



Phase 2 Technical Memorandum (Task #3)

CHATHAM COUNTY ADVANCED TRAFFIC MANAGEMENT SYSTEM AND TRAFFIC MANAGEMENT CENTER STRATEGIC PLAN

CASE STUDIES

Regional Traffic Management

Prepared for:



Prepared by:



In Association with:



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1 Introduction

This Regional Traffic Management Technical Memorandum builds upon the knowledge gathered from Traffic Management Center (TMC) scanning tours, which took place in 2013 and 2014, involving both CORE and Consultant Team. The scanning tours provided information and resources toward the justification for development of a regional traffic management strategy, including a summary of both field and central system recommendations.

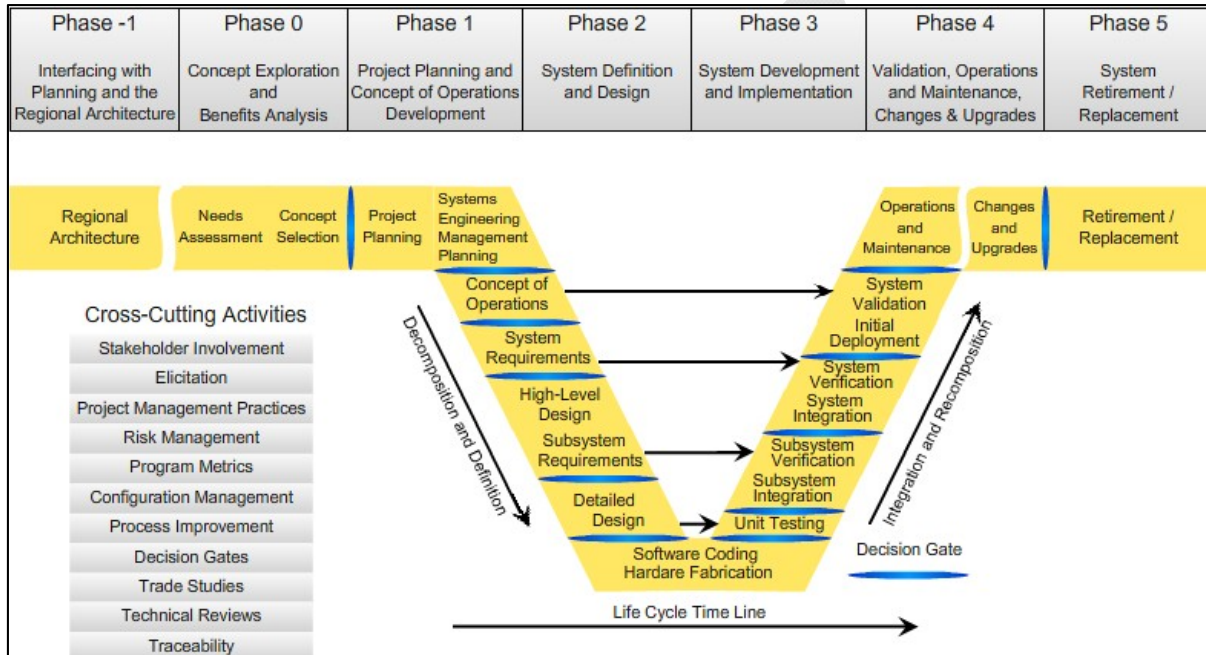
This Technical Memorandum forms a key deliverable as part of the Chatham County Intelligent Transportation System (ITS) and TMC Strategic Plan, referred to henceforth in this document as the Advanced Traffic Management System (ATMS) Strategic Plan. The Plan is being developed under a task order of GDOT funding contract 00010027. The recommendations in this document are based on the TMC scanning tours, along with the Task 2 Technical Memorandum, which addressed traffic management improvement options for the region. This Technical Memo will address specific TMC case studies across the Southeast U.S. that are relevant to the Coastal Region, the potential benefits of consolidated Regional Traffic Management Center and System development, and a justification for taking the next steps to regional TMC and systems development.

