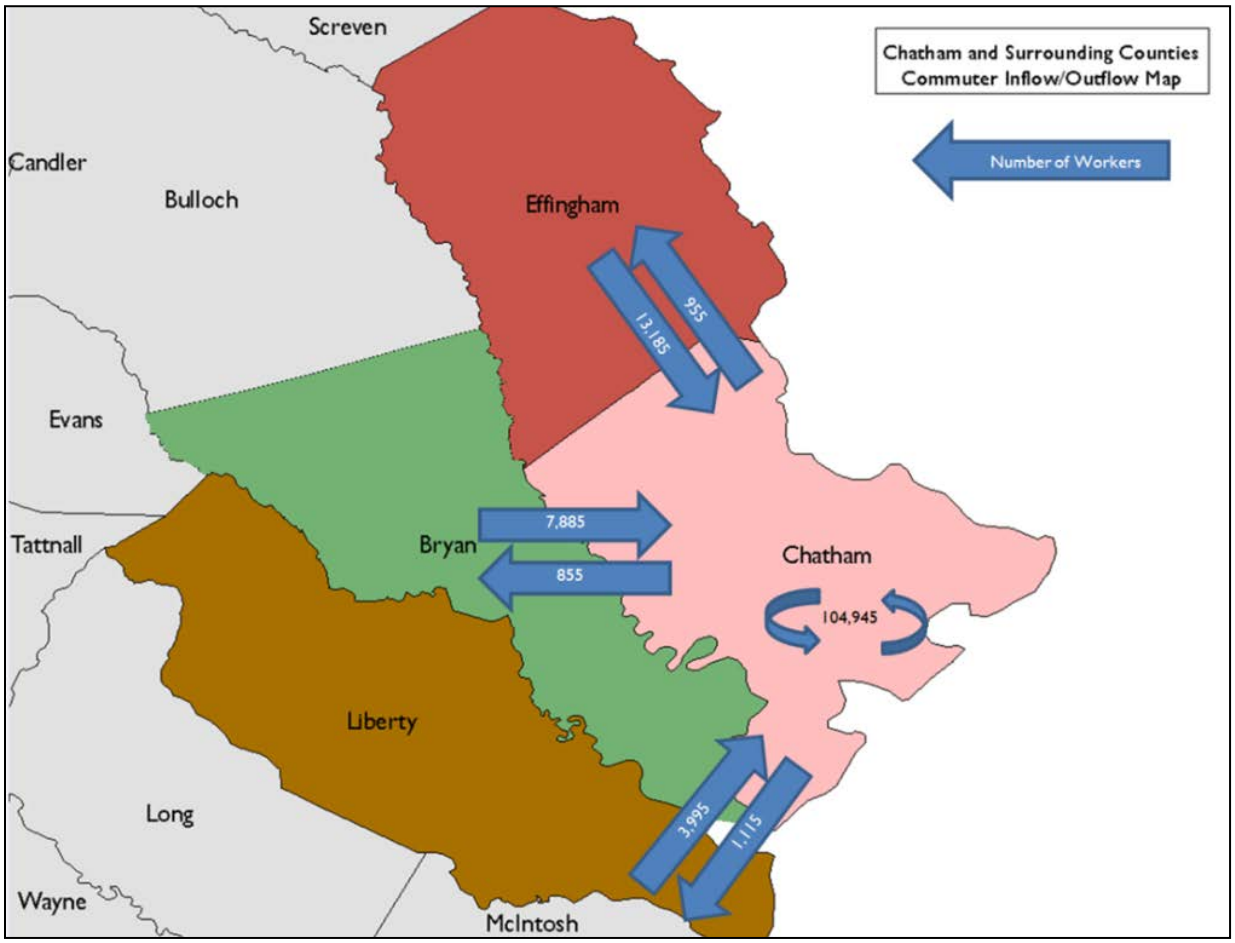
At this time, GDOT does not have any major committed traffic management improvement projects in the near future other than scheduled upgrades to equipment, poles, signal heads, etc. and signal timing updates.

2.3 Chatham County

2.3.1 Existing Traffic Conditions in Chatham County

Chatham County and its municipalities serve as the largest employment hub of the three counties in the region, as illustrated in **Figure 2-2**. This results in a large influx of traffic that enters the county from Effingham and Bryan Counties during the morning peak hours and a large exiting flow of traffic in the evening peak hours.

Figure 2-2: Daily Chatham County Commuter Flows



Source: U.S. Census Bureau. 2010 American Community Survey.

2.3.2 Inventory of Systems in Chatham County

Chatham County provided the following information.

2.3.2.1 Traffic Signals

Chatham County provided a list of all traffic signals they maintain. At the time the latest data was collected (2013), the County was responsible for 48 traffic signals with planning for three additional signals in the future.

GDOT maintains the Chatham County signals on Georgia State routes. The City of Savannah provides maintenance services for trouble calls and also assists in helping time the signals.

Other statistics for Chatham County traffic signals:

- About 85 percent of the traffic signal controllers are model 2070s.
- About 96 percent of the signals are either semi-actuated or fully-actuated (only two intersections do not have loop detection).
- There are two intersections that use video detection.

2.3.2.2 Existing Control Center

The county does not have a traffic control center to manage their traffic signals.

2.3.2.3 Communications Infrastructure

While many of the county signals are fiber-ready, the county cannot communicate with signals directly. One intersection has wireless capabilities.

2.3.2.4 Existing ATMS-related devices

The county uses very few ATMS devices. The county currently has six video cameras that are used for vehicle detection in place of in-pavement loop detectors. The cameras are not used for traffic surveillance purposes.

2.3.2.5 Emergency or Evacuation Field Devices

The county does not maintain any intersections with either emergency vehicle or railroad preemption devices. The county does not have any control over evacuation field devices.

2.3.3 County Committed Traffic Management Improvement Projects

At this time, the county does not have any major committed traffic management improvement projects in the near future other than some traffic signal equipment upgrades.

2.4 Pooler

2.4.1 Existing Traffic Conditions in Pooler

The city of Pooler is the only city in the region other than Savannah to maintain its own signals. The city has a population of 19,140 people according to the 2010 census. The major east-west route that travels through Pooler is Louisville Road (US 80, GA 26) carrying about 12,500 vehicles per day (vpd) through Pooler. Pooler Parkway, a north-south roadway on the west side of the city is carrying about 18,500 vpd, provides access to the Savannah Hilton Head Airport, and has interchanges with both I-16 and I-95. I-95 is located on the east side of the city and has an interchange with Louisville Road. The city is well served by major arterials and freeways.

2.4.2 Inventory of Systems in Pooler

The city of Pooler provided the following information.

2.4.2.1 Traffic Signals

The city of Pooler provided a list of all traffic signals they maintain. At the time the latest data was collected (May 2013), the city was maintaining all eight of its traffic signals.

Other statistics for the city of Pooler's traffic signals:

- 100 percent of the traffic signal controllers are model 2070s.
- 100 percent of the signals are either semi-actuated or fully-actuated (all have loop detection).
- There is one intersection that operates free.

2.4.2.2 Existing Control Center

The city does not have a traffic control center to manage their traffic signals.

2.4.2.3 Communications Infrastructure

Seven of the eight traffic signals maintained by the city communicate via fiber; however, the city cannot communicate with the signals directly.

2.4.2.4 Existing ATMS-related devices

The city does not have any ATMS devices.

2.4.2.5 Emergency or Evacuation Field Devices

The city does not maintain any signals with preemption devices. The city does not have any control over evacuation field devices.

2.4.3 Committed Traffic Management Improvement Projects in Pooler

The city does have some future committed traffic management improvement projects but could not disclose at this time the nature of those improvements.

2.5 Summary of Maintenance Responsibilities

In the tri-county region of Chatham, Effingham, and Bryan Counties, the maintenance of the 430 traffic signals is handled as follows:

- The city of Savannah maintains all of their traffic signals.
- GDOT maintains all of their traffic signals, including all signals in Effingham and Bryan Counties.
- Chatham County depends upon the city of Savannah to respond to trouble calls for their signals. The city also assists the county in timing the signals. GDOT maintains the Chatham County signals on Georgia State routes.
- The city of Pooler maintains all of their signals.

Based on the information gathered, **Table 2-1** summarizes traffic signal controller equipment in the region. Most signalized intersections operate in a coordinated system, although over 50 operate as isolated signals independent of others. All coordinated signals operate under pre-calculated fixed-time plans, most of which are old and have not been updated in recent years. No signals in the region currently operate in an "adaptive" mode in which timings along a corridor are continuously adjusted based on information the system receives about current traffic conditions.

Table 2-1: Existing Traffic Signal Equipment in the Savannah Region

Agency	Number of Signals [3]	2070 Controllers [4]	Communications [5]		Intersection Video [6]	
			Fiber	Wireless	Detection	Surveillance
Savannah	301	90%	55%	15%	2%	5%
GDOT	94	100%	40%	25%	9%	0%
Chatham County	27	65%	Est. low %	4%	7%	0%
Pooler	8	100%	88%	0%	0%	0%
Total	**430**	**91%**	**49%**	**16%**	**4%**	**5%**

7 Other Related Systems

In addition to the traffic signal systems discussed in Chapter 2, a variety of other systems or services exist in the region or may be implemented in the future that may play a role or be impacted by a more regional approach to traffic management in the future. The systems are discussed in this chapter, including freeway traffic management, transit, parking, emergency vehicle preemption, school flasher signals, and controlled at-grade railroad crossings.

7.1 Freeway Traffic Management

7.1.1 GDOT

Motorists driving the freeways in Georgia have access to free, real time traveler information by dialing 511 on their phones. The Georgia Navigator 511 system provides drivers with traffic reports and other travel information when they call in. They can choose either an automated response or talk to live operators. A major benefit of the 511 system is in incident management. Motorists can call and obtain information on incidents, report incidents, or receive emergency assistance.

In the Atlanta metropolitan area if a motorist calls 511 to report they have been in an accident, the Highway Emergency Response Operators (HERO) system will be notified to assist them. In the Savannah study region the HERO assistance is not available; however if a motorist calls 511, the Georgia State Patrol or an agency like the Chatham Emergency Management Agency (CEMA) would be notified.

In addition to the 511 system, there is some freeway traffic management activity in the study region such as DMS, CCTV devices, and Automated Traffic Recorders (ATR).

7.1.1.1 Dynamic Message Signs

GDOT maintains four dynamic message signs (DMS) in the region at the following locations:

- I-95 NB at Hwy 144
- I 95 SB at SR 26 (city of Pooler)
- I-95 at South Carolina Rest Stop
- I-516 / SR 21 at Union Camp Golf

GDOT also maintains two additional DMSs at the following non-freeway locations:

- Hwy 17/25 WB East of I-95
- Hwy 204 at Grove Point

As mentioned in Section 2.2.2.4, the local GDOT District office can control the messages on these signs, which helps to provide real time information to

motorists.

