



Intelligent Transportation Systems

Douglas County Comprehensive Transportation Plan

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INTRODUCTION

To meet future challenges, traffic operations strategies are an essential and affordable alternative to major capacity additions. The goal of Intelligent Transportation Systems (ITS) is to maximize the performance of the county's existing transportation infrastructure to facilitate safer, faster travel and enhanced mobility for the public. Douglas County has identified ITS as an important element of their Comprehensive Transportation Plan (CTP). A key ITS service is Advanced Traffic Management Systems (ATMS), which includes hardware, software, networking, and operations necessary to monitor and control traffic signals and other ITS devices.

Douglas County ITS-related infrastructure consists primarily of traffic signal systems. Although Douglas County does not currently have ITS infrastructure, the County has identified ITS as a vital feature of future overall transportation investments in the CTP. The ITS emphasis coupled with the CTP process exemplifies the Douglas County Mission Statement which is:

Douglas County will greet the future, while at the same time preserving its small town feel, its safe and rural environment, its valued historic and natural resources, and the continued creation of a quality built environment, while maintaining and developing a reasonable, balanced tax base.

Although ITS is not specifically mentioned in the mission statement, it will help prepare the county for the future. ITS provides a communications infrastructure and physical devices in the field, that when managed by a proactive and well-trained operations staff, can improve mobility and mitigate congestion.

The Atlanta Regional Commission completed the *Atlanta Regional ITS Architecture* in June 2004, which plans for regionwide deployment of ITS. Douglas County seeks to implement the vision and goals presented in the *Atlanta Regional ITS Architecture*. The regional ITS vision includes:

- developing an extensive communications network that will provide direct, real time vital transportation information to any local and state agency that participates in transportation and/or emergency management operations within the ten-county Atlanta region,
- providing real-time traveler information through various media to the public,
- providing an institutional environment that emphasizes efficient operations of the transportation system and provides technological tools that enhance the operations of all transportation and incident response agencies, and
- developing a process that monitors system performance and allows for system growth and enhancement.

In the context of this regional vision, Douglas County seeks to participate as both a receiver and disseminator of pertinent traffic information to help other state and local agencies with their transportation needs. In order to achieve this vision, Douglas County shares with the rest of the Atlanta Region the following goals:

- Improve multi-jurisdiction coordination and cooperation
- Improve incident management, reduce incident response times
- Improve communications and information sharing among agencies
- Disseminate real time multi-modal travel information
- Improve traffic management
- Improve the overall safety of the transportation network; reduce crashes
- Reduce non-recurring congestion, reduce delay and travel time and improve traffic flow and travel speed
- Improve air quality
- Enhance the security of the transportation infrastructure
- Improve roadway and transit systems capacity
- Improve regional integration, storage, and retrieval of ITS data for system planning and performance measures, tracking, and incident documentation

Douglas County's inclusion of an ITS/ATMS Plan as part of the overall CTP is a first step toward reaching these goals. The goals can be achieved through better management of the existing transportation system enabled by the implementation of ITS and better coordination among the transportation and incident response agencies.

The ITS section provides a guide for the county to better plan for what, when, where, why and how to implement ITS. Specific sections include:

- Source Documents – a review of the existing related planning documents.
- Existing ITS Infrastructure and Transportation System – a summary of the current transportation system in Douglas County, including existing and planned ITS elements.
- Stakeholder Input – a summary of the stakeholder involvement process including interviews, workshops, and synthesis of the results.
- Planned ITS System – a recommendation for implementing ITS in Douglas County based on current status and stakeholder input.
- ITS/ATMS Projects – following overall policy recommendations, this section recommends ITS projects the County could consider implementing in the short term as “early winners.”
- Implementation Strategy – a description of ‘next steps’ to implement ITS throughout the county.

SOURCE DOCUMENTS

The following is an overview of the available resources used in developing the ITS/ATMS Plan for Douglas County. These resources included extensive prior stakeholder input during development, which is still applicable for use in the ITS/ATMS Plan. The plan builds upon past knowledge but does not replace the original resources summarized below.

- Atlanta Regional ITS Architecture, Atlanta Regional Commission (Amendment #1: July 2004) – ARC maintains the Atlanta Regional ITS Architecture in accordance with federal government regulations and policies for ITS deployment. Its purpose is to enable transportation agencies in the region to share traffic systems operation knowledge, thus improving the overall safety and efficiency of the transportation system. The Atlanta Regional ITS Architecture describes the individual functional components of the NaviGator program and other elements of the recommended ITS system.
- Douglas County Comprehensive Plan, Transportation Element (March 2005) – This document includes a summary of the current transportation situation in the county. The county maintains the document and uses it as a guide for managing transportation resources throughout the county, but particularly in the rural sections.

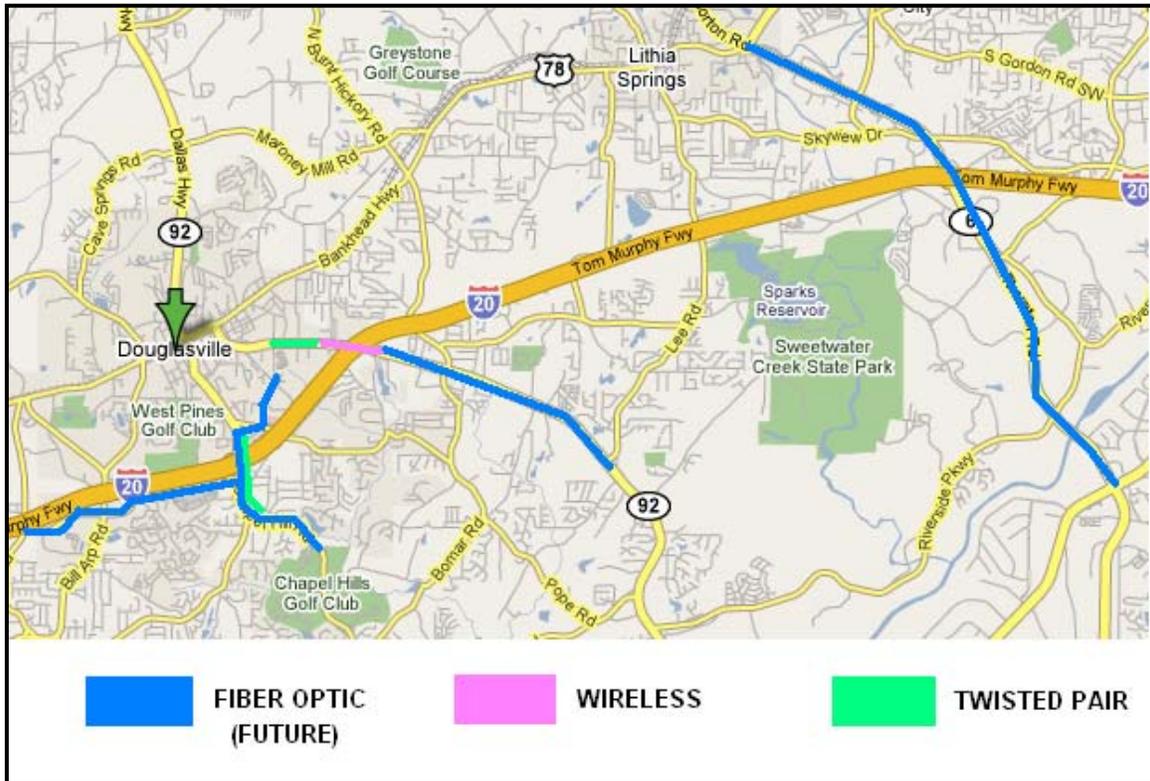
EXISTING ITS INFRASTRUCTURE AND TRANSPORTATION SYSTEM

Douglas County is a growing segment of the Atlanta metro area located along I-20. The county seat, Douglasville, is the County's largest city and its hub of commerce and business. One federal and several state highways pass through the county, most of which also pass through the city of Douglasville. The county shares the management of traffic signals with the Georgia Department of Transportation (GDOT). Douglas County maintains and operates most signals in the City of Douglasville.

ITS-related infrastructure in the county primarily consists of traffic signal systems. However, a fiber optic network services the Douglas County School System that could be used to provide the School System's Transportation Department real-time access to county traffic information. In addition, there are other communication medium, legacy twisted pair and wireless, installations as well as several fiber optic cabling projects in the county in various stages of completion that will provide communication to signals and other ITS field devices in the near future. Figure 1 displays the existing ITS components.