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2 Purpose

The plan follows the U.S. Department of Transportation-defined Systems Engineering process as is mandated in all federally funded ITS projects. The ATMS Strategic Plan will be developed consistent with the principles of the Systems Engineering Process for Intelligent Transportation System (ITS) project planning, design, implementation, and operations. Note that activities performed in Tasks 1, 2 and 3 of this study fall within “Phase 1” of the Systems Engineering Process as shown in Figure 1.

Figure 2-1: System Engineering Process



This memo provides an assessment of regional traffic management and TMC strategies. The Options and justifications provided are consistent with the Task 1 Goals and Objectives previously defined and approved by the CORE MPO, along with the traffic management improvement options assessed in Task 2. The assessment focuses on relevant TMC case studies, potential benefits of various regional traffic management deployment strategies, and regional traffic management system and TMC justification.

The following main sections are provided in this document:

- Introduction
- Purpose (this section)
- Lessons from TMC Case Studies
- Benefits of Regional Traffic Management
- Justification for Regional Traffic Management

3 Lessons from TMC Case Studies

The Consultant Team conducted four Traffic Management Center (TMC) case studies including GDOT in Atlanta, Cobb County, Georgia, Gwinnett County, Georgia, and Jacksonville, Florida. The centers offer a number of similarities as well as differences from the Coastal Region, in terms of the size of the region, institutional setting, coordination activities, and center configuration. It is valuable to address the range of options that are available for the deployment of regional TMC's and transportation management systems.

Each of the centers below are assessed as follows:

- Overview
- Operational capabilities;
- Level of integration with other adjacent or regional facilities;
- Levels of staffing;
- Annual operating costs;
- Sources of funding; and
- TMC operating agency, partners and stakeholders and agreements.

3.1 Georgia DOT Transportation Management Center – Atlanta

3.1.1 Overview

The GDOT TMC located in Atlanta is the headquarters and information clearinghouse for NaviGator, Georgia's Intelligent Transportation System (ITS). Operating 24 hours a day, 365 days a year, the TMC is committed to enhancing travel safety and transportation efficiency by managing incidents, controlling traffic, and providing accurate information to the traveling public.

3.1.2 Operational Capabilities

Georgia DOT's TMC provides 24/7/365: incident management including service patrol and state police dispatch; traffic management including ramp metering and a Regional Traffic Operations Program (RTOP); traveler information via Georgia 511; and emergency management. GDOT has heavily remodeled and reconfigured the TMC for \$2.9 million, concurrent with the development and expansion of tolled managed lane facilities. The managed lane facilities are operated by the State Road and Tollway Authority (SRTA) including the I-85 Express Lanes (currently in operation) and future facilities along I-75 (south leg), I-85 (extension of existing express lanes), and Northwest Corridor. The reconfiguration of the TMC to handle a larger number of operators and functions included a brand new floor plan with clustered workstations along with new system servers, revised video walls and wiring for video distribution throughout the building.

Figure 3-1: GDOT TMC in Atlanta



Source:

http://www.its3csummit.com/uploads/8/9/7/2/8972455/gdot_tmc_redesign_9-16-2014.pdf . Used with permission

3.1.3 Level of Integration with Other Adjacent or Regional Facilities

Both GDOT and SRTA personnel are based in the TMC. In addition, one Georgia State Patrol (GSP) dispatcher is located on the same console as the TMC supervisor. The center provides traffic and incident management along with traveler information functions through Georgia 511, as well as real-time traffic signal operations for GDOT-controlled signalized intersections, including active management of 28 Regional Traffic Operations Program (RTOP) corridors along key state highways in various jurisdictions.

RTOP represents a collaborative effort between GDOT and the local agencies which have operations and maintenance responsibility for the signals in the program. RTOP has agreements with multiple local government partners. Most of the signals in the program are connected through the "Regional Network", which uses the GDOT ITS freeway fiber network as its backbone. Signals which do not yet have fiber communicate via cellular network. The GDOT network is predominantly made up of two communication types:

- Direct connection to GDOT (Method A)
- Connection from local communications network across a firewall to GDOT (Method B)

RTOP Corridor Managers (contracted personnel who coordinate with GDOT and local agencies) are responsible for this coordination. System control of traffic signals is usually determined by the maintaining agency. Even though system control may reside with the local government, signal status can still be monitored at the GDOT TMC (signal in flash, loss of communications, etc.). GDOT maintains lead responsibility for signal timing activities in these corridors, with exceptions for localities

that need to override the corridor timing strategies. Traffic flow, vehicle and pedestrian detection, and signal controller operations are continuously managed and malfunctions addressed and monitored.