7.1.1.2 Closed Circuit TV Cameras

GDOT has one Closed Circuit TV (CCTV) camera located on I-16 and three located on 1-95 to assist in traffic surveillance.

7.1.1.3 Automated Traffic Recorders

GDOT has 19 Automated Traffic Recorders (ATR) in the study region. Eleven of these ATRs are located on I-16 and I-95. These traffic recorders count traffic 7 days a week, 24 hours a day, 365 days a year.

There is opportunity to expand Freeway Management technology in the region by implementing such strategies as ramp metering, increasing traffic monitoring capabilities using sensors and video, instituting freeway performance measure evaluation technology, etc.

7.2 Transit

7.2.1 Chatham Area Transit

Chatham Area Transit (CAT) is the Chatham County-owned fixed route and paratransit service within the Savannah metropolitan area. Fixed route service is provided within the city of Savannah, Garden City, Whitemarsh Island, Thunderbolt, Skidaway Island, Wilmington Island, and parts of unincorporated Chatham County.

The new Joe Murray Rivers Intermodal Transit Center, located at 610 West Oglethorpe Avenue, opened on October 7, 2013 to provide easier, more comfortable connections for all fixed route services to the downtown Savannah area. The center has the capacity for 14 buses at the same time with four separate bays available for Greyhound buses. The center will also serve as the base for CAT's new bike share initiative.

In March 2014, the CAT Board awarded a construction contract for the Hutchinson Island Intermodal Facility, which is a multiphase construction project designed to offer the variety of transit services already provided in Savannah to the other side of the river.

CAT completed the rehabilitation of its transit operations center at 900 East Gwinnett Street in April, 2014.

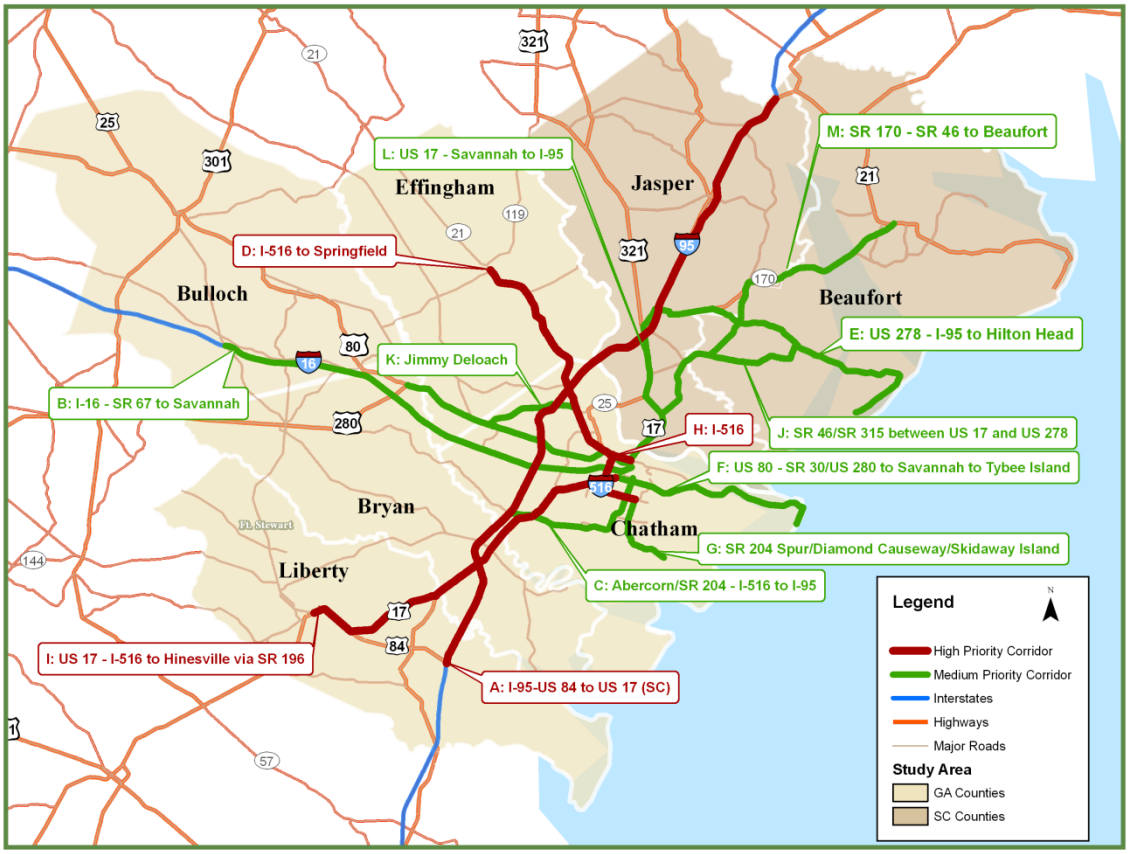
7.2.2 Transit Mobility Vision Plan

The Coastal Region MPO commissioned a Transit Mobility Vision Plan for the Savannah region encompassing five counties in Georgia (Bryan, Bulloch, Chatham, Effingham, and Liberty) and two counties in South Carolina (Beaufort and Jasper). The Vision Plan, completed in September 2013, included the identification of priority corridors and a wide range of mobility and connector strategies, such as Intelligent Transportation Systems (ITS) and Park and Ride facilities.

Priority Corridors – Based on an analysis of existing conditions and needs, combined with input from the Plan's Stakeholder Advisory Committee, a number of transit corridors were identified and prioritized. The four highest priority corridors, highlighted in red in **Figure 3-1**, were:

- Corridor A: I-95, from US 84 (GA) to US 17 (SC)
- Corridor D: SR 21, from I-516 to Springfield
- Corridor H: I-516, from DeRenne Avenue to I-16
- Corridor I: US 17 (GA) Ogeechee Road, from I-516 to US 84 to Hinesville

Figure 7-1: Transit Priority Corridors



Intelligent Transportation Systems (ITS) – A wide range of transit-related ITS elements have been implemented already and more are planned. These elements have focused on communications and coordination within and among transit agencies to support improved efficiencies and operations, as well as providing more up-to-date and accuracy traveler information to mobile riders. ITS systems deployed include electronic fare collection, automatic vehicle location systems, and advanced communication systems.

As part of the Vision Plan process, a regional ITS development concept working group was established, which discussed the following plans:

- Coastal Regional Coaches (CRC): The agency received federal funding for a broad system plan that would include: call center, scheduling/dispatching, mobile data computers, and fare media. They are currently awaiting GDOT approval for a statewide IT coordination contractor.

- Lowcountry Regional Transportation Authority (LCOG): The agency selected a contractor, RouteMatch, for a demonstration program coordinating scheduling/dispatching with several agencies. The program began in May 2011.

- City of Savannah – The city has issued two RFPs for on-street and off-street parking space/lot management, which include the capability to incorporate a proximity card into the payment process to minimize the volume of cash payments.

- Liberty County – The agency will be monitoring the progress of the CRC project for potential participation and coordination. For example, they will have the capability to upgrade existing fare boxes to accept proximity cards.

- Chatham Area Transit (CAT) – The agency currently has two ITS software packages for services, Trapeze for fixed-route and RouteMatch for demand response, but is reviewing opportunities for consolidation. They are moving forward with several grant funded ITS projects including:
  - fare box upgrades to accept multiple types of fare media
  - expanded interactive website
  - real time information for customers
  - the use of Google Transit; and
  - updated passenger amenities.

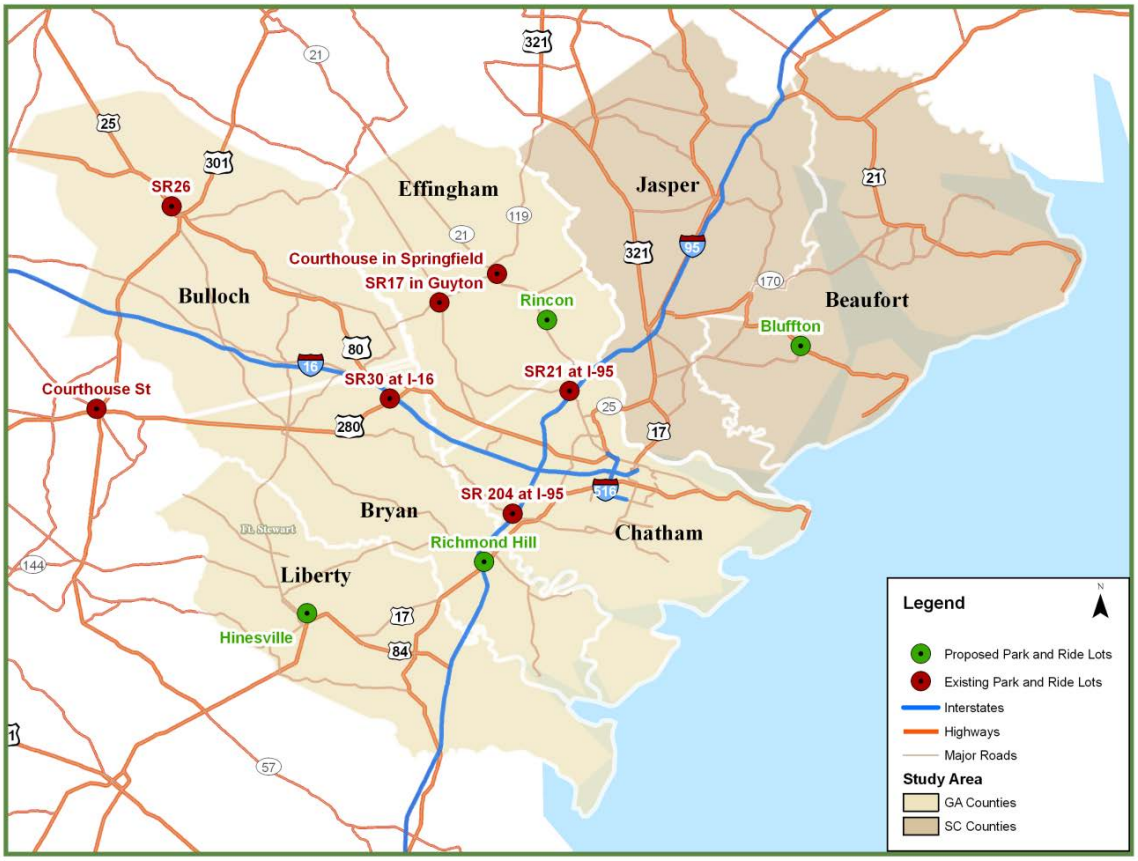
Park and Ride Lots - Chatham Area Transit identified four new potential park and ride lots strategically placed within the region to serve a proposed network of express bus services. The proposed lots, shown with existing lots in **Figure 3-2**, are strategically positioned to serve the regional commuter market shed within the greater Chatham County area where CAT is the primary fixed-route service transit provider. From these park and ride locations, linkages can be developed with the region's other transportation partners including Liberty Transit and Coastal Regional Coaches.