With a cooperative effort from area jurisdictions, ITS infrastructure could be substantially enhanced. The following describes roles and responsibilities each organization within the county that may implement ITS.

Figure 1: Douglas County Communications Network



DOUGLAS COUNTY DEPARTMENT OF TRANSPORTATION

- Incident management
- Traffic signal control on arterials
- Arterial traffic prediction capability
- Develop arterial alternate route plans and provide information to other operating agencies
- Compile and maintain incident data

COUNTY AND CITY DEPARTMENTS OF PUBLIC WORKS & MAINTENANCE (DOUGLAS COUNTY, DOUGLASVILLE, AUSTELL AND VILLA RICA)

- Manage work zones and disseminate maintenance and construction work activity information to transportation operating agencies and the public.
- Operate road condition and maintenance resource database.
- Process current and forecast weather data, road condition information and local environmental data, and use internal models to develop specialized detailed forecasts of local weather and surface conditions.

- Recommend maintenance courses of action based on current and forecast environmental and road conditions and additional application specific information.
- Track the location of maintenance and construction vehicles and other equipment through manual means.

DOUGLAS COUNTY 911 CENTER

- Identify necessary responding resources and incident notification to emergency responders (police, fire, medical, HAZMAT etc.)
- Provide incident information to other incident response agencies.
- Dispatch emergency vehicles.
- Initiate and monitor coordinated incident response.
- Take emergency calls, collecting available information about the caller and the reported emergency, and forwarding this information when necessary.
- Develop and store emergency response plans.

COUNTY AND CITY POLICE, SHERIFF, EMS, FIRE AND RESCUE (DOUGLAS COUNTY, DOUGLASVILLE, AUSTELL AND VILLA RICA)

- Provide incident management: verification, response and clearance.
- Provide incident status updates to the 911 center and operating agencies.
- Close roads and notify the 911 center and operating agencies.
- Restore roadway capacity and provide information to 911 centers and operating agencies.
- Enforce traffic laws.
- Enforce of red light running violations.
- Provide a direct communications interface between the emergency vehicle and public safety personnel.

ITS STAKEHOLDER INPUT

ITS stakeholders were identified throughout the county for input on the overall ITS/ATMS Plan. The goal of stakeholder involvement was to receive comments on:

- the future vision for ITS
- future ITS needs
- roles and responsibilities in planning, deploying, operating and maintaining ITS

On February 20, 2008, two workshops were held to solicit and record input from key stakeholders. The first meeting included public safety and emergency management professionals. The second meeting included representatives from the county and city transportation and planning departments as well as from the adjacent counties of Cobb and Paulding.

An overview of the CTP, an overview of ITS technology, and discussion centered on how an ITS-based ATMS could improve the County's surface transportation was presented. In

addition, each group participated in two interactive exercises to identify roadway deficiencies and potential ITS solutions. Participants received a follow-up questionnaire to augment and validate the meeting discussions. In general, both stakeholder meetings had good representation of the relevant stakeholders.

An overview of the participants in each stakeholder group and a brief summary of the information gathered follows. A more detailed summary of the stakeholder interviews is contained in Appendix A.

ORGANIZATIONS REPRESENTED

- Douglas County 911
- Douglas County EMA
- Douglas County GIS
- Douglas County Information Services
- Douglas County Fire/EMS
- Douglas County Board of Commissioners
- Douglas County Schools
- Douglas County Water System Authority
- Douglas County Department of Transportation
- Douglas County Rideshare
- City of Douglasville
- Paulding County Department of Transportation
- Cobb County Department of Transportation
- Georgia Department of Transportation

CURRENT/FUTURE PROBLEMS AND CONCERNS

- Drainage on I-20 near Tyson Rd
- Signs and striping
- Holiday traffic at Arbor Place
- Railroad crossings
- Congestion along major arterials
- Local incident management
- Rural growth areas

SOLUTIONS DISCUSSED

- Douglas County Traffic Control Center (TCC)
- Highway Advisory Radio (HAR)
- HERO Expansion (division of NaviGator)
- Public Relations
- Arterial Changeable Message Signs (CMS)
- Automated Vehicle Location (AVL)
- Early Warning System
- Fiber optic cable for ATMS

CTP STAKEHOLDER INTERVIEWS

Prior to the ITS Stakeholder interview process, planning-related stakeholder interviews were held in September 2007 as part of the development of the CTP. A summary of the results that are related to ITS implementation follows.

- Safety at railroad crossings – alternate routes for emergency vehicles, warning systems
- Truck traffic – alternate routes and/or better management of flow through Douglasville; traffic signal timing schemes
- Federal and State funding shortfalls – need to find additional funding as well as alternative, more cost-effective solutions.
- Utilization of Public Transportation – improve station safety and broadcast schedule information
- Better regional incident management – better coordination and communication including information sharing

POTENTIAL ITS CORRIDORS

As a growing part of the Atlanta metro area, Douglas County is experiencing increasing congestion. Regional forecasts indicate that congestion will continue to rise through the plan's horizon year, 2030. Commuter traffic from Paulding and Cobb counties passing through the Douglas County to access I-20 is contributor to congestion. Another issue is the development around the Arbor Place Mall and surrounding shopping district. Routes that may benefit with improved traffic flow from an ITS solution follow:

- Chapel Hill Road/Campbellton Street
- SR 5/Bill Arp Road
- SR 92/Fairburn Road (Dallas Highway)
- SR 6/Thornton Road
- US 78/Bankhead Highway (Broad Street)
- Rose Avenue
- Chicago Avenue

By implementing ITS solutions along these corridors, traffic congestion should be managed due to controlled signal timing schemes and enhanced incident management.

ITS SYSTEM INPUT

The ITS System Concept for Douglas County was derived from information extracted from existing documents such as the *Atlanta Regional ITS Architecture* and the county's Comprehensive Plan, a survey of existing ITS in the county as well as interviews and discussions with ITS stakeholders.

Information obtained from these sources was used to determine ITS market packages that are relevant to Douglas County. ITS Market Packages are bundled solutions that address specific transportation issues. Most of the described market packages require a countywide Traffic Control Center (TCC) and communication between the TCC to traffic signals and other ITS field devices. The following sections highlight recommended activities and implementation procedures.

RELEVANT MARKET PACKAGES

The *Atlanta Regional ITS Architecture* is an important resource to ensure that the County deploys ITS in a manner consistent with the Atlanta region. The *Atlanta Regional ITS Architecture* includes the following high priority market packages:

- *Network Surveillance* – Freeway and Arterial communications, CCTV, detection, CMS
- *Surface Street Control* – Arterial communications, CCTV, Traffic signal controller upgrades, Traffic signal intersection upgrades, Traffic signal timing adjustments, Adaptive signal upgrade and timing
- *Regional Traffic Control* – Transportation Control Centers for Local Agencies (Douglas County TCC)
- *Incident Management* – Roadway Service Patrols (HERO Operation Expansion)

Though each of the market packages is relevant, the packages that improve arterials are of main importance for Douglas County. GDOT takes the lead role in interstate operations with the county's support. Other regional transportation priorities are the following market packages:

- Managed Lanes
- *Traffic Information Dissemination* – Arterial Changeable Message Signs
- *Emergency Response* – AVL and MDT in emergency vehicles
- Transit Vehicle Tracking
- Transit Fixed-Route Operations
- Transit Passenger and Fare Management
- Transit Traveler Information

Of the market packages listed, traffic information dissemination and emergency response are most relevant to Douglas County's ITS/ATMS Plan. Although enhancement of GRTA's Xpress bus service originating from the county's Transportation Center using ITS solutions is possible, no specific project related to transit was recommended. ITS related to transit should be re-evaluated in future updates to the CTP as Douglas County implements local transit operations.

During the February 2008 stakeholder meetings, the attendees validated the high-priority market packages from the regional architecture. The county's top priorities matched GDOT's in three out of four instances. The one exception was placing Emergency Response as a higher priority than Regional Traffic Control. The *Atlanta Regional ITS Architecture* does not include two additional market packages that may be beneficial to Douglas County.

- Speed Monitoring (ATMS19) – systems designed to capture and display real-time vehicle speeds to motorists
- Standard Railroad Grade Crossing (ATMS13) – systems designed to mitigate issues related to at-grade railway crossings

They were not included in the original Regional Architecture because at the time of publication, the relevant stakeholders may not have indicated a need, or the need was

not determined at the time to be of a high enough priority to include the Market Package in the Architecture. Two of the recommended projects for Douglas County pertain to these market packages. If these projects are approved by Douglas County, procedures to add these market packages to the regional architecture should be explored and completed before these projects could receive federal funding.