Other city or county signal operations systems or staff are not physically located within GDOT's TMC but may be based in separate TMC facilities (see Cobb and Gwinnett County TMC facilities discussed below).

3.1.4 Levels of Staffing

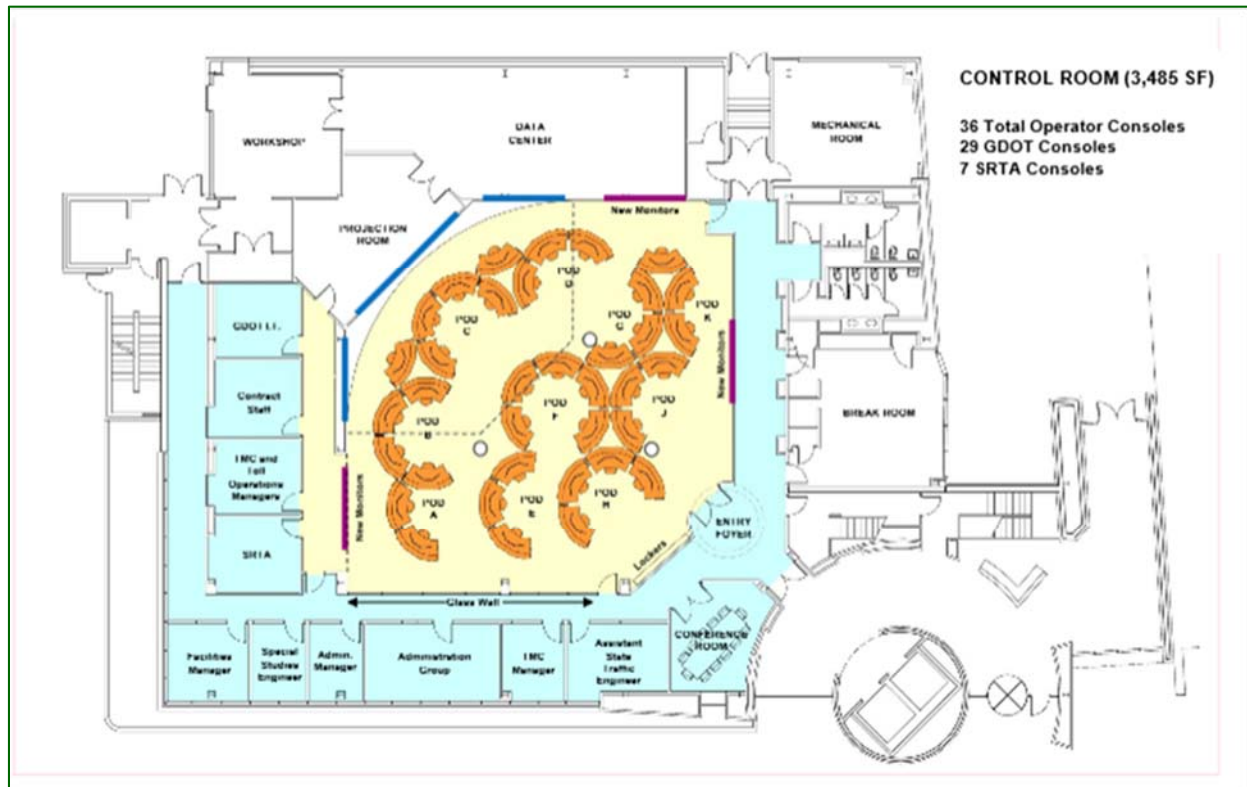
The TMC contains both operations staff and office staff within the TMC facility. Operations staff that can be accommodated in the control room include the following:

- Managed Lanes Console, 14 staff (11 managed lanes operators from GDOT or SRTA, 1 GDOT traffic specialist, 1 GDOT supervisor, and 1 SRTA supervisor)
- One GDOT Operations Console with Traffic Specialist, 4 staff (1 traffic specialist, 2 operators, 1 dispatcher)
- Four standard GDOT Operations Consoles, 3 staff each (2 operators, 1 dispatcher)
- RTOP Corridor Manager Console, 2 staff
- Supervisor / GSP Dispatch Console, 2 staff (1 GDOT supervisor, 1 GSP dispatcher)

The above represents a total of 34 workstation positions within the control room, although Figure 3 from GDOT shows a capacity of 36 positions.