7.2.3 Importance of Transit to Regional ITS Strategies

The proposed CAT Transit Operations Center (TOC) will not be collocated with the potential regional Traffic Control Center and to-date the existing and planned transit-related ITS elements have focused on communications and coordination within and among transit agencies. Nevertheless, CAT and other regional transit agencies have an important and significant role to play in the planning, design, and operation of a regional Traffic Control Center and communication and computer technologies have made collocation an option not a necessity to achieve operational goals.

During the planning and design stages the locations of Intermodal Transfer Centers, bus stops, park and ride lots, and priority corridors can be considered in the planning of new or enhanced communications infrastructure and Advanced Traveler Information System (ATIS) components. Transit providers have the potential to become an important source of real-time traffic data to the TMC, as well as major users of information developed by the TMC that can be passed on to transit operational staff and potential riders via mobile and fixed traveler information devices. This includes real time incident information that helps buses avoid congestion. The buses can be used to provide arterial congestion information, and could be the source for new incident information when they happen to witness any incidents.

Figure 7-2: Park and Ride Lots



Source: Transit Mobility Vision Plan

Additionally, buses use the same road network as cars and trucks. Advances in signal timing and coordination can be even more important for transit as it will help buses achieve greater schedule reliability. Additionally, any future transit signal priority system would have to go through the new TMC. Finally, the transit agencies can work with the TMC to provide kiosks at select locations that help travelers plan routes on transit, and even show them when transit is cheaper or faster.

7.3 Parking Management

It is estimated that 30 percent of congestion in downtown areas is caused by motorists searching for parking[3]. Information on specially designed and strategically located dynamic message signs can inform drivers of the number of spaces available in nearby public parking facilities.

GDOT's Navigator traveler information system currently does not provide information on the availability of spaces in publicly owned parking facilities.

[3] An Introduction to ITS America Research's 2012 Report, Smart Parking and the Connected Consumer.

7.4 Emergency Vehicle Preemption

Emergency Vehicle Preemption (EVP) systems are designed to increase response time for emergency vehicles (EV) while reducing the possibility of an EV crash. Studies have proven that both increased response times and fewer crashes result from implementing these systems. Using ITS technology, EVP systems provide a special green phase for EVs as they approach intersections while the opposing approaches receive a red indication. EVs are fitted with special devices that transmit signals to intersection preemption equipment which communicates with a device in the controller cabinet that changes the signal. The most common types of EVP systems are infrared and GPS.

The four key agencies were consulted about their current Emergency Vehicle Preemption capabilities.

7.4.1 GDOT

GDOT does not have any intersections with EVP devices. The primary means of emergency signal preemption is via push button for traffic signals located at fire station driveways, i.e., when a fire truck is called to an emergency, a push button activates the traffic signal to stop traffic on opposing approaches and provide green for the fire station driveway to allow the fire truck to exit station.

GDOT has 5 intersections with railroad preemption devices.

7.4.2 City of Savannah

The city of Savannah has 80 intersections with EVP devices. The city uses the Opticon GPS EVP system.

The city also has one intersection with a railroad preemption device.

7.4.3 Chatham County

Chatham County does not maintain any intersections with EVP.

7.4.4 City of Pooler

The city of Pooler does not maintain any intersections with EVP.

Given there are about 407 intersections in the study region, there is potential to increase the number of EVP systems.

7.5 School Flasher Signals

During school hours, school flasher signals are intended to warn drivers they are approaching school zones. These flashers are usually accompanied by a sign indicating the school zone boundary and a designated school zone speed.

7.5.1 GDOT

GDOT maintains 20 school flasher signals.

7.5.2 City of Savannah

The City of Savannah maintains 56 city school flashers and 16 Chatham County school flashers.

7.5.3 Chatham County

Chatham County has 16 school flasher signals, which are maintained by the City of Savannah.

7.5.4 City of Pooler

The city of Pooler maintains four school flasher signals.

7.6 Controlled At-Grade Railroad Crossings

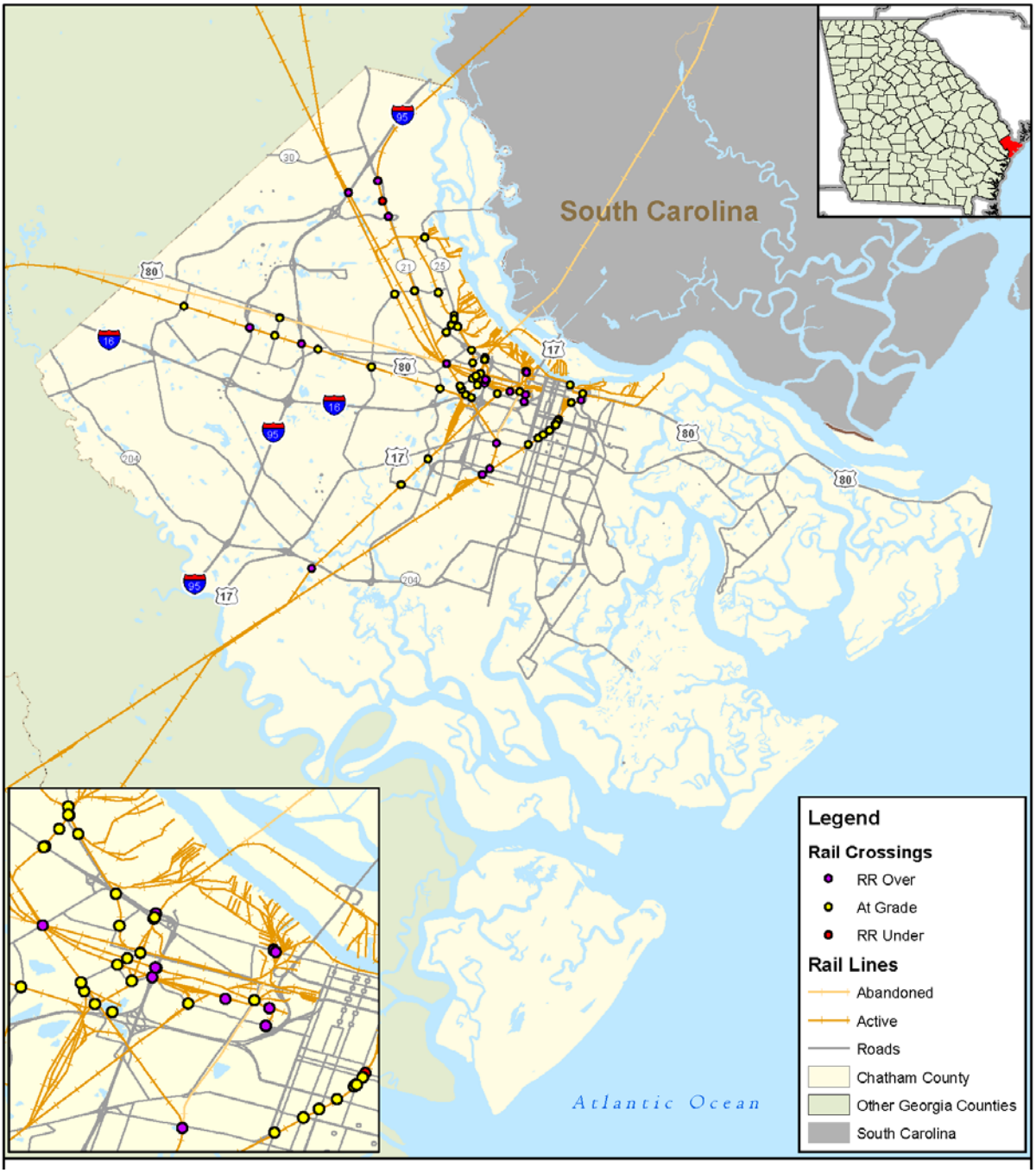
As noted elsewhere in this report, a number of locations in the Savannah region have traffic control devices related to the operation of at-grade railroad crossings:

- One intersection in the city of Savannah has railroad preemption; and
- GDOT has five intersections with railroad preemption.

At intersections with railroad preemption the traffic signal controller may respond to operation of the crossing gates and other railroad safety equipment by automatically illuminating signs and/or implementing special phasing and timings to warn motorists and optimize traffic flow while one of the intersection approaches is blocked by train movements.

The locations of at-grade railroad crossings in Chatham County are shown in **Figure 3-3**.

Figure 7-3: Railroad Crossing Locations in Chatham County

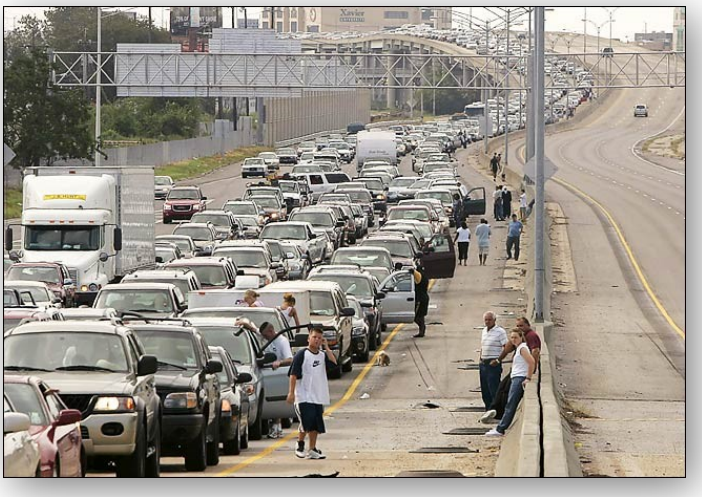


8 Hurricane Evacuation

The Georgia Hurricane Plan[4] has been prepared by the Georgia Emergency Management Agency as Annex A to the Georgia Emergency Operations Plan[5]. Extracts from the Plan are included in this Chapter to provide the background and context for hurricane evacuation capabilities that may be incorporated within the proposed Chatham County Traffic Control Center.

8.1 Plan Introduction

The entire State of Georgia is vulnerable to tropical cyclone-related hazards. The Georgia Hurricane Plan establishes the overarching framework for protective actions pertaining to the preparedness, response, and initial recovery from hazards associated with tropical cyclones.



Georgia has a long history of major impacts from tropical cyclones. This plan provides a hazards analysis that quantifies the threat posed to Georgia by tropical cyclones. The Georgia Hurricane Evacuation Study (HES), in conjunction with other sources, provides scientific data that is utilized in the hazards analysis.

This plan outlines the framework for a coordinated and comprehensive response to tropical cyclone-related impacts by disaster enterprise partners. The State Operating Conditions (OPCONs) are designed to provide time-delineated and action-based trigger points for requisite and remedial protective actions including the deployment of key evacuation support resources, the staging and forward deployment of critical life supportive commodities, and the broad-reaching coordination efforts that occur before and after impacts are realized.