In summary, the market packages identified as being of primary interest to Douglas County include:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)
- Incident Management (ATMS08 & EM04)
- Emergency Response (EM01)
- Traffic Information Dissemination (ATMS06)
- Regional Traffic Control (ATMS07)
- Speed Monitoring (ATMS19)
- Standard Railroad Grade Crossing (ATMS13)

Short-term “early winner” projects described under ITS/ATMS Projects relate to one or more of these identified priority market packages.

PLANNED TCC AND FUNCTIONALITY

In addition to upgrading the fiber optic communication network, a high priority ITS project is the establishment of a Traffic Control Center (TCC). Within the TCC, operators will manage ITS devices, including traffic signals, perform tasks that mitigate congestion and safety issues, and report information to regional partners.

Douglas County may implement a countywide TCC in two phases. Phase One is a ‘mini’-TCC, consisting of one or more workstations and/or servers and a wall-mounted wide-screen monitor. Phase One only requires a portion of a room or office to accommodate the ACTRA Traffic Signal Management software system. The other short-term projects will also be managed through the TCC.

Potentially, Phase Two could be a stand-alone building, or a larger room (or set of rooms) within the current or expanded Douglas County Transportation Center. This facility could contain an operations room where one or more operators seated at workstations perform traffic operations. The TCC would likely include one or more wall-mounted video screens to enhance monitoring capability. Phase Two should include a conference room for meetings. There also should be dedicated office space for one or more supervisors and other management staff. The following features are recommended for the Phase Two TCC.

Facilities

The Douglas TCC will initially be large enough to house two operator consoles and additional work areas for legacy computer systems. The TCC would provide a conference area that doubles as a command center in times of severe weather or major traffic incidents. The facility should include a set of large viewing screens for the viewing video

or data from all angles on the TCC floor. An equipment room to store the TCC's computer and communication equipment over the next 10-12 years will be necessary.

Equipment/Hardware

Hardware required to support the TCC will be distributed between the field, the main area of the TCC and the equipment room. The TCC hardware will provide for the human interface to the system and the equipment room hardware will provide communications and server support to field devices and other systems.

Field equipment controlled from the TCC will include closed circuit television (CCTV) cameras for traffic surveillance and traffic signal controllers for control of traffic. Future equipment may include cable television access, Internet access, travel time detection sensors, changeable message signs (CMSs), highway advisory radio (HAR) stations, and other features.

Software

The TCC will connect several different systems, each requiring separate software for access and control. Some of the various software components required in Phase Two include:

- Traffic Signal Central Software (ACTRA system)
- NaviGator Access Software – currently being upgraded to a web-based system
- Display control software for video wall
- County software for e-mail, timesheets and other applications

Personnel

The following is a description of the skill sets required by staff in the Phase Two TCC. In practice, one person may fill more than one of these roles. In addition, some functions associated within the TCC will require assistance from other organizations within the county such as information services and facilities.

- *TCC Manager* – Responsible for the overall operation of the Douglas County TCC, the manager must have the authority to supervise the TCC Operators and organize staffing and training schedules. The manager must be able to interact effectively with others in charge, including signal maintenance, public safety, information technology, higher levels of management, equipment vendors, suppliers, and the public. The manager should be well versed in the operation of all TCC systems and should develop and update TCC standard operating procedures.
- *TCC Operator* – Responsible for performing the day-to-day operations of the TCC, the Operator must be able to operate the basic TCC systems such as the surveillance cameras and traffic signal control software. Operators do not need to be capable of developing traffic signal timing plans; however, they should be competent enough to upload/download signal timing databases as required by the Traffic Engineers and Technicians. The Operator must be capable of viewing signal operation and correcting signal operational problems that arise.

- *TCC Systems Administrator* – Responsible for maintaining the computers and computer systems utilized in the TCC, the Systems Administrator must understand the connectivity of the field devices to the system, including IP addressing. This administrator will most likely be a computer systems professional capable of supporting the TCC.

Functionality

The Douglas County TCC will be the location for command and control of ITS assets. From the TCC, upon full Phase Two implementation, the Operator or Engineer will be able to:

- Connect to Douglas County traffic signals and CCTV cameras as well as any other ITS devices
- Communicate with GDOT/NaviGator and share video feeds
- Communicate with other centers (such as Douglas County 911) and agencies (i.e. Police, Fire, EMA, Sheriff) through the County
- Communicate with Norfolk Southern Railroad
- Notify the public of traffic congestion, emergencies or incidents
- Integrate with the Georgia Statewide 511 System

PLANNED COMMUNICATIONS STRATEGY

TCC personnel will be required to communicate with personnel outside of the TCC on a regular basis to accomplish tasks. Communications to other departments such as traffic signal maintenance technicians in the field, the 911 Dispatch Center, and others will require a combination of telephones, radio/microwave systems and fiber optic links.

As part of the ITS/ATMS Plan, the following are a set of guidelines, strategies and recommendations for the necessary communications infrastructure in Douglas County. A Comprehensive Communications Plan could be part of the proposed ITS Master Plan Project, described in the ITS/ATMS Projects section or alternately programmed as a separate project.

The Role of Communications in ITS

Communications is the means by which transportation systems gain intelligence. The establishment of a communication network in the locations where ITS field devices are anticipated and/or proposed is a primary consideration of the county.

General Network Recommendations

The county will require a fiber optic network backbone, originating from the Douglas County TCC and serving traffic signals and any future ITS field devices. The backbone conduit would follow major arterials and/or I-20 forming a fiber ring topology, meaning that the backbone has no start or end and forms a complete circuit. The ring design provides a path to re-route network traffic in the case of an outage on the main network. GDOT's current ethernet standards for communicating with field devices is recommended.

As shown in Figure 1, the completion of a fiber ring would necessitate additional sections of fiber optic communications along major arterials into downtown Douglasville. With the

exception of a small gap between the Courthouse at the Dorris Road/Hospital Drive intersection and the Fairburn Road/Hospital Drive intersection, a possible southern segment of a potential loop is already planned or under construction.

Utilization of Current Network

The use of one of the following methods will provide remote communication to devices not connected to a fiber network.

- Wireless
- Cellular
- DSL
- Dial-up Leased Line

All of these communications options have pros and cons that require further investigation. An important factor is the availability of a telephone network near the remote ITS field device to be connected. Other considerations include the quality/resolution of data required and the project budget.

There are a few small sections of wireless and twisted-pair communications in the county as shown in Figure 2. Also shown are a few segments of fiber optic communications that are under construction, scheduled for construction, or planned for the future. Plans are underway to upgrade each of these to fiber optic communications in the future. Additionally, there is a partially complete fiber network as well as connections under construction between several Douglas County schools. Specifics of the current and future network could be evaluated for utilization by the Douglas County ITS in the Comprehensive Communications Plan - a recommended sub-project of the ITS Master Plan. The TCC should collaborate with the school system to fully utilize the fiber network to route buses and manage resources such as school zone flasher timing more efficiently. Bandwidth may be available through private fiber network providers who lease 'dark fiber' - fiber that has already been laid but is not being used.

Fiber networks require cable drops at locations where ITS field devices are needed, such as at signalized intersections. As a result, use of alternatives may be limited to runs between devices and/or the Douglas County TCC.

Network Implementation Strategies

As the County implements an ITS network to support field devices and operations, the following strategies should be considered.

- *Connect to other command and control centers*

The TCC will be connected to the ITS fiber optic network backbone along with other command and control centers throughout the County. Such centers include the Douglas County 911 Center. The ability to transfer information between DCDOT and the public safety subsystem (Police, Fire, and EMS) is important in performing regional incident management. The DCDOT Maintenance and Construction Facility should also be connected to expedite dispatching of county vehicles to job sites and facilitate the distribution of traffic control devices - especially during emergencies, lane closures, or detours.

- *Add fiber to road construction projects*

A comprehensive and accessible fiber optic network is a requirement for a successful ITS system; however, the cost of installation is significant. Savings will result from installing fiber optic cable in conduit whenever possible, including county construction projects.

- *Communicate with GDOT*

Continued communications with GDOT Traffic Operations by Douglas County will remind decision-makers that cable installation along I-20 is a high priority. Although future access to NaviGator will not 'require' a physical connection to the current GDOT NaviGator network, a physical connection is necessary for optimum performance. Extension of the fiber network west along I-20 was delayed by a future road project that will add Truck-Only Toll (TOT) lanes on I-20.