The office space includes accommodations for up to 20 staff, including the Assistant State Traffic Engineer, 11 TMC and toll operations staff, administrative and IT staff, a Special Studies engineer, 5 contract staff and 2 SRTA representatives. In total, the TMC capacity would be 56 staff, not taking into consideration multiple control room staff shifts needed to provide 24/7/365 operation.

Figure 3-2: GDOT TMC Layout including remodeled control room (yellow) and office space (blue)



3.1.5 Annual Operating Costs

The GDOT TMC's current annual operating costs are about \$10 million. This includes outsourced operations staff. This figure does not include HEROs, ITS Maintenance, or software.

The current annual operating costs for the GDOT HEROs (Highway Emergency Response Operators) are about \$10 million.

The annual ITS Maintenance costs for the ITS devices in Atlanta (not including traffic signals) are \$5 million. This includes the following ITS devices in Atlanta:

- CCTV cameras: 654
- Video Detection System (VDS) Stations: 2,000+
- Changeable Message Signs: 141
- Ramp meters (metro Atlanta): 176
- ITS Hubs (metro Atlanta): 24

3.1.6 Sources of Funding

The operation and maintenance (O&M) of the TMC, including ITS maintenance* is funded through annual Federal projects dedicated to Operations and Maintenance. These O&M projects use NHS (National Highway System) funds. It is an 80% Federal and 20% State match system.

* For example, replacing an old CCTV camera.

New capital expansions of the ITS system (such as building a new 10 mile ITS segment) are funded similarly to a road building project, i.e. a programmed capital project. Funding source can vary from State funds to Federal funds.

The Georgia DOT HEROs (Highway Emergency Response Operators) are funded by an annual Federal project. There is also a sponsorship project in place with State Farm that partially funds their operation.

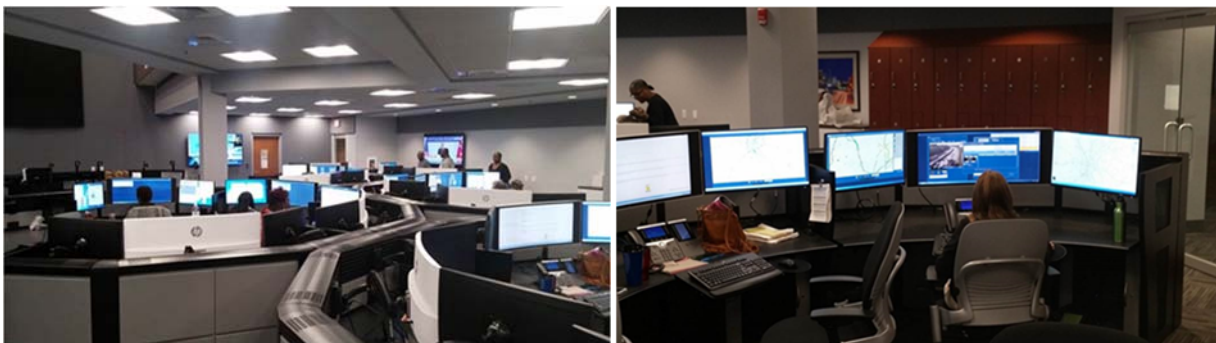
Managed lanes projects have lately been design/build style projects, funded through a mix of Federal and State funds. PPP (Public Private Partnerships) is another method sometimes used for Managed Lanes projects.

3.1.7 TMC Operating Agency, Partners and Stakeholders and Agreements

GDOT serves as the TMC operator, partnering with:

- SRTA for toll facility operations,
- local and county agencies for RTOP corridor operations,
- Georgia State Patrol (GSP) for incident management activities (including dispatch from within the TMC), and
- specific contractors for operations on the TMC floor, management of RTOP, and management of the Georgia 511 system.