This plan serves as an update to the 2010 Georgia Hurricane Plan and incorporates advances in disaster operation capabilities that were fostered through numerous collaborative planning functions. Newly developed or refined capabilities in the plan include logistical support, command and control, and enhanced initial re-entry operations. The Georgia Hurricane Plan is compliant with the National Incident Management System (NIMS) and National Response Framework (NRF).

[4] Georgia Hurricane Plan, 2013. www.gema.ga.gov
[5] Georgia Emergency Operations Plan, 2013, http://www.gema.ga.gov/content/atts/prepare/Plans%20and%20Maps/Plan%20Library/GEOP2010.pdf

8.2 Evacuation Support and Information Sources

8.2.1 Direct Evacuee Support – HERO Units

Evacuation can be a stressful process for evacuees as well as their vehicles. A vehicle that becomes stranded or breaks down could potentially block traffic and hinder the overall progress of the evacuation. GDOT's Highway Emergency Response Operator (HERO) units are available during evacuations to mitigate such issues. HEROs' two primary goals are to provide direct assistance to vehicles in distress and ensure the maximum throughput of vehicles along evacuation routes. During evacuations, HERO units are deployed to evacuation routes, where they traverse the routes throughout the evacuation to assist distressed motorists.

HERO units may provide a variety of services, including changing flat tires, jumping weak batteries, providing vital vehicle fluids (fuel, coolant, etc.), providing road and travel information, transporting travelers to safer areas, and providing use of a courtesy phone. If a vehicle is blocking the roadway, a HERO unit can gently push the inoperable vehicle out of general traffic lanes. At the present time HERO vehicles only operate in the Atlanta region, except during evacuations as noted above..

8.2.2 Direct Evacuee Support - Law Enforcement

Law enforcement resources provide direct evacuee support during evacuations. During evacuations, law enforcement resources will repeatedly traverse evacuations routes responding to requests for assistance. Law enforcement resources are able to direct support to distressed evacuees, resolve legal issues, coordinate with local officials for additional support services, and provide information on route conditions for further support.

8.2.3 Real-Time Traffic Monitoring

Real-time traffic monitoring allows state and local authorities to mitigate traffic issues in a timely manner. There are a host of resources available to monitor traffic along evacuation routes. GDOT's "Navigator" is an advanced traffic management center headquartered in Atlanta. It features traffic cameras, changeable message signs, ramp meters, and speed sensors to monitor traffic speeds. In addition to providing critical information to local officials, much of this information is accessible to the public via a website (http://www.georgia511.org) and by dialing "511" anywhere in Georgia. Other resources for monitoring traffic during evacuations include GDOT's traffic counter network, aerial reconnaissance, and field reports.

8.2.4 Internet Sources

The internet is used increasingly as the primary source of information for many people. Many disaster response partners maintain websites that provide critical information during evacuations. GDOT's Navigator website (http://www.georgia511.org), as mentioned previously, provides real-time traffic information to the public. There is also a mobile-friendly version of the site for people with internet-capable phones. The National Hurricane Center's website (http://www.nch.noaa.gov) provides information on the timing and impacts of the storm, as well as the locations of any watches and warnings in effect. Local National Weather Service offices in Charleston, Jacksonville, and Tallahassee (http://www.nws.noaa.gov) features information on local impacts from the approaching storm, and

often provides succinct weather briefing packets as the threat increases. (The particular office issuing updates depends on the location of the storm's anticipated landfall.)

GEMA's website (http://www.gema.ga.gov) features information on personal and business emergency preparedness, the location and status of open shelters, as well as press releases and other pertinent Information about preparedness and response for the tropical cyclone. Shelter location may also be obtained from the American Red Cross (http://www.redcross.org).

GEMA, in coordination with the Georgia Department of Public Health, also has a mobile phone application to aid in emergency preparedness. The "Ready Georgia" app features real-time weather and hazard alerts for the user's location, as well as customized, location-specific maps, stream gauge data (for flooding risk), and local disaster history. The app also features tools for the user to develop emergency plans and update an emergency supplies checklist. In addition, users can access general information on a variety of threats and recommended preparedness measures.

8.2.5 Portable Variable Message Boards

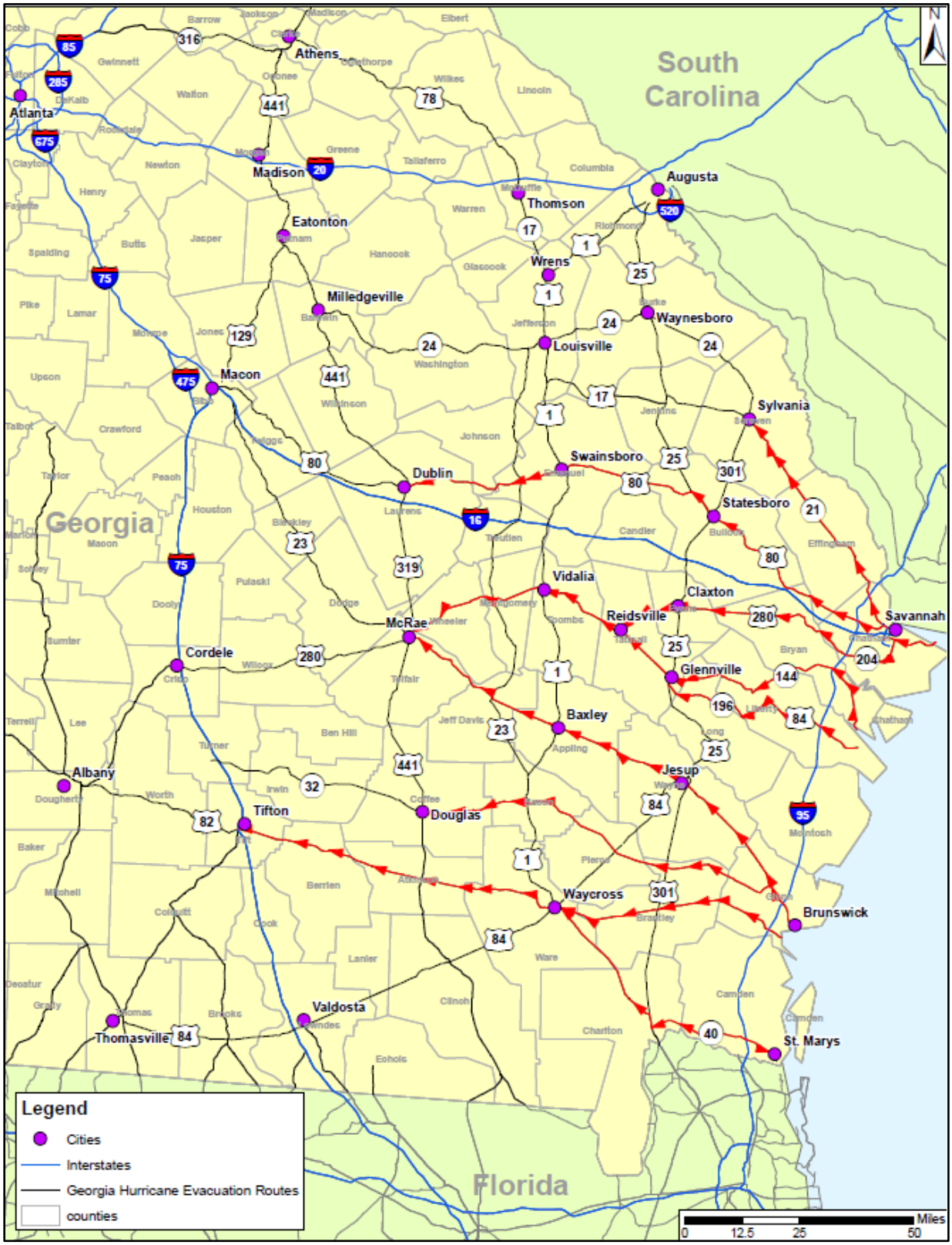
When evacuation orders are issued, GDOT places portable variable message boards in strategic locations along evacuation routes to provide targeted information to evacuees along that route. Information displayed on the boards includes exit information for contraflow operations, shelter availability, radio station listings, and other pertinent information.

8.3 Evacuation Routes

The designated evacuation routes for Chatham County are shown in **Figure 4-1**. Leaving Chatham County and the city of Savannah:

- Take US 80 away from the coast towards Statesboro and points northwest;
- Take westbound SR 204 to US 280 towards Claxton and points west;
- Take northbound SR 21 across I-95 towards Sylvania; or
- Take westbound I-16 towards Macon.

Figure 8-1: Chatham County Evacuation Routes



Source: Georgia Emergency Operations Plan, Incident Annex A: Hurricane CONPLAN, Appendix 2: Evacuations, Attachment 2: Coastal Georgia Evacuation Routes

9 Assessment of Needs

For any project or concept, before purchasing or designing, it is important to define why this project is important. For ITS projects in particular, the systems engineering approach is used to formally document the process of defining what the project is supposed to accomplish. This can be extensive for complicated systems such as a Traffic Management Center.

The previous sections defined what assets and capabilities already exist in the Savannah region, as well as some of the issues that prevent the agencies from fully realizing their goals. The next step is to define "needs". Needs are generally high level concepts such as "improve signal timing". Phase II will take these needs and develop formal goals and objectives. These will directly relate to the design and procurement of the eventual TMC.

The Coastal Region Metropolitan Planning Organization 2030 Long Range Transportation Plan (CORE MPO LRTP) for the Savannah MPO identified four systems needs for the region:

1. Roads and Bridges / Interchanges
2. Public Transportation
3. Bicycle and Pedestrian
4. Freight

All of these needs relate to operations in the region – the movement of people and goods. Most of them require an investment in Advanced Traffic Management System (ATMS) infrastructure throughout the region. There were also several goals and objectives identified along with the needs. The goals include economic activity, safety and security, accessibility/mobility, environment/quality of life, and system management and preservation. ATMS and improved operations directly address all of the goals.

The CORE MPO LRTP includes several projects under Traffic Management. This includes the larger capital projects such as communications infrastructure, sensors deployments, and the TMC. Additionally, there are numerous signal timing and coordination projects. However, there are many ATMS and transportation system management operational projects that are small enough, or far enough in the future, to not be directly addressed in the current long range plan.

Based on the LRTP and stakeholders input, this study addresses needs that are focused on how the system currently operates, and how the region would like it to operate in the future. Some of the critical items in addressing these needs are how various agencies should benefit, and also identifying how the Traffic Control Center is anticipated to operate in a general sense. On the first item, it is recognized that multiple agencies are impacted by ATMS and operations. On the transportation side, planning agencies use the information generated by the ATMS systems to improve their knowledge and operations. Designers and implementers can benefit not only from the improved information, but from having additional resources at their disposal. The entire process is improved by better information and better capabilities.

This section is divided into two parts – infrastructure and operations. Infrastructure concentrates more on the physical and field components while operations focuses more on services, but both follow the overall regional vision laid out in the CORE MPO LRTP.