- *Consider off-the-shelf alternatives for short-term remote ITS devices*

Some of the proposed projects require communication to the future TCC from locations where fiber optic cable is not recommended. Devices that do not require fiber optic cable can be integrated into the NaviGator system in the future. However in the short-term, purchasing a stand-alone system may be the best alternative for the county.

ITS/ATMS PROJECTS

One of the functions of the ITS/ATMS Plan was to identify long-term projects and to itemize and prioritize short-term/early-winner ITS projects for the county. Early-winner projects can be implemented immediately without a complete recommended fiber optic network in-place.

Recommending details of long-term projects requires a more detailed analysis. As further described in Section 6.3, Item ST-5, an ITS Master Plan is recommended for a more thorough analysis of Douglas County's future ITS implementation.

The methodology for developing a list of potential early-winner projects follows:

- Analyze stakeholder input from the surveys and the February 20, 2008 workshops
- Identify present and future high-level and mid-level congested corridors (as identified in the Comprehensive Transportation Plan), and
- Conduct a gap analysis of the existing and planned ITS projects.

PROGRAM FUNDING

Table 1 provides a tabular summary of recommended projects and estimated construction costs.

Table 1: Summary of Recommended Projects

No.	Projects	Estimated Capital Costs	Estimated O&M Costs/Year
ST-1	Douglas County Traffic Control Center – initial	\$25,000-40,000	\$4,000-6,000
	Douglas County Traffic Control Center – complete	\$100,000-200,000	\$15,000-30,000
ST-2	Trouble Spot CCTV Surveillance	\$40,000-60,000	\$4,000-6,000
ST-3	Early Warning - Speed Monitoring System	\$35,000-50,000	\$3,500-\$5,000
ST-4	Railroad Crossing Warning System	\$500,000-700,000	\$50,000-70,000
ST-5	Douglas County ITS Master Plan	\$195,000	n/a
	TOTAL	\$895,000-1,245,000	\$76,500-117,000

Funding for ITS projects is available from federal, state, or local resources. Federal funding programs fall under the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), which authorizes the federal surface transportation programs for highways, highway safety, and transit for fiscal years 2005-2009. Locally funded projects have various means to obtain funding resources including imposing a Special Purpose Local Options Sales Tax (SPLOST) or the creation of a Community Improvement District (CID).

Transportation projects utilizing federal funds must be included in an approved Transportation Improvement Program (TIP). The Atlanta Regional Commission (ARC), the designated Metropolitan Planning Organization (MPO) for the Atlanta region, prepares the TIP in conjunction with the Georgia Department of Transportation (GDOT), the Georgia Regional Transportation Authority (GRTA), the Metropolitan Rapid Transit Authority (MARTA), local governments and other project sponsors. Funding regional ITS projects with federal monies requires a series of steps to ensure the project meets guidelines as set by the Federal Highway Administration (FHWA).

1. Review the Regional Architecture to ensure project is consistent with requirements.
2. Submit TIP application for approval to ARC when a “call for projects” is solicited for projects to be included in the TIP. Provide project descriptions along with any other supporting documentation.
3. If approved by ARC, the project is programmed into the TIP for the appropriate fiscal year. The TIP is then incorporated into GDOT’s Statewide Transportation Improvement Program (STIP) for final approval.
4. GDOT is then tasked with the responsibility of coordinating and executing agreements with local jurisdictions to authorize federal funds.

5. Once federal funds are authorized, project work can begin following GDOT's Plan Development Process (PDP).

The federal aid programs listed below are some of the sources of federal funding that can be used for ITS-related projects.

- *Congestion Mitigation and Air Quality Improvement Program (CMAQ), Program Code L400*: Provides funding for projects and programs in air quality non-attainment and maintenance areas for ozone, carbon monoxide (CO) and particulate matter which reduces transportation related emissions. CMAQ also provides funding for projects that improve transportation systems management and operations that mitigate congestion and improve air quality. Douglas County is included in the Atlanta non-attainment area.
- *Surface Transportation Program (STP) Fund for urbanized areas with populations over 200,000, Program Code L230*: Provides funding that may be used by states and localities for projects on any federal-aid highway, including the NHS, bridge projects on any public road, transit capital projects and intracity and intercity bus terminals and facilities. STP also provides funding for projects related to intersections that have disproportionately high accident rates, high congestion levels, and are located on a federal-aid highway.
- *National Highway System (NHS), Program Code L050*: Provides funding for improvements to rural and urban roads that are part of the NHS, including the interstate system and designated connections to major intermodal terminals.

Potential local funding sources include:

- *Special Purpose Local Options Sales Tax (SPLOST)*: Douglas County has a history of using SPLOST funding, however, the most recent program failed by a slim margin to receive public approval.
- *Community Improvement District (CID)*: Commercial property owners, through a public-private partnership, can form a CID. Geographically defined CIDs allow commercial property owners to self-impose a tax to pay for projects. To implement a CID, a majority of property owners holding at least 75 percent of the assessed property value in the area must vote affirmatively. Once created, funds are collected by the taxing authority and provided to the Board of Directors elected by the property owners. The board is responsible for determining funding and managing the process and for identifying and retaining staffing resources necessary to conduct daily operations.

Funds collected through a CID may be used for a number of applications including public transportation, street and road construction and maintenance, and parking, terminal and dock facilities type projects. CID funds can also be used to leverage additional public and private funds. There are currently no CIDs located within the County, however, several exist in the region.

- *Fast Forward Bond Program*: Encompassing three types of bonds; Grant Anticipation Revenue Vehicles (GARVEE) Bond, Guaranteed Revenue Bond (GRB) and General Obligation (GO) Bond, this funding source allows the State to sell



bonds to expedite the construction of federally approved operations projects. The majority of bonds sold are GARVEE.

RECOMMENDED PROJECTS

Figures 2 and 3, illustrate the recommended short-term “early winner” ITS projects for Douglas County in a geographic and functional context. Note that the projects address issues in urban, suburban and rural areas of the county.