Figure 3-3: GDOT TMC Control Room – Revised Console Layouts



4 Cobb County Regional Transportation Management Center (RTMC)

4.1 Overview

In June 2009, Cobb County DOT began construction of a new 24,000-square-foot Regional Transportation Management Center (RTMC) to house the management operations for Cobb County's Advanced Transportation Management System (ATMS). The RTMC features an Operations Room, where images from over 70 closed-circuit television cameras are monitored on nine separate operator consoles, as well as an 8' x 16' video wall. Over 500 traffic signals in the County's ATMS are controlled from the facility, as well as several arterial dynamic message signs providing important information to motorists regarding accidents, traffic congestion, alternative routes and expected delay times. Dispatching services for roadway and traffic signal maintenance are also managed through the RTMC. The building concept for the project was derived from a Transportation Management Center built by the Tennessee Department of Transportation (TDOT) in Nashville, Tennessee. GDOT and FHWA each provided approval of the plans and construction contracting and provided funds for completion of the project.

Figure 4-1: Exterior of the Cobb County Department of Transportation's Regional Transportation Management Center



Source: Cobb County Department of Transportation

Figure 4-2: Cobb County RTMC Control Room



Source: Gresham Smith

4.2 Operational Capabilities

The RTMC houses operations for the county's advanced transportation management system, including more than 70 traffic cameras, over 500 traffic signals, and 4 dynamic message signs. The system operates 12 hours a day, five days a week with two operators. The five-year plan for the ATMS program calls for the RTMC to ramp up to a 24-hour, seven-day-a-week operation. The center also manages the Cobb Commute web page which receives data both from the County as well as from GDOT's 511 system relative to traffic speed, incidents, road work, video images and dynamic message sign displays both on arterials and on Interstate highways through the county.

4.3 Level of Integration with Other Adjacent or Regional Facilities

Cobb County is networked with the GDOT TMC to support RTOP and data sharing activities. The traffic signals in the county are connected through a dedicated County fiber network for traffic operations.

4.4 Levels of Staffing

The RTMC currently is set up with nine operator positions. Currently there are two full time and two-part time control room operators.

4.5 Annual Operating Costs

Annual operating costs are \$3,000,000 for the Traffic Operations Division, TMC and Traffic Signal groups combined.

4.6 Sources of Funding

Combining FHWA Congestion Mitigation and Air Quality (CMAQ) and GDOT Advanced Transportation Management Systems (ATMS) funding sources, the county was able to assemble the capital need to go forward. These funding sources paid for 80% of the construction (appx. \$3.5 mil.), with the County providing a local match of 20% (appx. \$880k).

4.7 RTMC Operating Agency, Partners and Stakeholders and Agreements

Cobb County currently coordinates with GDOT for sharing of 511 information showing freeway traffic, CCTV and DMS, as well as RTOP activities on major arterials in the County. Additional coordination agreements are in place for traffic operations activities include the Georgia Regional Transportation Authority, and the cities of Atlanta, Marietta, and Smyrna.

Figure 4-3: Cobb County RTMC Layout



Source: <http://www.greshamsmith.com/projects/cobb-county-transportation-management-center>

5 Gwinnett County DOT Traffic Control Center (TCC)

5.1 Operational Capabilities

Gwinnett County's TCC provides real-time monitoring of arterial operations using traffic signal communications and 230 video cameras. The Intelligent Transportation System (ITS) system covers about 220 miles of major arterials in Gwinnett County using mostly fiber optic cable with some wireless links. The County has Ethernet connections to 488 of 705 traffic signals and uses closed loop dial-up to about 45 more. The County utilizes layer 2 networking for individual arterials and layer 3 networking for redundancy and aggregation. Layers refer to the different parts of IT network communications.

Figure 5-1: Gwinnett TCC Console with Video Wall in Background



Source: Gwinnett County Department of Transportation

5.2 Level of Integration with Other Adjacent or Regional Facilities

Gwinnett DOT provides county public safety personnel access at the 911 center, EOC, Police HQ and Fire HQ. They have integrated with the GDOT Navigator system so that county cameras are available to their staff and vice versa.