9.1 Infrastructure Needs

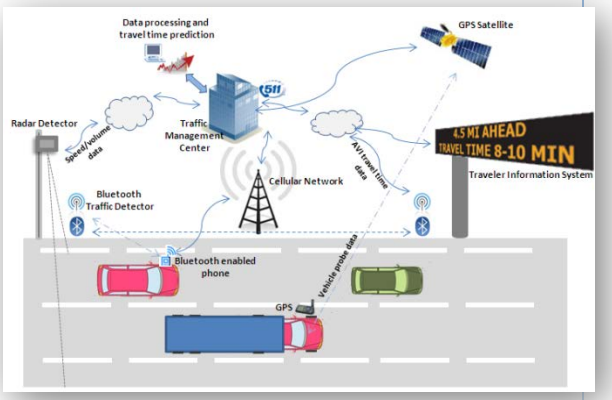
Upon completing the inventory of the existing traffic signal system in the study region, it was possible to determine the ATMS infrastructure needs of the region. The following sections detail these needs. In order to better match the physical nature of the infrastructure, this section is divided into three infrastructure sections – communications, controllers and cabinets, and ATMS field devices. In addition, a final infrastructure section is provided on integration of these systems.

9.1.1 Communication Needs

A communication network transmits data between a central traffic center and field devices. Currently, only the city of Savannah has a traffic management center and the capabilities to communicate with some of their field devices.

9.1.1.1 City of Savannah Communication Infrastructure

As described in Section 2.1.2.3, the city uses multiple methods to communicate with traffic signals.



The city currently has fiber connected to 113 signals (about 44 percent of their signals); however, the fiber system is running out of capacity since most is multimode fiber. The city has indicated a preference for more single mode fiber as single mode fiber is faster and is better for communications over longer distances.

9.1.1.2 GDOT Communication Infrastructure

As discussed in Section 2.2.2.3, GDOT uses multiple methods to communicate with traffic signals.

A little over a third of the GDOT signals in the region running isolated with no communication. Those that do have communication are almost all coordinated.

Currently, GDOT does not have a TMC in the District, but can communicate with their 24 wireless signals from the District office. However, this means that communication to other signals is lacking. An upgrade to the communication infrastructure could include providing communication to all signals.

9.1.1.3 Chatham County Communication Infrastructure

As described in Section 2.3.2.3, Chatham County signals are fiber-ready but cannot be communicated with directly from the county offices. There is one county signal that is wireless. The county does not have a TMC.

9.1.1.4 City of Pooler Communication Infrastructure

As described in Section 2.4.2.3, seven of eight intersections in Pooler are connected via fiber; however, the city cannot communicate directly with them.

9.1.1.5 Regional Operational Needs related to communications

Regional operational needs related to or impacted by communications infrastructure may be summarized as follows:

1. Regional and corridor signal integration and coordination
2. Maximize efficiency of signalized intersections
3. Plan and implement techniques to manage recurring congestion events.
4. Plan and implement techniques to manage for non-recurring congestion events
5. Monitor real-time traffic data. Respond to Map Visual Data - Highway- Railroad Incidents and Signal Malfunctions

Relative to communications, it is readily apparent that the city of Savannah, in particular, needs to upgrade the communication infrastructure. This could be accomplished with continued deployment of fiber or with a move more toward wireless communication. The other cities and counties have fewer signals, but will want and need to combine their efforts with any larger deployment.

The best approach is to initiate a separate communications study to develop a single regional solution. This study will need to consider all the various agencies and needs. For example, it may be easiest to use wireless in older, historic areas and fiber in more rural/suburban areas. The key is not to pick a single technology, but to ensure that the region works together on a single system that benefits all.

9.1.2 Controller and Cabinet Upgrades

Based on the inventory conducted in the study region, it appears that many of the traffic signal controllers have been upgraded to model 2070 controllers (done as part of the Statewide Advanced Transportation Controller Implementation). As part of the controller upgrades, many Type 332 and Type 336 traffic cabinets were installed.

9.1.2.1 City of Savannah Controller and Cabinet Upgrades

As described in Section 2.1.2.1, 100 percent of the controllers in the city are model 2070 controllers. The cabinets for the 2070 controllers are either Type 332 or 336.

Thus no controller or cabinet upgrades are needed.

9.1.2.2 GDOT Controller and Cabinet Upgrades

All of the GDOT controllers in the study region are model 2070 with the upgraded Type 332 or 336 cabinets. Consequently, GDOT has no pressing controller or cabinet upgrade needs for these signals.

9.1.2.3 Chatham County Controller and Cabinet Upgrades

Out of the 48 Chatham County controllers, about 85 percent are model 2070 with upgraded Type 332/336 cabinets. The remaining controllers are models 170 or 1880 with NEMA cabinets.

Upgrading the controllers and cabinets to model 2070 and Type 332 cabinets would fulfill the current needs of the county.

9.1.2.4 City of Pooler Controller and Cabinet Upgrades

All of the city's controllers are model 2070 with the upgraded Type 332 or 336 cabinets. Therefore, there are no pressing controller or cabinet upgrade needs for these signals.

9.1.2.5 Regional Operational Needs Related to Controllers and Cabinets

Regional operational needs related to or impacted by controllers and cabinets may be summarized as follows:

1. Regional and corridor signal integration and coordination
2. Maximize efficiency of signalized intersections
3. Respond to congestion event
4. Plan and implement techniques to manage recurring congestion events.
5. Plan and implement techniques to manage for non-recurring congestion events
6. Monitor real-time traffic data. Respond to Map Visual Data - Highway- Railroad Incidents and Signal Malfunctions
7. Provide Emergency/Special Event/Transit Vehicle Movement Information to Coordinate Traffic Signals

The vast majority of the signals in the region are model 2070 controllers and associated cabinets. The various stakeholders are happy with these signals and would like to see standardization across the region. This is primarily to maximize the ability to integrate the signals across the region into a single managed system.

9.1.3 Needs for ATMS Field Devices

ATMS field devices consist of items such as CCTV cameras, Dynamic Message Signs (DMS), system detection, and transit signal priority. Each of the four agencies employs some of these items, as discussed below.

9.1.3.1 City of Savannah ATMS Field Devices

The city has very few ATMS devices:

- 15 video cameras for surveillance (although they do have access to 66 cameras),
- 19 video cameras for detection,
- 1 Variable Message Sign (VMS)

CCTV Cameras

The city currently only has 15 cameras for surveillance; therefore, there is a need for additional cameras placed at key intersections.

DMS

The city currently possesses 1 variable message sign that is out-of-date. Additional DMS capability, possibly portable, is a need to better communicate with the driving public.

System Detection

The city has no adaptive controlled signals and only six video cameras installed for detection. About 83 percent of the traffic signals in the city are either semi-actuated or fully-actuated. Therefore, there is detection in place at many intersections. Increasing the number of intersections with detection and/or under adaptive control could fill a need. Replacing loops with video detection or adding more loops are possible upgrades to the system. A lot will depend on the maintenance capabilities of the city.

Transit Signal Priority (TSP)

Future needs for TSP are to be identified by the local transit agencies.

9.1.3.2 GDOT ATMS Field Devices

GDOT also uses few ATMS devices in the region. They currently have:

- 4 video cameras for freeway surveillance,
- 8 video cameras for intersection vehicle detection, and
- 6 Variable Message Signs (VMS)

GDOT notes that much of their video technology is outdated.

CCTV Cameras

GDOT currently only has 4 cameras for freeway surveillance and none for intersection surveillance; therefore, there is a need for additional cameras to be placed at key freeway and intersection locations.

DMS
GDOT currently maintains 6 variable message signs on I-95, I-516, Hwy 17 and SR 204. Adding more DMS to other locations in the region would help better communicate with the driving public.

System Detection
GDOT currently has no adaptive controlled signals in the region and only eight video cameras are installed for detection. While there is detection in place at many intersections, increasing the number of intersections with detection and/or under adaptive control could improve traffic operations. Replacing loops with video detection or adding more loops are possible upgrades to the system. As with the city of Savannah, the types of upgrades implemented will depend upon the maintenance capabilities of GDOT.

GDOT has 19 Automated Traffic Recorders (ATR) in the study region. Eleven of these ATRs are located on I-16 and I-95.

Transit Signal Priority (TSP)
Future needs for TSP are to be identified by the local transit agencies.

9.1.3.3 Chatham County ATMS Field Devices

CCTV Cameras
The county does not own any cameras for intersection surveillance; therefore, there is a need for additional cameras to be placed at key intersection locations.

DMS
The county does not own any DMS, including portable DMS.

System Detection
The county currently has no adaptive controlled signals and only six video cameras are installed for detection. In the county, about 95 percent of intersections are either semi-actuated or fully-actuated (only two intersections do not have any loop detection). There are two locations that use video detection. While there is some detection in place at all intersections, considering adaptive control at some locations could fill a need. Replacing loops with video detection or adding more loops are possible upgrades to the system. The types of upgrades implemented will depend upon maintenance capabilities.

Transit Signal Priority (TSP)
Future needs for TSP are to be identified by the local transit agencies.

9.1.3.4 City of Pooler ATMS Field Devices
The city of Pooler does not have any ATMS devices.

9.1.3.5 Regional Operational Needs related to ATMS Field Devices
Regional operational needs related to or impacted by ATMS field devices may be summarized as follows:

1. Respond to congestion event

2. Respond to police notification of congestion event.
3. Plan and implement techniques to manage recurring congestion events.
4. Plan and implement techniques to manage for non-recurring congestion events
5. Monitor real-time traffic data. Respond to Map Visual Data - Highway- Railroad Incidents and Signal Malfunctions
6. Provide Emergency/Special Event/Transit Vehicle Movement Information to Coordinate Traffic Signals
7. Monitor and manage traffic for information dissemination. Information could be received from CCTV and traffic detectors
8. Provide condition map to the public on the city of Savannah and GDOT websites
9. Display GDOT and city of Savannah CCTV images in the new TMC for rapid accessibility to emergency service providers
10. Coordinate the development of traffic response plans to hurricane and other emergency events.
11. Traffic response plans relate the location and nature of the event to the following controls and displays: DMS, PCMS, VMS, HAR, queue warning systems, traffic signal diversion timing plans.
12. Schedule and implement planned construction and special events.
13. Verify and classify incidents and congestion.
14. Provide support for Emergency management functions
15. Supports roadway service patrol vehicles that monitor roads that aid motorists, offering rapid response to minor incidents (flat tire, accidents, out of gas) to minimize disruption to the traffic stream.
16. Monitoring of transportation infrastructure (e.g., bridges, tunnels and management centers) for potential threats using sensors and surveillance equipment and barrier and safeguard systems to control access, preclude an incident, and mitigate the impact of an incident if it occurs

Many of the field infrastructure needs are directly tied to the operational needs described in Section 5.2. For example, a large numbers of CCTV cameras are not needed around the region if no one is going to look at the images. DMS is not needed if there are no plans to use them on a recurring basis. The needs for these field devices are more fully identified below.