Figure 2: Recommended Early Winner Projects – Geographic

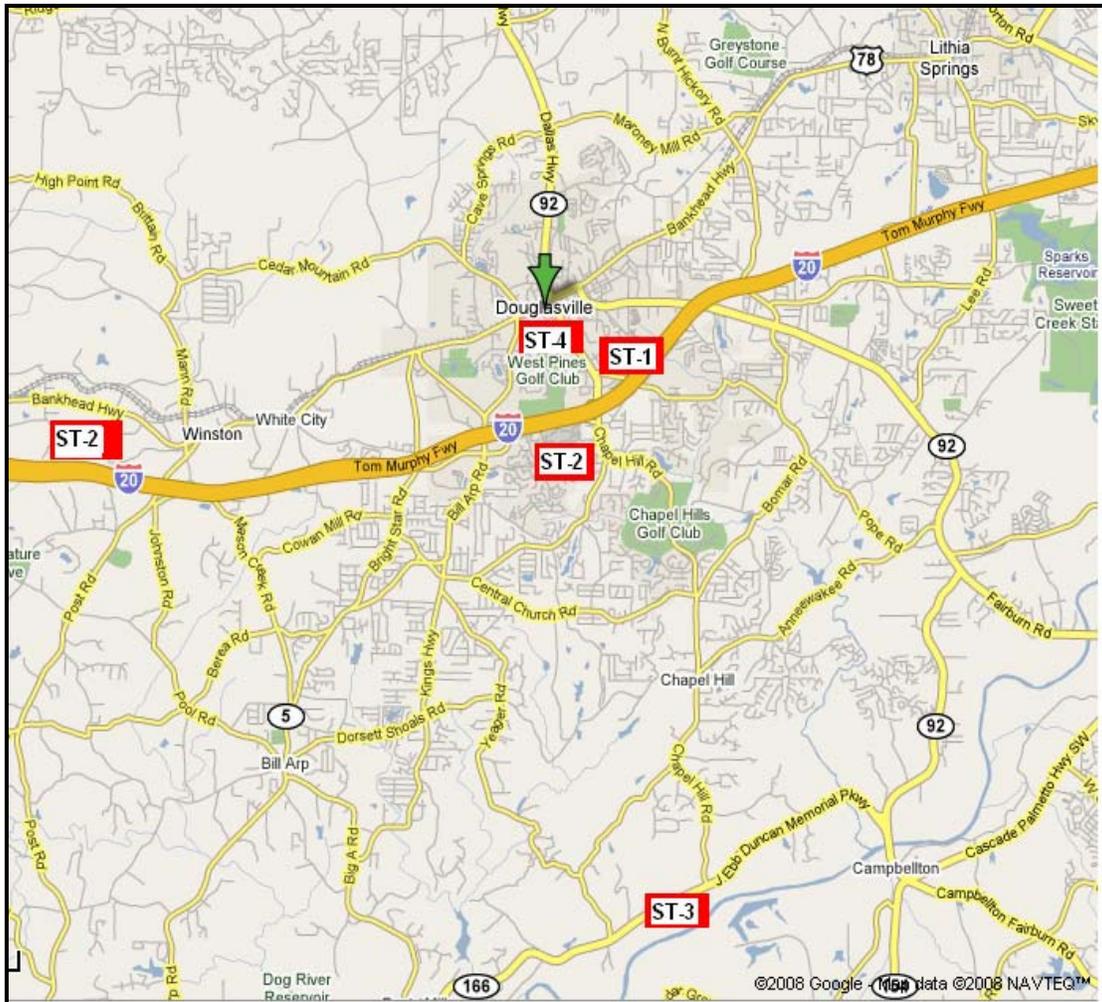
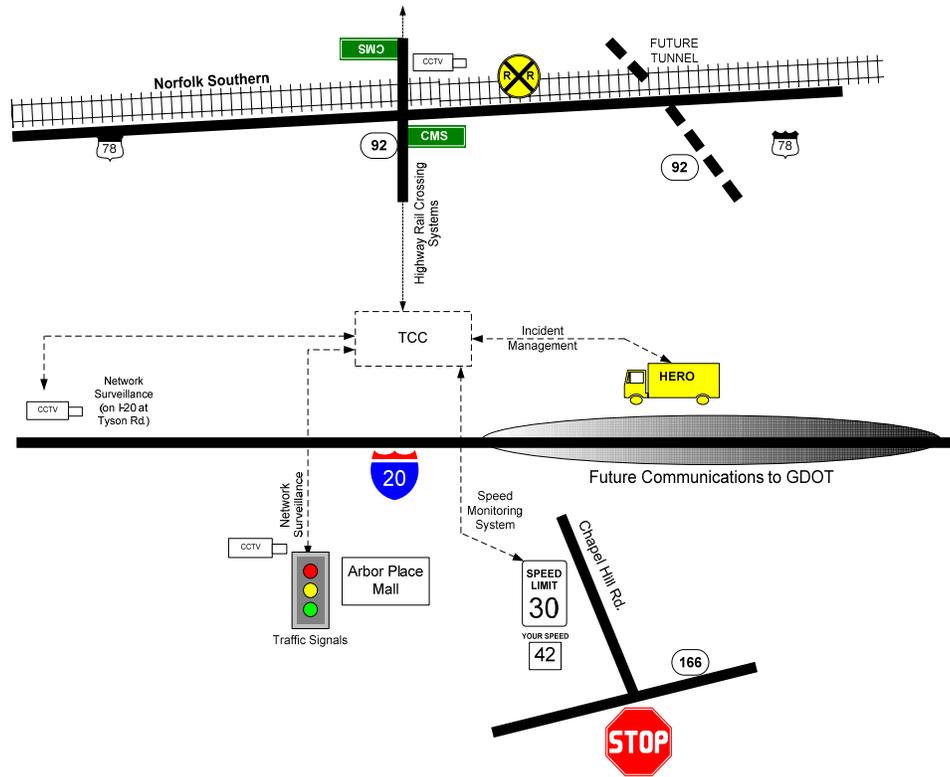


Figure 3: Recommended Early Winner Projects – Functional

Douglas County ITS/ATMS Plan Early Winner Projects



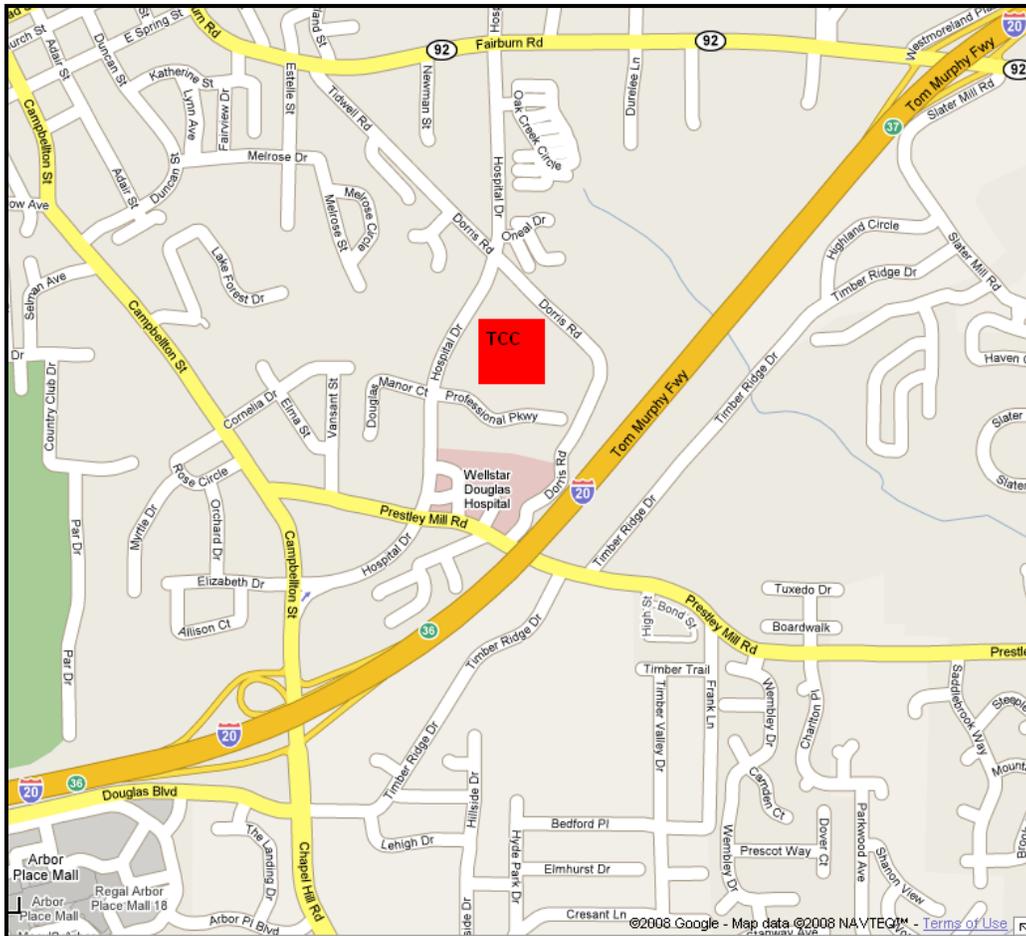
Note: Although not programmed as Douglas County Projects, as illustrated in Figure 3, Douglas County should work with GDOT to ensure that network communications to GDOT is established as soon as possible. The County should also work with GDOT to extend the HERO Incident Management Program into Douglas County. These two potential GDOT projects relate to the following market packages: Incident Management (ATMS08 & EM04) and Traffic Information Dissemination (ATMS06).

Starting on the next page, through the end of this section are project descriptions, which cover project location, justification, capital costs, annual operations and maintenance cost, and any potential issues related to deployment.

Douglas County Traffic Control Center (TCC)

Project Number: ST-1

Project Location: Initial location is proposed for the current Douglas DOT office in the County Courthouse – indicated on the map below as “TCC.” Initially, the TCC should co-locate with DOT to ensure staffing and control.



Project Description: The ITS System Concept, Douglas County seeks to implement a Traffic Control Center that could be used to manage ITS devices in the County, including traffic signals. The TCC will share video and other data with GDOT and other agencies as needed.

Project Justification: This project will provide the County with a central location to monitor and control ITS devices, including signals.

Estimated Capital Costs: \$125,000-240,000

Estimated O&M Costs: \$19,000-36,000

ITS Architecture Compatibility: Supports the (ATMS03) Surface Street Control, Traffic Information Dissemination (ATMS06) and (ATMS07) Regional Traffic Control Market Packages.

Agencies/Stakeholders Involved: Douglas County DOT, GDOT

Dependencies: The TCC requires a means of communications with ITS devices and signals. Fiber optic communication is recommended and is expected to be in place in the near future.