5.3 Levels of Staffing

Three engineers and 18 technicians work in the TCC. One engineer serves in the role of ITS & TCC management. The managing engineer has 2 traffic analysts that staff the TCC during each shift. One

shift is from 6 am to 3 pm and the other is 10 am to 7 pm, both Monday-Friday. An IT technician is also assigned to the TCC, with others supporting system operations and maintenance activities.

5.4 Annual Operating Costs

Gwinnett DOT spent a little over \$100,000 in 2015 with an on-demand contractor for camera maintenance and repairs to damage fiber cable. They spent about \$116,000 in 2014. There has also been about \$40,000 in equipment repairs or replacements each of those years.

5.5 Sources of Funding

The county's DOT Annual operating budget is the primary finding source. The construction of the TCC and ITS network were funded primarily from County SPLOST dollars that were leveraged to get state and federal funds (STP and CMAQ). The county has invested about \$22 million total in the system to date. It has taken about 35 separate construction projects over 10 years to get to this point.

5.6 TCC Operating Agency, Partners and Stakeholders and Agreements

The Gwinnett TCC is connected to Georgia DOT's Transportation Management Center via fiber. It is used to provide GDOT access to County cameras & the RTOP signals. The County has access to the GDOT cameras along the freeways. Both agencies put snapshots from the other's cameras on 511 & gcsmartcommute.com. Most of the internal County stakeholders have been handshake agreements. They have some intergovernmental agreements with GDOT for the Navigator integration. Gwinnett DOT developed an ITS Master Plan and TCC Master Plan in 2007 before opening its current TCC. Those have been most helpful in guiding Gwinnett DOT to date, but are due for an update.

6 North Florida Regional Transportation Management Center (RTMC)

6.1 Operational Capabilities

The North Florida RTMC, located in Jacksonville, Florida, covers 18 counties for Florida Department of Transportation (FDOT) and Florida Highway Patrol (FHP). The RTMC merged separate FDOT and FHP facilities into one center. The center opened in late 2015, with about 1,000 Centerline miles of roadway responsibility involving traffic and incident management activities, along with traffic signal operations on both freeways and arterials. In the Northeast Florida region, there are nearly 200 miles of freeway coverage including a fiber network for broadband communications with CCTV cameras, dynamic message signs and traffic detection.



Source: North Florida Transportation Planning Organization

6.2 Level of Integration with Other Adjacent or Regional Facilities

Integration between the various stakeholders (FDOT, FHP, Florida Fish and Wildlife Conservation Commission, etc.) was technically feasible but had to be addressed slowly due to multiple IT offices being involved in the effort and related sensitivity to network security and responsibility. As a result, it took 5 years to get a consensus for RTMC development although operations staff throughout the region were “all in” on this effort. Major changes were required to the region’s IT network architecture with varying protocols, firewalls and anti-virus software.

6.3 Levels of Staffing

The RTMC control room contains 32 operator workstations. Florida Highway Patrol staff number 12 per day (supporting 24/7 coverage), Fish & Wildlife staff number 4 per day (for 24/7 coverage), FDOT traffic operations staff are as follows:

1. One North Florida RTMC operator working a 13 hour shift on Interstates
2. One North Florida RTMC operator working a 24/7 shift on Interstates
3. Two RTMC operators working 10 hour shifts on Arterials
4. Two RTMC Supervisors working split shifts 40 hours per week each
5. One RTMC Manager working 40 hours per week
6. One RTMC PM working a 10 hour week
7. One Probe Vehicle operator working two 3 hour shifts (AM and PM peak)
8. One Network Administrator working a 40 hour week
9. One Assistant Network Administrator working a 40 hour week
10. One QA/QC Manager working a 20 hour week
11. Two TMC Consultants working on Performance Measures and Operational Analysis at a total of 30 hours per week

Jacksonville Sheriff's Office (JSO) staff number 4 for major events and targeting at least one on weekday hours.

Fish & Wildlife staff work closely with FDOT to monitor wildlife crossings, which allow wildlife to cross under roadways.

6.4 Annual Operating Costs

The FDOT spends about \$1.5 million per year on contracts to support operations and maintenance activities including the specific FDOT staffing described above.