9.2 Operational Needs

As stated above, ATMS and improved operations directly address all of the needs and goals of the CORE MPO LRTP. Additionally, there are many ATMS and transportation system management operational projects that are small enough, or far enough in the future, to not be directly addressed in

the current long range plan. The critical items in addressing these operational needs are how various agencies should benefit, and identifying how the Traffic Control Center is anticipated to operate in a general sense. Multiple agencies are impacted by the potential TMC, including those involved in emergency and incident management. This includes Chatham County Emergency Management Agency, law enforcement, fire response, and towing and recovery firms. Savannah's location along the Atlantic seaboard also ensures that hurricanes and their required evacuations will be recurring events.

This section will look at the various operational aspects of a TMC and what needs are anticipated. Operational and functional needs include the coordination of signals, planning, and traffic engineering activities as well as staffing needs.

The TMC relies on the ITS technology to accomplish its goals and objectives. ITS technology combines several systems to prevent and/or mitigate congestion, improve driver information and actively manage special event and weather related traffic. As this particular topic is closely tied with the U.S. National ITS Architecture, the operational and functional needs for the TMC have been grouped and associated with the industry standard service package groups from the ITS Architecture.

9.2.1 Traffic Management

***Functional Need**: Monitor arterial and freeway systems performance, incident management, and railroad grade crossing systems. Collect and exchange data to perform transportation functions. Develop signal timing plans for the city of Savannah and coordinate maintenance of these signals. Promote efficient system management and operation. Increase the accessibility, mobility and connectivity options available to people and freight. Enhance mobility for bicycle and pedestrians.*

***Operational Need**:*

1. Regional and corridor signal integration and coordination
2. Maximize efficiency of signalized intersections
3. Respond to congestion event
4. Respond to police notification of congestion event.
5. Plan and implement techniques to manage recurring congestion events.
6. Plan and implement techniques to manage for non-recurring congestion events
7. Monitor real-time traffic data. Respond to Map Visual Data - Highway- Railroad Incidents and Signal Malfunctions
8. Provide/Coordinate Service Patrols
9. Provide Emergency/Special Event/Transit Vehicle Movement Information to Coordinate Traffic Signals
10. Provide ATMS Railroad Crossing Functions

Of the identified needs, signal integration and coordination is likely the most critical and immediately beneficial. ATMS can be used to coordinate signals along a corridor and provide demand responsive systems to address non-recurring events. The majority of these functions are all typically within the control of a traffic control center. Depending on the exact choices in functions and field deployments, most should be considered as part of the TMC. Service patrols are often coordinated with other departments and automated vehicle identification and monitoring is typically accomplished by the individual "owning" agency. Key issues in this list include integration with other systems and archiving of data collected.

9.2.2 Public Transportation

***Functional Need**: Provide safe and reliable mobility service to people. Monitor fixed, or/and responsive transit systems. Increase accessibility and mobility of people and goods. Improve public transportation efficiency and information systems.*

Operational Need:

1. Monitor Transit Vehicles
2. Monitor Transit Signal Priority operations
3. Management of transit fleet
4. Provide transit traveler information
5. Monitor demand-response transit operations

In the long range plan, many of the identified projects include additional vehicles and service. The automated payment systems can be included as an ITS system, although the management of the payment systems is rarely the responsibility of a TMC.

9.2.3 Traveler Information

***Functional Need**: Receive, process, display, and communicate traffic related conditions. Increase the accessibility and mobility of people and for freight. Promote efficient system management and operation. Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight. Increase the safety of the transportation system for motorized and non-motorized users*

Operational Need:

1. Monitor and manage traffic for information dissemination. Information could be received from CCTV and traffic detectors
2. Managed and filer incident information obtained from the 911 dispatcher Communications Center
3. Display traffic detector speed data in a traffic condition map. The condition map will also identify the location of traffic incidents
4. Provide information from map to emergency vehicle responders by rapid, low cost communications
5. Provide condition map to the public on the city of Savannah and GDOT websites

6. Display GDOT and city of Savannah CCTV images in the new TMC for rapid accessibility to emergency service providers

7. Monitor Environmental and Road Weather Information Systems (RWIS) functions

Traveler information is almost always managed from a TMC. Many states or regions (including Georgia) have 511 systems. Typically the TMC will supply information to the regional 511, but will also be responsible for local traveler information through Dynamic Message Signs (DMS), web sites, etc.

9.2.4 Commercial Vehicle Operations

***Functional Need**: Emphasize the preservation of the existing transportation system.*

Operational Need:

1. Provide the route for a commercial vehicle by either utilizing an in-house routing software package or an Information Service Provider. Routes generated by either approach are constrained by hazardous materials and other restrictions (such as height or weight).
2. Detect over height vehicles
3. Provides for on-board commercial vehicle safety monitoring and reporting

Savannah is a major port and has considerable freight traffic. Many of the freight specific operational needs are addressed outside of a TMC. These include electronic manifests, safety monitoring, and intermodal operations. The commercial vehicle functions of the TMC are expected to be limited to Weigh in Motion (WIM) and a few monitored systems. While that is the initial assumption, the TMC should continue to cooperate with the other freight entities and actively look for areas of joint benefit. This could be as simple as freight specific signal timing plans, or as complex as feeding information into a new connected vehicle project.

9.2.5 Emergency Management

***Functional Need**: increase safety for vehicles and pedestrians. Promote efficient system management and operations. Provide efficient aid in hurricane evacuation events.*

Operational Need:

1. Coordinate the development of traffic response plans to hurricane and other emergency events.
2. Traffic response plans relate the location and nature of the event to the following controls and displays: DMS, PCMS, VMS, HAR, queue warning systems, traffic signal diversion timing plans.
3. Schedule and implement planned construction and special events.
4. Verify and classify incidents and congestion.
5. Provide notification to stakeholders as to when the plan should be terminated.
6. TMC operators may assist emergency responders to access the incident site and to assist them in managing traffic at the site with the ability to monitor traffic conditions.
7. Respond to motorist alerts
8. Provide support for Emergency management functions
9. Utilize Advanced Traffic System Management to monitor signal preemption

10. Supports roadway service patrol vehicles that monitor roads that aid motorists, offering rapid response to minor incidents (flat tire, accidents, out of gas) to minimize disruption to the traffic stream.
11. Monitoring of transportation infrastructure (e.g., bridges, tunnels and management centers) for potential threats using sensors and surveillance equipment and barrier and safeguard systems to control access, preclude an incident, and mitigate the impact of an incident if it occurs

The main difference between emergency management and incident management is the scale of the incident. All TMCs are involved in some manner of incident management including crash verification, potential signal timing changes, etc. The primary emergency management area for Savannah remains hurricane evacuations. There should be long standing plans for evacuation. The TMC should be designed to aid in this activity for the next time it is required.

9.2.6 Archived Data

***Functional Need**: Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight. Allow data collection from multiple agencies, and data sources across modal and jurisdictional boundaries.*

Operational Need:

1. ITS data warehouse, provide a single repository data warehouse
2. Capability to query historic data for reporting based on needs
3. ITS virtual data warehouse

As mentioned in Traffic Management, the archiving of data collected by a TMC is of critical interest to many outside of the TMC. In the past, many TMCs were built with no or limited ability to archive data. This includes not only storing the information, but in a format or system that facilitates retrieval. While this storage may be completed off site from the TMC, the original source of data should primarily rest with the TMC directly.

9.2.7 Maintenance and Construction Management

***Functional Need**: Emphasize the preservation of the existing transportation system. Increase safety of motorized and non-motorized users.*

Operational Need:

1. Truck maintenance and construction vehicle and equipment
2. Collect, process and distribute roadway weather data
3. Manage and monitor work zones

Maintenance and construction are often more difficult to integrate into a TMC. Demonstrating an ability to monitor work zones and provide useful information to those in the field is a good way to help integrate the two functions.

All of these functions and needs will be identified prior to designing and constructing the TMC. Once all functions are identified, the agencies will need to determine the requirements these functions

place on a TMC. Does the TMC have to operate 24/7? What kind and number of staff are required? Initial indications are that signal timing is a primary function along with incident and emergency management. These can likely be accomplished with minimal daily staff and only occasional 24/7 operations. The integration of the TMC with other agencies both technically and institutionally will be very important.

9.2.8 Truck Routes

This section discusses potential impacts of the proposed TMC on truck route operations.

The TMC will serve as a focal point and provide traffic management support to trucks through the use of DMS, PCMS, and sensors by providing information and traffic monitoring activities for incidents, special events and selected high profile or sensitive closures. For example, any truck restrictions that may be implemented offer the region the opportunity to better control select vehicles when implementing a dedicated lane or route. The new TMC will allow for safer operations in these particular lanes or routes by:

- Allowing dynamic truck restrictions
- Deploying strategies based on prevailing roadway conditions without requiring operator intervention
- Preparing and implementing response plans for maintenance of flow during incidents, coordinate routing with construction, communicate regularly with dispatchers at local truck terminals
- Conveying real-time information to truckers on incidents, special events, weather information, detour routes, etc.
- Managing signal timing to ensure adequate freight mobility with a priority on facilities with freight priority

Additional sensors and communications subsystems can be implemented in commercial vehicles to support safe and efficient operations. Many of these are being researched as part of the USDOT connected vehicle program. Such subsystems can provide a two-way communications between the commercial vehicle drivers, their fleet managers, attached freight equipment, and roadside officials, and provides HAZMAT response teams with timely and accurate cargo contents information after a vehicle incident. These subsystems provide the capability to collect and process vehicle, cargo information from the attached freight equipment, and driver safety data and status and alert the driver whenever there is a potential safety or security problem.

The new TMC can have the capability to provide traveler information for re-routing directions that is specific to commercial vehicles, depending on current road network conditions both on a daily congestion approach and re-routing information due to special events, incidents, weather, etc. TMC would also make information available to all, and may manage routes using DMS or other means. Some TMCs have specific web sites dedicated to truckers or connections to large local dispatchers to help facilitate this information flow.

9.2.9 Evacuation Routes

This section discusses the potential impacts of the proposed TMC on planning and implementation of evacuation routes.

The new TMC will support the evacuation of the general public from a hurricane or other emergency event and manage subsequent reentry to the area. The TMC will support coordination of evacuation plans among the federal, state, and local transportation, emergency, and law enforcement agencies that may be involved in a large-scale evacuation. All affected jurisdictions (e.g., states and counties) at the evacuation origin, evacuation destination, and along the evacuation routes are informed of the plan to implement, special traffic control strategies for traffic evacuation, including traffic on local streets and arterials as well as the major evacuation routes.