Implementation Issues & Considerations: The initial TCC may only include a single workstation with limited monitoring based on need and staff availability. The future TCC will likely include multiple workstations, one or more wall screens, and dedicated staffing. To avoid an unnecessary large cost estimate, the future TCC assumes co-location with DOT and no dedicated TCC building. Other assumptions include only modest room arrangement changes to an existing facility and installation of the required inside-plant networking. Operations and maintenance costs include monthly fees for cable TV and cable- or DSL-based internet or leased-line communications.

Table 2: Cost Estimate and Assumptions

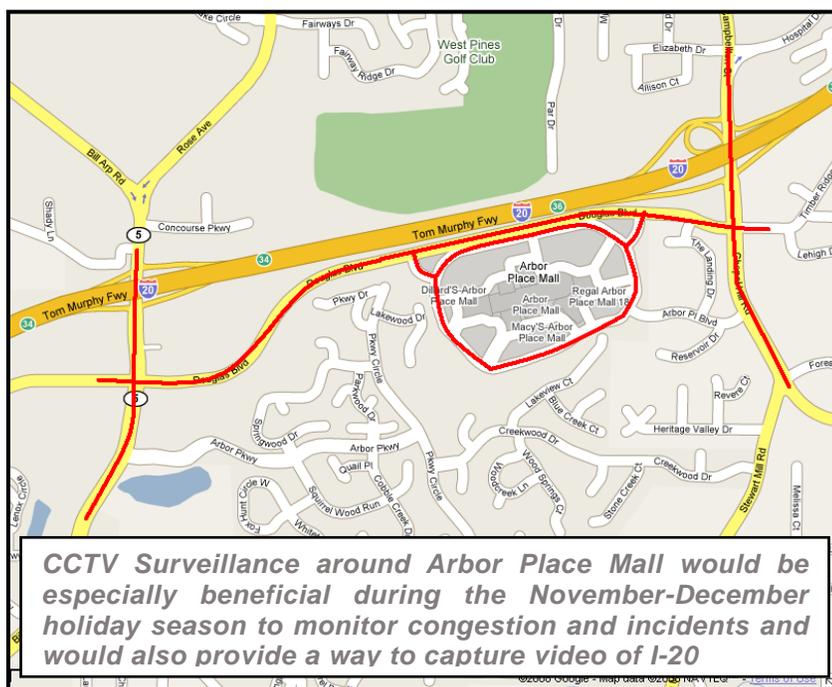
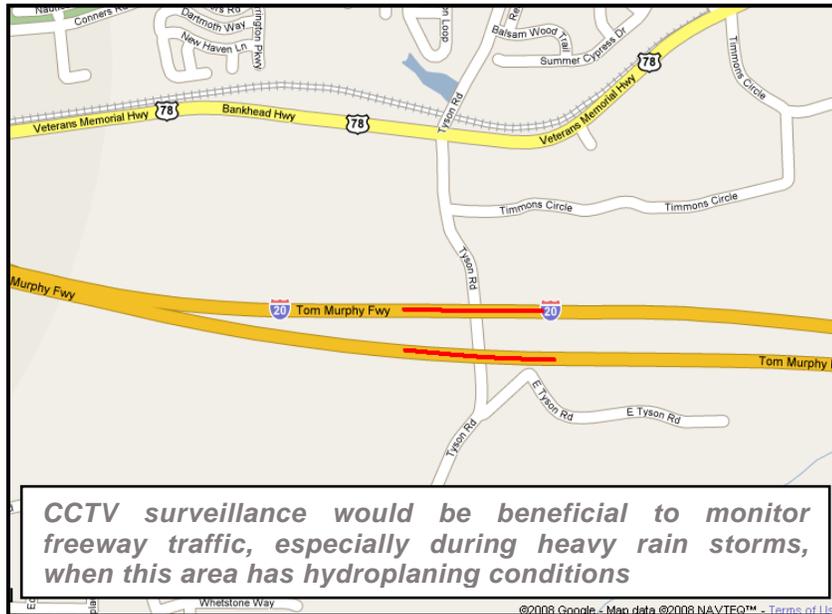
Component/Item	Unit	Quantity	Unit Cost	Costs
Douglas County Traffic Control Center – Phase One	EA	1	\$25,000	\$25,000
Douglas County Traffic Control Center – Phase Two	EA	1	\$100,000	\$100,000
Sub Total				\$125,000
Contingency (15%)				\$18,750
CEI (10%)				\$12,500
CALCULATED TOTAL				\$156,750
TOTAL				\$125,000-240,000

Cost Estimate includes one workstation in Phase One and two workstations and two servers in Phase Two. Operating System, networking and video control software is included in the cost estimate. ITS Application software is not included in this cost estimate.

Trouble Spot CCTV Surveillance

Project Number: ST-2

Project Location: Various locations around the County; the two mapped include I-20 near Tyson Rd and the local arterials and signals in the vicinity of Arbor Place Mall. Additional locations to be determined as part of the recommended ITS Master Plan project.



Project Description: The purpose of this project is to provide a solution to monitor problem locations throughout the county from the proposed TCC. The initial proposal is for the two locations already described.

Project Justification: This project offers real-time information for the appropriate responder to mitigate issues at trouble spots around the county. Timely resolution of incidents help reduce congestion and crash frequency in the vicinity.

Estimated Capital Costs: \$40,000-60,000

Estimated O&M Costs: \$4,000-6,000

ITS Architecture Compatibility: Supports the (ATMS01) Network Surveillance and (ATMS03) Surface Street Control Market Packages.

Agencies/Stakeholders Involved: Douglas County DOT and Public Works, GDOT

Dependencies: Camera placement along I-20 may require an access permit from GDOT. Arbor Place Mall ownership may limit the location of surveillance cameras.

Implementation Issues & Considerations: Alternative and parallel efforts outside the realm of ITS should be investigated. The drainage problem on I-20 may be resolved by repairing the problematic segment of roadway. The cost of CCTV at Arbor Place Mall could be shared with mall ownership if CCTV is utilized by the mall for security purposes. The CCTV at the mall would also benefit GDOT by capturing images of I-20. Isolated ITS elements and elements installed in the short-term will require wireless or dial-up communications at a recurring cost. Elements should be positioned where possible in areas of future fiber optic cable installation.

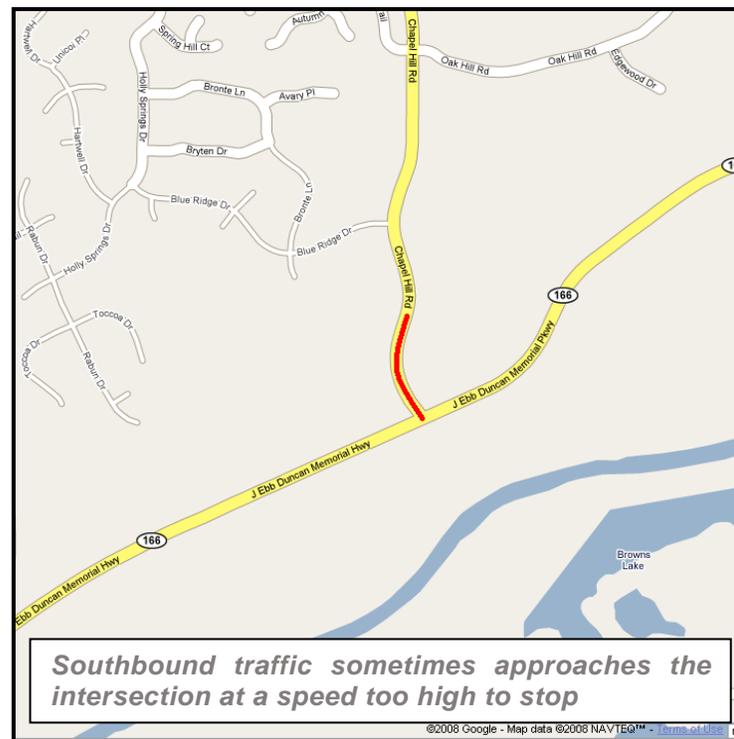
Table 3: Cost Estimate and Assumptions

Component/Item	Unit	Quantity	Unit Cost	Costs
Trouble Spot CCTV Surveillance	EA	2	\$20,000	\$40,000
Incl. recurring \$35/month for DSL				
Sub Total				\$40,000
Contingency (15%)				\$6,000
CEI (10%)				\$4,000
CALCULATED TOTAL				\$50,000
TOTAL				\$40,000-60,000

Early Warning - Speed Monitoring System

Project Number: ST-3

Project Location: Near the intersection of Chapel Hill Rd. and State Route 166, southbound Chapel Hill Rd. traffic approaches the intersection on a downhill roadway segment.