The FHP, Sheriff's Office, Fish & Wildlife maintain the same level of staffing as previous to the move to the new RTMC. The cost savings are witnessed in reduced times for managing incidents and also due to the RTMC being certified as a LEED facility with Silver Certification. As an example, an annual utility expenditure of approximately \$300,000 was estimated but the invoices over the past few months show a reduction of approximately \$175,000 due to the LED lighting, sensors and building design.

6.5 Sources of Funding

Funding design and construction for the 25,600+ square foot RTMC is identified in the North Florida Transportation Planning Organization (NFTPO)'s Transportation Improvement Program, using Federal CMAQ funds including approximately \$1 million for design and \$9.75 million for construction. FHP provided some funding for operation consoles (approximately \$600,000), FDOT provided some office furniture, consultant staff, and construction support (approximately \$350,000). The NFTPO is co-located with the RTMC.

6.6 RTMC Operating Agency, Partners and Stakeholders and Agreements

Verbal agreements were drafted and are under review for signature. The draft MOU for FHP is included in Appendix A as an example.

7 Benefits of Regional Traffic Management

Transportation Systems Management and Operations (TSM & O) is strongly promoted by USDOT and is increasingly practiced throughout the public sector. By definition, TSM & O requires an emphasis on “regional integration”, as presented in the Task 2 technical memorandum. One of the key facets of regional operations is the concept of Integrated Corridor Management (ICM), also addressed in Task 2, which jointly addresses freeway, arterial and transit services in specific corridors, addressing opportunities to encourage alternate routing, mode shifts (to transit or ridesharing), and active management strategies to reduce personal travel delays.

Although the Savannah area and Coastal Region as a whole may have less population than areas such as Atlanta or Jacksonville, the geography and topography of the region, high rate of tourist traffic, and incident and evacuation needs for the region are all significant.

The FHWA Planning for Operations resources offer a view of potential benefits, institutional considerations, and processes associated with TSM & O. Specifically, the TSM & O Benefit-Cost Compendium is found at the following email address: (<http://www.ops.fhwa.dot.gov/publications/fhwahop14032/index.htm>). The compendium looks at different regional operations strategies and identifies potential performance measures, benefits and costs associated with various strategies. In general, regional TMC's are implemented in order to achieve the following:

- Reduce time and cost in managing non-recurring congestion and incidents
- Reduce overall person-trip delay for all routes, modes and combinations thereof, under recurring and non-recurring conditions
- Supervise emergency management of transportation network, including expediting evacuation and rescue efforts

The mechanisms for achieving these goals involve providing interagency coordination capability which reduces the decision-making needed to implement an incident management strategy, permits resources from different agencies to communicate with one another to influence specific operational responses (e.g., police managing the incident scene and advising the traffic operator which lanes will be closed and for how long). Multiple agencies may manage resources such as traffic cameras and traffic signals, especially with local agencies maintaining jurisdiction for their intersections. As the result of freeway closure due to roadwork or an incident, knowledge of the impacts of traffic using alternate routes is needed by those agencies operating arterial traffic signals on the alternate routes, as well as managing the flow on or off the freeway.

Table 1 indicates a “universe” of potential transportation performance benefits. Typical benefits for achieving successful regional TSM&O may be as highlighted in yellow below, and represent either primary benefits achieved through regional TMC operation or secondary benefits which occur as a result of the primary benefits.

To address the parameters described in the table, the benefits of regional TMC's go beyond the well documented benefits of implementing up-to-date coordinated signal timings along arterial roadways and include the more subjective benefits of integrating and coordinating transportation planning and traffic management operations among multiple agencies in a region. This will include integrating data collection from multiple sources, as well as processing and dissemination of information to governmental agencies, private entities and the general public via the many media channels available today. Traffic operations resulting from accidents and extreme weather conditions requiring evacuation are to be addressed as well as daily peak hour congestion. The end results of this are presented above, but need to be further detailed for any regional TMC development effort, particularly in light of issues related to interagency coordination and compatibility of systems and services, as well as even the agency mission statements.