Hurricane evacuation routes have been designated by the Georgia Emergency Management Agency. Currently, most of the evacuation routes are designated as hurricane routes with static signs. Shoulder use, closures, special signal control strategies, and other special strategies may be implemented to maximize capacity along the evacuation routes. Resource requirements are forecast based on the evacuation plans and the necessary resources are located, shared between agencies if necessary, and deployed at the right locations at the appropriate times.

The new TMC may serve as a focal point for providing basic public safety call-taking and dispatch services in coordination with the local emergency operations center. Additional responsibilities between the Emergency Operations Center (EOC) and TMC may include:

- Manage emergency vehicle equipment, equipment used to receive and route emergency calls, and wireless communications that enable safe and rapid deployment of appropriate resources to an emergency.
- Coordination between agencies, emergency centers and emergency vehicle supports.
- Dispatch and provision of information to responding personnel
- Provide traffic information, road conditions, and suggested routing information to enhance emergency vehicle routing. Special priority or other specific emergency traffic control strategies can be coordinated to improve the safety and time-efficiency of responding vehicle travel on the selected route(s).
- Provide routing information for the emergency fleet based on real-time conditions. The Emergency Vehicle may also be equipped with dedicated short range communications for local signal preemption and the transmission of alerts to surrounding vehicles.
- Gather information about the incident, and determine the appropriate response.
- General surveillance capabilities that enable the TMC to remotely monitor public areas (e.g., rest stops, parking lots) to improve security in these areas.
- In response to threats, barrier and safeguard systems may be activated by the TMC to prevent an incident, control access to an area or mitigate the impact of an incident.

9.3 Integration Needs

The effective and comprehensive management of a transportation system encompasses all of the elements detailed above. A Traffic Control Center constructed to manage all of these elements is imperative. For adequate and effective management of a street network, the various agencies will

need to upgrade the various elements of its traffic signal and communications infrastructure to enable real-time monitoring of traffic conditions, which in turn allows for the immediate and continuous adjustment of the various parameters and physical conditions to ensure optimal system operations. The implementation of adaptive signal control is an integral element of effective transportation system management, which can greatly improve operations and increase efficiency.

In addition, expanding Freeway Management technology in the region by implementing such strategies as ramp metering, increasing traffic monitoring capabilities using sensors and video, instituting freeway performance measure evaluation technology, etc., is part of the overall system as well. With all of these elements, the key is to build the components as part of one larger integrated system. All elements are able to benefit both physically and operationally from each other if the systems are planned that way from the beginning.

10 Typical Benefits from ITS Improvements

According to the U.S. DOT's Research and Innovative Technology Administration (RITA), *"Intelligent Transportation Systems (ITS) technologies advance transportation safety and mobility and enhance American productivity by integrating advanced communications technologies into transportation infrastructure and into vehicles. ITS encompasses a broad range of wireless and traditional communications-based information and electronic technologies."*

In this report, the current state of the region's traffic signal systems and freeway management activities has been assessed. While it has been determined that there are some ITS devices in the field and certain ITS strategies being employed, there is much more that can be done to *"advance transportation safety and mobility"* in the region. These are primary goals that a new Traffic Control Center should strive to achieve – safety and mobility.

Information published by RITA is summarized in this chapter to highlight some of principal benefits that may result from further investments in ITS technologies to advance transportation safety and mobility in the Chatham County region. The chapter concludes with a discussion of visits made to traffic management centers by regional stakeholders during Phase 1 of the study to learn first-hand about such centers from those who manage and operate them on a daily basis.

10.1 ITS Technology and Benefits

RITA cites along with other technologies that Traffic Signal Coordination and Traveler Information Systems "appear to have the most broad-based benefit in the area of improved mobility." Both technologies also help provide a safer roadway for motorists.

10.1.1 Traffic Signal Coordination

A key ITS technology that can reap immediate benefits is traffic signal coordination. While simple retiming and optimization of traffic signals along corridors or in downtown areas can be effective, more often, advance signal timing technology, such as adaptive signal control can offer much more flexibility and efficiency in signal operation.

The deployment of adaptive signal control can be critical to optimal traffic operations beyond typical pre-established fixed time of day signal coordination plans. Adaptive traffic control works by continuously adjusting the parameters of signal timing along a corridor based on information the system receives about current traffic conditions. Typical objectives of an adaptive system include:

- Quick response to fluctuations in traffic demand and unexpected impacts resulting from normal changes in demand, special events, incidents, weather etc.;
- Increase the efficiency of intersections by allocating proper signal green times and area wide signal coordination;
- Reduce travel time, stops, delay and emission; and
- Reduce side street and pedestrian delay.

To achieve the most benefit out of adaptive traffic signal control, upgrades in controllers and communication are vital. The region is getting there, but upgrades will be needed.

10.1.2 Traveler Information Systems

Another key ITS component is traveler information systems or better known as Advanced Traveler Information Systems (ATIS). For example, GDOT has the Navigator 511 system which provides assistance to drivers and is especially comprehensive in the Atlanta metropolitan area with the number of DMS, the HERO program, etc. In the Savannah area there is opportunity to upgrade the ability to disseminate information to the motorists.

Advanced Traveler Information Systems (ATIS) provide transportation related information to the traveling public. The methods of providing this information range from agency-owned devices such as message signs and agency websites to commercial services such as radio reports or private websites. The information is typically distributed as pre-trip or en route information. Pre-trip traveler information is meant to inform people prior to the beginning of their trips. This is usually done through the use of media outlets (local news, public access cable TV), kiosks, or the Internet. Once travelers have begun their journeys, information received en route can be given through devices including roadside elements (e.g., DMS, telephone services such as 511, etc.) and through in-vehicle media services (e.g., radio, navigation systems).

ATIS strategies include message signs. As discussed earlier in this technical memorandum, DMS (also known as variable (VMS) or changeable (CMS) message signs) display user-defined messages to the public. They are typically used to provide motorists with real-time traffic information, travel time information and detour advisories in advance of key decision points along freeways or primary arterials. Agencies can also use DMS to broadcast AMBER Alerts, providing motorists with information regarding abducted children. The actual signs can be fixed or portable.

It is quite easy to see the benefits of having an ATIS system with DMS located at strategic locations. Being able to disseminate important information to motorists can save not only time and fuel consumption, but may also save lives.

10.2 The Traffic Management Center (TMC) and Benefits

The TMC brings all the ITS technology together and manages its use.

The key function of the TMC (sometimes also called a Traffic Operation Center, or TOC) is to provide traffic management staff with the capability to interface with the traffic control equipment / system and to monitor traffic information from a central location. The TMC can vary in complexity from a single desktop computer with the management software to an elaborate room with large video monitors for viewing CCTV images, workstation displays with space dedicated for communication, and

other traffic related equipment. Ideally, the TMC size is dependent on the number of signalized intersections and other field devices deployed that are to be managed from the TMC by one or more operators; the more signals and field devices to monitor and operate, the larger the TMC and number of TMC operators. Practically, TMC size is often determined by the agency's budget for the TMC and size of the area to house the TMC.

The TMC typically serves as the critical communication hub between the field elements and the Engineer. The TMC will have equipment installed that provides the ability to control signalized intersections, CCTV cameras, DMS, and other field devices. The TMC equipment can also monitor priority requests at signals, if transit priority and/or emergency vehicle preemption operation are deployed. In addition, the TMC can serve as the central location to share data with other agency departments and partner agencies to share information across jurisdictional boundaries in anticipation of incidents affecting mobility in the region. For example, signal operation access, and CCTV camera video and control, can be set such that viewing and/or modification can be done by one or multiple agencies, or by one or multiple departments within an agency. Opportunities for co-location of the traffic operators with emergency personnel, first responders, police, fire, etc., are a benefit, especially during emergencies and incidents.

The TMC can also be a hub for evaluating performance measures (now a Government hot-button issue with the MAP-21 legislation). Given that the appropriate ITS field devices are in place (e.g., detectors, cameras), data can be collected to determine how well or how poorly freeways and arterials are operating.

Clearly, a regional TMC would be beneficial for managing traffic signals, disseminating driver information, collecting performance data, and improving response times for emergencies and incident management. The integration of the surface street system with the freeway system – treating all roadways as one system provides the means to achieve the goal of providing safety and mobility to motorists.

10.3 State of the Practice – TMC Visits

As part of this study, it was deemed important to look at other TMCs and evaluate how other agencies manage their traffic signal systems and other ATMS devices. It was desired to visit TMCs that could provide different aspects and strategies of traffic management. Several nearby TMCs in the southeast were contacted in order to determine which would offer the most diverse type of operation. Two TMCs, in Jacksonville, FL and Valdosta, GA, were selected and the first of two scan tours was undertaken on Wednesday, November 13, 2013. Two further tours to TMCs in Cobb County and the GDOT TMC were conducted on Friday, March 21, 2014 with a similar agenda.

Twelve people participated in the first scan tour to Jacksonville with nine continuing on to Valdosta (the three GDOT representatives did not go to Valdosta):

- Chris Needham, Georgia DOT
- Cynthia Phillips, Georgia DOT
- Rick Hardenbrook, Georgia DOT
- David Grotyohaun, Chatham Emergency Management Agency

- Stephen Henry, City of Savannah
- Tom Thomson, Coastal Region MPO
- Mark Wilkes, Coastal Region MPO
- Wykoda Wang, Coastal Region MPO
- Michael Adams, Coastal Region MPO
- Ellis Cook, Coastal Region MPO
- Shedrick Coleman, Coastal Region MPO
- Eric Tripi, Iteris

Eleven people participated in the second scan tour to Atlanta:

- Mike DiSanza, City of Savannah
- Stephen Henry, City of Savannah
- John Chapman, City of Savannah
- David Brantley, Chatham County
- Charles McMillan, McMillan and Associates
- Tom Thomson, Coastal Region MPO
- Wykoda Wang, Coastal Region MPO
- Shedrick Coleman, Coastal Region MPO
- Adam Ivory, CDM Smith
- David Castle, CDM Smith
- Eric Tripi, Iteris

Both tours followed a similar agenda. The agenda for the first tour is shown in **Figure 6-1**.

10.3.1 Regional Traffic Management Center, Jacksonville, Florida

The first stop on the scan tour was at the Regional Traffic Management Center in Jacksonville, FL. It was an appealing TMC to visit given its regional jurisdiction.

The two main contacts at the TMC were:

- Donna Danson, the Florida District 2 ITS Operations Project Manager
- Peter Vega, P.E., the Florida District 2 ITS Engineer

Figure 10-1: Jacksonville/Valdosta TMC Scan Tour Agenda

CORE COASTAL REGION MPO

METROPOLITAN PLANNING ORGANIZATION

Jacksonville/Valdosta TMC Scan Tours Agenda

Date: November 13, 2013
Project: Regional ATMS

The following contains the estimated itinerary for the Jacksonville/Valdosta TMC scan tours.