Project Description: The purpose of this project is to offer motorists advance warning signage and a flashing light that there is an intersection (with a stop sign) ahead. Included on the sign, would be a radar-controlled display of the speed of oncoming vehicles. A recommended speed should be included on the sign. The driver's speed would flash if higher than the pre-determined recommended speed. An alternate addition to the project is control of the recommended speed based on weather conditions, specifically slippery roads caused by rain or snow. Changes to the recommended speed could be controlled from the proposed Douglas County TCC.

Project Justification: This project will help increase the safety of the intersection.

Estimated Capital Costs: \$35,000-50,000

Estimated O&M Costs: \$3,500-5,000

ITS Architecture Compatibility: Supports the (ATMS19) Speed Monitoring Market Package. Although this is not one of the high-priority market packages identified by

the stakeholders, this project could be implemented early at a reasonable cost and will provide an immediate benefit.

Agencies/Stakeholders Involved: Douglas County DOT

Dependencies: None.

Implementation Issues & Considerations: This element is located distant from Douglasville and the areas of the county where fiber optic cable is anticipated in the future. Signage will require wireless and/or dial-up communications in the near future. The project should be located far enough uphill from the intersection to allow trucks distance to slow to the appropriate speed. There would be recurring costs for the remote communication to the device.

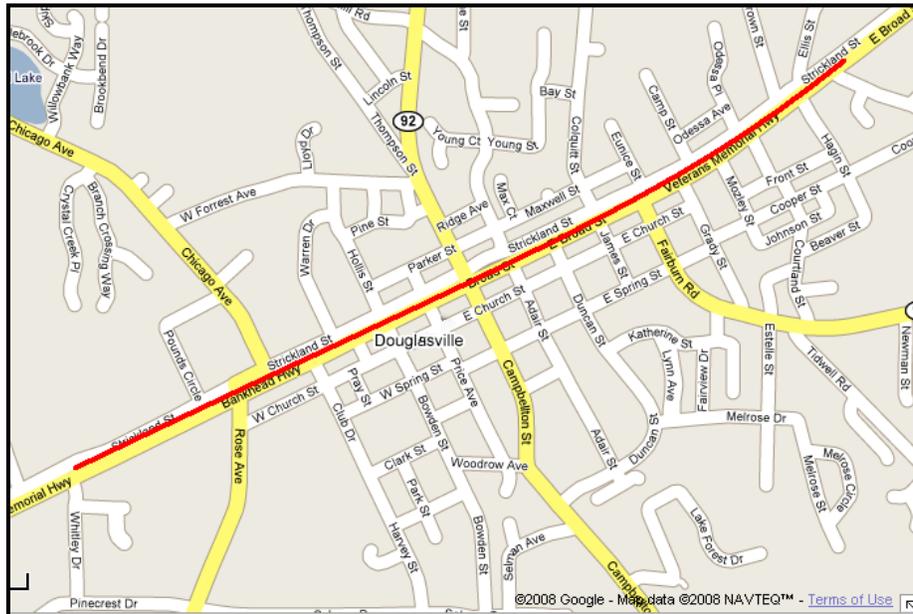
Table 4: Cost Estimate and Assumptions

Component/Item	Unit	Quantity	Unit Cost	Costs
Early Warning Speed Monitoring System	EA	1	\$10,000	\$10,000
Incl. recurring \$35/month for DSL				
Sub Total				\$10,000
Contingency (15%)				\$1,500
CEI (10%)				\$1,000
CALCULATED TOTAL				\$12,500
TOTAL				\$10,000-15,000

Railroad Crossing Warning Systems

Project Number: ST-4

Project Location: The Norfolk Southern railroad facility passing through the County



Project Description: The purpose of this project is to manage issues related to a busy railway (approximately 30 trains per day) passing through the length of the County. Potential remedies include:

- Warning alert to be broadcast when vehicles are stuck on at-grade rail crossings
- Notification when long trains are approaching and will cause significant queuing
- Notification that a train is stopped on the tracks through Douglasville

Anticipated recipients and action takers include the Douglas County TCC, Douglas County Schools, Norfolk Southern Railroad, Douglas County 911 Center and related emergency responders who dispatch resources to railway incidents, or to incidents occurring on the opposite side of the railway from the dispatched resource. Motorists will be advised of delays by strategically placed changeable message signs (CMS) which can offer alternate routes to avoid crossings blocked by a long and/or stalled train.

Train notification would automatically notify the Douglas County TCC when long trains are approaching causing significant queuing. Detection of stopped trains will automatically alert the TCC. Several ITS partners will be able to take advantage of advance notice when at-grade rail crossings are blocked.

Railway incident detection can be used at problematic at-grade railway crossings, initially at SR 92 in downtown Douglasville, to warn of a stuck vehicle on the tracks. The Norfolk Southern Railroad operations center would automatically receive notification, as would the Douglas County TCC, who will be able to assist in notifying the appropriate dispatching agency to assist in removing the stuck vehicle. Douglas County TCC operators will use CCTV to validate at-grade crossing incidents, monitor progress and advise the appropriate dispatching agencies of the incident status.

Project Justification: This project will provide stakeholders with the adequate information needed to facilitate response to incidents on the railway and to properly dispatch assistance and route traffic as necessary.

Estimated Capital Costs: \$500,000-700,000

Estimated O&M Costs: \$50,000-70,000

ITS Architecture Compatibility: Supports (ATMS13) Standard Railroad Grade Crossing and Emergency Management (EM01)

Agencies/Stakeholders Involved: Douglas County DOT, City of Douglasville, Douglas County Schools, Emergency Responders, Douglas County 911 System, the GDOT Utilities Office and Norfolk Southern Railroad

Dependencies: Coordination between stakeholders is needed to establish the operational concept of this ITS element. The train notification system will require cooperation with Norfolk Southern railroad through an Memorandum of Understanding.

Implementation Issues & Considerations: Placement of CMS should be strategic to maximize the motorists' ability to react and take alternate routes.

Table 5: Cost Estimate and Assumptions

Component/Item	Unit	Quantity	Unit Cost	Costs
Train Notification System	EA	1	\$85,000	\$85,000
<i>Incl. 2 CMS at the SR 92 crossing</i>				
Railway Incident Notification System	EA	1	\$415,000	\$415,000
<i>Incl. one CCTV at the SR 92 crossing</i>				
Sub Total				\$500,000
Contingency (15%)				\$75,000
CEI (10%)				\$50,000
CALCULATED TOTAL				\$625,000
TOTAL				\$500,000-\$700,000

Douglas County ITS Master Plan

Project Number: ST-5

Project Location: Countywide

Project Description: The purpose of this project is to expand on this ITS/ATMS Plan from a section of the overall Comprehensive Transportation Plan (CTP) into a more detailed document. Items covered in the Master Plan may include:

- Concept of Operations
- TCC Functionality
- TCC Operations Manual
- TCC Standard Hours of Staffing
- TCC Operating Budgets
- ITS Maintenance Plan
- Projects describing future ITS components which may include some or all of the following
 - Fiber optic infrastructure throughout the County, especially in the vicinity of Douglasville *
 - Remote communication to ITS devices in rural areas of the County*
 - Interconnected traffic signal controllers, controlled from the Douglas County TCC
 - CCTV at major intersections, monitored and controlled from the Douglas County TCC with video made available to GDOT NaviGator
 - CMS in advance of exit ramps to I-20 on arterials
 - Regional Incident Management – coordination of incident management activities with neighboring counties and expansion of the HERO patrol route west on I-20 (coordinate with GDOT)
 - Highway Advisory Radio (HAR) to broadcast significant incidents or special event information
 - Ramp Metering at major I-20 crossings (coordinated with GDOT)
 - Automatic Vehicle Location (AVL) on County vehicles
 - Maintenance and Construction Transportation Management plans
 - CMS and CCTV at the Douglas County Transportation Center
 - Method for sending pertinent information to the GDOT 511 system

** - These items might be split out into a separate Communications Plan “early winner” project at the County’s discretion.*

Project Justification: Blueprint for cost-effective planning and implementation of appropriate ITS in Douglas County.

Estimated Capital Costs: \$195,000

ITS Architecture Compatibility: Various Market Packages – including all described in this document plus others under development.

Agencies/Stakeholders Involved: All stakeholders mentioned in this document as well as potential stakeholders identified in the future.