Table 7-1: Potential ITS Performance Measures (TMC-related in yellow)

GOAL TYPE: MOBILITY
Trip-based travel time
Travel time reliability
Delay
Vehicle and person throughput
Average speed
Vehicle miles traveled (VMT) by congestion level
Lost time or delay due to congestion
Level of service or volume-to-capacity ratios
Vehicle hours traveled or VMT per capita
Person miles traveled (PMT) per VMT
PMT per capita or worker
Customer perceptions on travel times
Person hours traveled
Passenger trips per household

GOAL TYPE: ACCESSIBILITY
Average origin-destination travel times
Average trip length
Percentage of employment sites within x miles of major highway
Number of bridges with vertical clearance less than x feet

GOAL TYPE: OPERATING EFFICIENCY (SYSTEM AND ORGANIZATIONAL)
Cost for transportation system services
Cost-benefit measures
Average cost per lane-mile constructed
Origin-destination travel times
Average speed
Percentage of projects rated good to excellent
Volume-to-capacity ratios
Cost per ton-mile
Customer satisfaction

GOAL TYPE: ECONOMIC DEVELOPMENT
Economic cost of crashes
Economic cost of lost time
Percentage of wholesale, retail, and commercial centers served with unrestricted (vehicle) weight roads

GOAL TYPE: SAFETY
Number of crashes per VMT, year, trip, ton mile, and capita
Number of high crash locations
Incident response time
Incident clearance time
Crash risk index
Customer perception of safety
Construction-related fatalities

GOAL TYPE: ENVIRONMENT
Tons of pollutant emissions
Number of days in air quality noncompliance
Fuel consumption per VMT or PMT
Number of accidents involving hazardous waste

GOAL TYPE: QUALITY OF LIFE
Lost time due to congestion
Accidents per VMT or PMT
Tons of pollutant emissions generated
Customer perception of safety and urban quality
Average number of hours spent traveling
Percentage of population exposed to noise above certain threshold

GOAL TYPE: SYSTEM PRESERVATION
Percentage of VMT on roads with deficient ride quality
Percentage of roads and bridges below standard condition
Remaining service life
Maintenance costs
Roughness index for pavement

Benefits studies for regional TMC implementations have, to date, yielded the following representative results:

- Houston TranStar, established in 1994, combines the operations of Texas DOT freeways and arterials with traffic signal operations for the City of Houston and Harris County, along with Metro transit operations, including bus and light rail facilities, along with express lane operations. Police and other stakeholders are situated in the center to support the dispatch of first responder services. Texas Transportation Institute evaluated Houston’s TranStar operation in 2010, estimating a 9.9:1 benefit-cost ratio based on reduction in delay, fuel consumption and GHG’s over a thirteen-year period of operation, along with reductions in the number of fatalities and property damage as a result of improved incident and emergency response activities.
- The Georgia NaviGator system is situated in the statewide TMC in Atlanta as presented earlier. According to the TSM & O Benefit-Cost Compendium, the results (developed by GDOT over a two period, 2003-2004) indicated three benefits types: 1) reduction in travel delay, 2) savings due to delay reduction, and 3) savings due to secondary crash reduction. The results indicated a benefit-cost ratio of 4.4:1, based on the following parameters:

Table 7-2: Benefit-Cost Summary for the Georgia NaviGator

ANNUAL BENEFITS (2003-2004)	
Mobility – incident delay savings	\$152,053,180
Environmental – reduced emissions	\$20,243,009
Environmental – reduced emissions	\$10,365,969
Safety – reduced secondary crashes	\$1,611,054
Customer Satisfaction – motorist assistance	\$2,955,323
Total Annual Benefits	\$187,228,535
ANNUAL COSTS	
Total Annual Costs	\$42.5 million
BENEFIT-COST COMPARISON	
Benefit-Cost Ratio	4.4:1

Source: FHWA, Georgia DOT

8 Next Steps: Justification for Regional Traffic Management

Information gathered in this and other tasks will be organized and formatted for use in informing and educating non-technical personnel about the benefits of taking a regional approach to traffic management in the Chatham County region. Various materials including presentations and other promotional materials will be prepared to raise the awareness of regional traffic management center facilities.

It is anticipated that presentations will be made to management level staff and decision makers. All presentation materials and files will be provided to enable the presentation to be presented and adapted by MPO staff, as necessary in the future. A final stakeholder meeting will also be held to gain input from a broad cross-section of stakeholders.

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