- 7:30a – Meet at the MPC office, located at 110 East State Street. The bus will be parked on East State Street in the Loading Zone in front of the building.
- 7:45a – Depart for Jacksonville TMC (2.5 hours)
  - [Refreshments will be provided on bus…coffee/bagels]
- 10:15a – Arrive at the Jacksonville TMC
  - 2198 Edison Avenue, Jacksonville, Florida 32204, phone: (904) 360-5463
  - Take tour of TMC
  - Question and Answer period
- 12:15p – Depart Jacksonville TMC for Valdosta, GA (2.5 hours)
  - [Boxed lunches will be provided for bus ride]
- 2:45p – Arrive at the Valdosta TMC
  - 310 E Adair St, Valdosta, GA 31601, phone: (229) 259-5431
  - Take tour of TMC
  - Questions and Answer period
- 4:45p – Depart Valdosta for Savannah
  - [Refreshments will be provided on bus…sodas/water, snacks]
- 7:15p – Arrive in Savannah

110 EAST STATE STREET, P.O. BOX 8246, SAVANNAH GEORGIA 31412 - 8246 PHONE 912-651-1440 FACSMILE 912-651-1480

Ms. Danson and Mr. Vega proceeded to give a presentation on their TMC operation, took questions, and then gave a tour of their facility. The main findings from the visit were as follows:

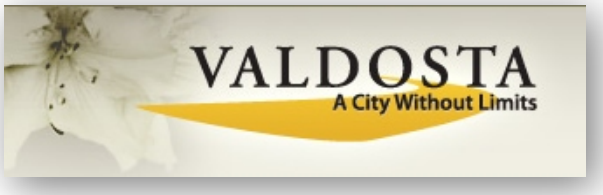
- Started in the late 1990s with $2.6 million out of District discretionary funds – this paid for the original building and the TMC
- Initial coverage area was Duval County and now has expanded to multiple counties
- The TMC manages:
  - 200+ digital cameras
  - 6 weather stations
  - 288 microwave detectors
  - 100 bluetooth-devices on arterials for origin-destination studies
  - 29 wind sensors on bridges
  - 93 DMS
  - 4 license plate detectors

- They are about ready to move to a new 20,000 s.f. facility to house the TMC
- They will add traffic signal management to the TMC - about 460+ traffic signals in the region will be under their purvey
- They will use Trafficware software to control signals in the TMC
- Communication with the EB I-10 DMS is via wireless
- DOT, Florida Highway Patrol, Sheriff, Fire will be located at the new TMC

The trip yielded good information on the typical operation of a Regional TMC and provided insight behind the funding of a TMC and how it can evolve from a small limited coverage area to a regional presence.

10.3.2 Traffic Management Center, Valdosta, Georgia

The next visit was to the TMC in Valdosta, GA. This TMC represented a smaller city (pop. 54,000) with 127 signals. This TMC was selected because it is managed by a city, located in Georgia, and is not part of the GDOT Navigator system.



The main contact at the TMC was:

- Kevin Tolliver, P.E., the city of Valdosta Traffic/Transportation Engineer

The group met in the TMC operations room and Mr. Tolliver gave a presentation on the TMC operation and took questions. The main findings from the visit were as follows:

- The city spent $1.4 million on the TMC while GDOT kicked in $350,000 for fiber (10 years ago).
- The city manages 127 signals, 117 of which can be communicated with from the TMC.
- 10 intersections run free (not connected).
- They manage 26 cameras for surveillance (not used for detection)
- City police are housed in a separate facility – first-come/first-serve access to cameras between Traffic Department and city police.
- The TMC is typically staffed with 2 people.
- There is one supervisor and 4 maintenance technicians on staff (the 4 maintenance technicians also can staff the TMC)
- They use Tactics signal software
- They have 12-13 signals with EVP
- They have 2070 controllers and were one of the first Cities in Georgia to fully implement 2070 controllers at all of their intersections.

The TMC in Valdosta provided some additional insight on how smaller Cities manage traffic signals with ATMS devices. They also provided information on how the obtained the financing to construct the TMC in the beginning.

10.3.3 Regional Traffic Management Center, Cobb County, Georgia

An interesting and informative presentation on the Cobb County TMC was made by Kathy Clark, Traffic Control Center Manager, David Montanye, Traffic Operations Division, and Brook Martin, Traffic Signal Engineer. Fact sheet information on the center is provided in Appendix A. This center, which became operational in 2010 and is pictured in **Figure 6-2**, provides much of the scope and functionality anticipated of the proposed Chatham County TMC, including:

- Countywide in extent;
- Linked to GDOT's Navigator system;
- Controls and/or monitors traffic signals within multiple jurisdictions; and
- Collects and distributes traveller information.

Unique among the four TMCs, some of the traffic signals in Cobb County operate under the SCATS adaptive control system.

10.3.4 GDOT Traffic Management Center, Atlanta, Georgia

The fourth and final tour was to GDOT's Statewide TMC in Atlanta. Information about the center and Georgia's statewide ITS system, known as Navigator, was provided by:

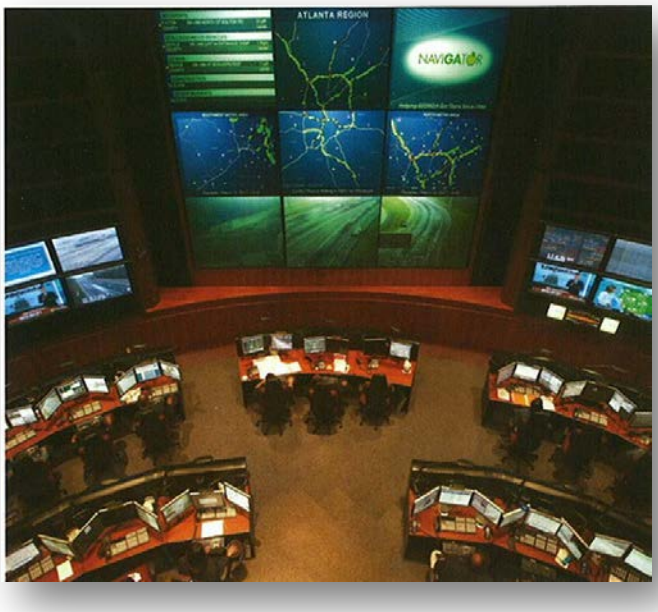
- Meg Pirkle
- Cathy Zuhul,
- Mark Demidovich; and

- Grant Waldrop.

Figure 10-2: Cobb County Traffic Management Center

In additional to providing operational capabilities for traffic management in the Atlanta region, the GDOT TMC, pictured in **Figure 6-3**, exchanges information with regional TMCs around the state, including the Valdosta and Cobb County TMCs discussed previously. The GDOT TMC also acts a command center during periods of emergency operations, for example, hurricane evacuations, snow and ice events, etc. Information on Navigator is provided in Appendix B. Georgia's 511 traveller information system, which is an integral part of Navigator, is described in Appendix C.

Figure 10-3: Control Room in the GDOT TMC



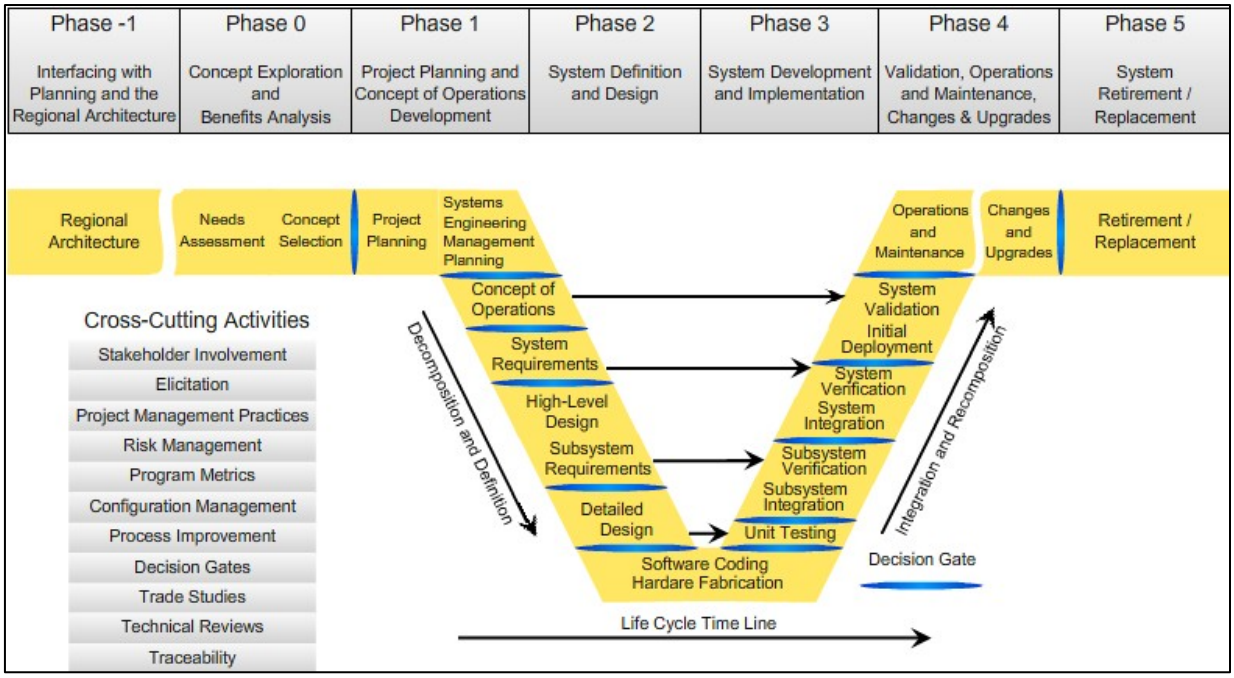
11 Next Steps

The activities and findings documented in this report were conducted within Phase I of the development of the *ATMS Strategic Plan*. In Phase II, the strategic plan itself will be developed through the following activities:

- Draft goals and objectives will be identified for the proposed Chatham County TMC.
- An alternatives evaluation will be conducted that will identify potential improvement options that should be considered to address short-, medium- and long-term traffic management needs. The evaluation will consider the Traffic Management Center, system components, including traffic signal controllers and cabinets, communications, other traffic management hardware and software, and identification of traffic "hot spots".
- Case studies of regional traffic management centers will be prepared and documented to increase awareness of both the benefits and practical implementation issues related to regional traffic management operations of similar size and scope to that envisioned for Chatham County.
- The *ATMS Strategic Plan* will leverage the existing traffic signal system and infrastructure to the greatest extent possible. The strategy will address recommended infrastructure changes, including signal system hardware and software, TMC components, a reliable and robust communications network, desired ITS field devices, and other traffic management and ITS strategies, as appropriate. The *ATMS Strategic Plan* will be designed to guide decision making at the city, county and regional levels.

The *ATMS Strategic Plan* will be developed consistent with the principles of the Systems Engineering Process for ITS project planning, design, implementation, and operations, illustrated in **Figure 7-1**.

Figure 11-1: Systems Engineering Process



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