Dependencies: Successful utilization of the ITS/ATMS Plan deliverable.

Implementation Issues & Considerations: N/A

Cost Estimate and Assumptions: Cost estimate assumes that information derived from the ITS/ATMS Plan would be utilized in the ITS Master Plan, lowering development costs of a standalone project. A separate Communications Plan project could split the costs.

IMPLEMENTATION STRATEGY

The ITS/ATMS Plan provides a high-level description of ITS system capabilities and the roles and responsibilities. Strategies that support the implementation of ITS and are recommended for consideration throughout Douglas County follow.

STRATEGY 1: DEVELOP ITS CAPITAL PROJECTS

Use the ITS/ATMS Plan to examine opportunities to integrate ITS into projects already programmed by Douglas County. Major arterial projects, and other projects which will cause prolonged disruption to traffic flow or potential public safety hazards, are likely candidates for ITS strategies. Recommended projects are listed in the previous section of this document; however, these projects should be evaluated further before implementation. Additional projects may need to be considered in the short-term.

STRATEGY 2: ENGAGE THE LOCAL AGENCIES

The local government agencies, such as the cities of Douglasville, Austell and Villa Rica, are important partners with Douglas County in the implementation of ITS. These agencies will be users of the Douglas County ITS system and play an integral role in its success. The Douglas County School Board has expressed an interest in the advancement of ITS technology and wishes to continue to be a stakeholder during project planning.

Douglas County should continue to involve local agencies as a follow-up to development of the ITS/ATMS Plan to discuss planning and implementation of the Douglas County ITS system.

STRATEGY 3: FOCUS ON COLLECTION OF DATA TO SUPPORT TRAVELER INFORMATION SYSTEMS

This document recognizes the importance of traveler information systems, specifically 511, in the future. For 511 to be successful in meeting customer expectations, Douglas County must expand data collection efforts to obtain timely and accurate information. At a minimum, real-time conditions should be posted for all limited access roadways, construction and maintenance work zones, major incidents and special events having a significant traffic impact.

Vehicle Infrastructure Integration (VII), slated by the US DOT to begin rapid deployment by December 2008, will eventually provide the ability to capture real-time conditions directly from vehicles. Douglas County recognizes this future capability and has committed to ensure that ITS in the County is able to meet future communications needs.

STRATEGY 4: INTEGRATE ITS INTO CONSTRUCTION AND MAINTENANCE PROJECTS/ACTIVITIES

Construction and maintenance activities can significantly affect traffic flow. Major construction projects often narrow or close lanes. Resulting delays often result in driver frustration and increased carelessness. Additionally, construction activities can shift lanes, damage vehicle detectors, and relocate signal interconnect impacting traffic flow.

Douglas County should take a more active role in identifying potential problems associated with construction and maintenance activities and implementing solutions to mitigate these problems. For instance, Transportation Management Plans (TMP) should be developed for major construction projects that result in significant lane closures. These plans, developed early in the project process, identify and implement ITS and other traffic operations strategies in the construction plans to minimize impacts.

Another key issue with construction and maintenance activities is collecting real-time information on lane closures. Accurate and real-time reports on traffic interruption should be provided to the Douglas County TCC and where applicable to the Statewide TMC.

Appendix A – Stakeholder Meetings Summary

The Stakeholder meetings were divided into two sessions to address the different Public Safety and Transportation/Planning priorities. The approach was successful in generating feedback from the stakeholders.

Both meetings had representation of the relevant stakeholders. Attendance by the City of Villa Rica and the Douglasville Police/Fire/EMS community would have added benefit.

Current Problems/Issues

The following problem areas in the County were discussed:

- **Drainage** – I-20 near Tyson Rd: I-20 has a low spot near Tyson Road that creates a hydroplaning risk during rainfall. An interim ITS solution discussed was to mount a CCTV in the vicinity, so the roadway can be monitored during rain events and situations can be quickly addressed. SR 5 and Douglas Blvd is another area with a drainage issue – the same solution was discussed.
- **Signing and striping** – Laneline reflectors are needed on freeways because striping fades and is difficult to detect when raining, especially at night. Improvements could enhance safety.
- **Holiday traffic at Arbor Place** – Holiday traffic (Nov/Dec) has recently improved near Arbor Place Mall, especially along Chapel Hill Rd., due to signal timing adjustments. The issue is anticipated to resurface in the future as traffic volumes continue to increase. {One solution discussed was to install CCTV at key intersections in the vicinity of the mall. Propagation of Adaptive Signal Control was also mentioned.}
- **Railroad crossings** – The Norfolk Southern rail that passes through the county was discussed at length as a source of problems affecting a number of stakeholders. Approximately 30 trains a day pass through the County. Problems identified included trucks and other vehicles stuck on the crossings – several of which have a steep elevation – and stopped trains blocking all travel, with a high impact on emergency response and school bus schedules. {Some suggested solutions included alarms and messaging to notify the railroad, the school system, the emergency responders and the public of real-time issues and suggested alternative routes and/or response.} Norfolk Southern wants to close two downtown Douglasville crossings, but there is local opposition due to the citizens adversely affected – [primarily those without cars who would have to walk an additional distance to downtown.] Closure would be delayed until the SR 92 bypass is built and opened and a better way to cross the railroad tracks (possibly a tunnel) is provided.
- **Congestion** – The worst traffic congestion areas identified were those shown on the 2005 LOS map along Thornton Road, Downtown Douglasville and in the vicinity of Arbor Place Mall, especially the on-ramps of the nearby interchanges with I-20. The 2030 LOS map identifies additional areas of future problems.

- Local Incident Management – Paulding County responds to fatal accidents or ones that require special traffic control. They have a trailer of portable signs to help with signing detour routes. {ITS might be a helpful tool to manage this task.}
- HERO Program in I-20 – The County wants the GDOT HERO program expanded through Douglas County.

Future Problems/Issues

- Rural growth areas – A new school on Post Road is in a high growth area and will see congestion worsen in the near future. Commuters from Carroll County are also beginning to use the two-lane Post Road to access I-20. The intersection of Bright Star and GA 166 is also poised for future growth. Paulding County commuters are beginning to congest roads in the northwest portion of the county to access I-20 at the Post Rd. interchange. Another future problem may be the intersection of GA 92 and GA 166 where a new shopping center will draw traffic from south Fulton County.

Other Solutions Discussed

- Douglas County TCC – the general consensus is that a small TCC would start in the DCDOT office space and eventually relocate to its own facility, possibly at the Intermodal Transportation Center behind the Courthouse or within the current or future offices of the Douglas County DOT.
- Highway Advisory Radio (HAR) – HAR was mentioned as a tool to be used to disseminate traveler information of several types. GDOT’s representative noted that a metro area radio station for traveler information is being explored.
- HERO Expansion – Several were interested in expanding regional incident management. Discussion centered on how far to expand coverage down I-20 and how to go about the expansion of coverage. Wrecker service initiatives were mentioned but not embraced by the group.
- Arterial CMS – The group consensus was that CMS on arterials should be placed in advance of entrance ramps to I-20 and would be used to post freeway travel conditions.
- Automated Vehicle Location (AVL) – Douglas County plans to install AVL in the summer of 2008 in county vehicles.
- Early Warning System – The “T”-intersection of Chapel Hill Road at SR 166 in the southeast portion of the county was discussed. Traffic approaching the intersection is going down an incline and several accidents with drivers running through the intersection have occurred. {ITS might be helpful for advanced warning and speed control.}
- Fiber optic cable for ATMS – Extension of the fiber infrastructure down I-20 into Douglas County is being delayed because of a planned HOV/HOT-lane project that would move any conduit in place – an unnecessary expense. The County would like

to see conduit and fiber optic cable installed on I-20 at least to the western side of Douglasville.

- Freeway CMS – CMS placed on the eastbound lanes would help alert travelers to issues at and around the I-285 interchange.

User Services Identified by the Stakeholders

One exercise asked participants to identify which user services were more critical to their needs. The seven service to choose from were:

- Network Surveillance
- Surface Street Control
- Traffic Information Dissemination
- Regional Traffic Management
- Incident Management
- Emergency Response
- Interactive Traveler Information

The four receiving the highest number of votes were:

- Network Surveillance
- Surface Street Control
- Incident Management
- Emergency Response

The other three user services were also considered important, and in some cases, the other three items are needed to communicate the information gathered by the top four user services to the intended audience. The ITS/ATMS Plan will emphasize projects for these four service areas.