Genesee County

"Shaping our Transportation Future Together"

2035 Long Range Transportation Plan

INTELLIGENT TRANSPORTATION SYSTEMS SUMMARY

What is an Intelligent Transportation System?

An Intelligent Transportation System (ITS) improves transportation safety and mobility and enhances productivity through the use of advanced communications technologies. It encompasses a broad range of wireless and wire line communications-based information and electronics technologies. When integrated into the transportation system's infrastructure, and in vehicles themselves, these technologies relieve congestion, improve safety and enhance American productivity. The system is made up of 16 types of technology based systems. These systems are divided into intelligent infrastructure systems and intelligent vehicle systems.

Intelligent Infrastructure

- Arterial Management
- Freeway Management
- Transit Management
- Incident Management
- Emergency Management
- Electronic Payment and Pricing
- Traveler Information
- Information Management
- Crash Prevention and Safety
- Roadway Operations and Maintenance
- Road Weather Management
- Commercial Vehicle Operations
- Intermodal Freight

Intelligent Vehicles

- Collision Avoidance Systems
- Driver Assistance Systems
- Collision Notification Systems

Major Intelligent Transportation System Areas

The major areas of an ITS are the Intelligent Vehicle Initiative (IVI), the Commercial Vehicle Operations (CVO) and the Advanced Rural Transportation Systems (ARTS). The Intelligent Vehicle Initiative integrates driver assistance and information so that all vehicles will operate more safely. The Commercial Vehicle Operations area has applications for commercial vehicles to speed the process of freight movement, carrier operations and vehicle inspections. The Advanced Rural Transportation Systems area will improve mobility, safety, efficiency and communication in rural areas.

Intelligent Vehicle Initiative

The Intelligent Vehicle Initiative uses on-board collision avoidance systems based on radar or sonar technology. These systems detect objects that the vehicle may strike, and warn the driver of the impending hazard. Dashboard monitors display travel maps and provide directions. An intelligent cruise control adapts vehicle speed to maintain a safe driving distance from other vehicles. During bad weather, on-board sensors warn drivers of obstacles in front of the vehicle and emit warning signals to help drivers avoid hitting objects. During slippery weather conditions, advanced vehicle and brake systems measure wheel speeds and steering wheel angles to determine if a spin is imminent. If it is, braking is automatically applied to the appropriate wheels, and the vehicle can balance out of the spin.

Commercial Vehicle Operations

The Commercial Vehicle Operations area links carrier, state, and national information networks to facilitate a simple and cost-effective exchange of safety and business data. Commercial processes such as roadside safety inspections, credential checks, vehicle registration, fuel-tax collection and hazardous materials transport are simplified. Electronic screening automates weight, safety and credential screenings at roadside weigh stations. International border clearances are also speeded along by this system. More unsafe drivers and vehicles can be removed from the road by this process, than by conventional methods. ITS technologies can also identify truckers with poor safety records for more frequent inspections, while compliant trucks are allowed to proceed.

Advanced Rural Transportation Systems

The Advanced Rural Transportation Systems applications help solve the transportation problems of the rural traveler. Speeders are common in rural areas, and Advanced Rural Transportation Systems can help avoid high-speed collisions. Drivers can also be

warned about animals crossing the road ahead. But when accidents do occur, response times are improved, even in remote, deserted areas thanks to a "panic button" in the vehicle. This system pinpoints the exact location of the accident and relays that information to local emergency agencies. Tourists and other travelers in the rural area may not be familiar with the roads, and directions may be hard to come by. In-vehicle navigation systems can get people back on the right road quickly. In rural areas, bad weather conditions and rugged terrain can combine to produce awful driving conditions. On-board weather updates can help save lives and property.

Integrated Components of an Intelligent Transportation System

There are nine integrated components of an ITS. These components include traffic signal control, freeway management, transit management, electronic fare payment, electronic toll payment, incident management, traveler information services, emergency management services and railroad grade crossing safety.

Traffic Signal Control Systems

Traffic Signal Control Systems use in-pavement detectors to monitor the current demand. These systems measure the demand for right-of-way, shifts in directional demand, and changes in cross-street directional demand. The detectors relay this information to the traffic signals, which can then adapt to the current needs of the vehicles. The result is a smoother flow of traffic, with shorter waiting times. As a safety measure, automatic cameras at signalized intersections have reduced the numbers of speeders and red-light runners, by photographing license plate numbers and fining the violators.

Freeway Management Systems

Freeway Management Systems use ramp metering techniques to measure and regulate how much traffic is entering and leaving major freeways. The metering rate ensures that demand remains below capacity, reducing congestion. Metering rates also improve safety by breaking up groups of merging vehicles competing for space in the stream of traffic. Cities using Freeway Management Systems report handling more traffic while maintaining or increasing travel speeds.

Transit Management

Transit Management includes Automatic Vehicle Location (AVL) technologies and computer-aided dispatch systems to help keep buses on schedule and improve service.

Some cities have integrated the bus system with the traffic light system at key intersections. This increases the green lights along these routes by only a few seconds, but the end result is a reduction in transit travel time.

Electronic Fare Payment Technologies

Electronic Fare Payment Technologies have reduced cash-handling costs for transit operators, due to more accurate data collection. This method is also more convenient for the passengers, who no longer have to worry about having the correct change for fare payment.

Electronic Toll Payment

Electronic Toll Payment allows travelers to speed through toll collection plazas without stopping to pay their toll. A roadside sensor locates a transponder in the approaching vehicle, and automatically bills the corresponding account. This results in significantly reduced levels of vehicle emissions.

Incident Management Systems

Incident Management Systems include dynamic message signs, which alert travelers to accidents or stalled vehicles on the road ahead. Video cameras and road sensors help to detect and locate incidents quickly, and computer-aided dispatch can speed emergency services to the scene.

Traveler Information Services

Traveler Information Services utilize many modes of communication, such as the internet, radio, kiosks, pagers, dial-up services, television, and on-board computers. These services allow travelers to access pre-trip and en route information so they can plan the most efficient route for their needs. Also available is information on all modes of public transportation and ridesharing in the area, as well as specialized services for senior citizens or persons with disabilities.

Emergency Management Services

Emergency Management Services are greatly enhanced by traffic control centers that continually monitor roadway conditions. When an incident occurs, the nearest emergency service vehicle is located electronically and dispatched to the scene. Highway managers then alert other drivers of the incident through dynamic message signs. These services reduce response times, help save lives, and reduce the occurrence of secondary incidents.

Railroad Grade Crossing Safety

Railroad Grade Crossing Safety can be increased by using signing systems that alert drivers to approaching crossings and oncoming trains. The signing system for buses includes a wireless antenna built into the railroad sign and an in-vehicle communicator that alerts the driver to the railroad crossing and any oncoming trains.

SAFETEA-LU

ITS architectures satisfy the conformity requirements first established in the Transportation Equity Act for the 21st Century (TEA-21) highway bill and continued in the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) bill passed in 2005. Regions implementing an ITS project using federal funds must have an ITS architecture plan and show conformance with their regional ITS architecture in order to be eligible for funding from FHWA or FTA.

ITS Plans

There are currently three ITA plans that serve Genesee County: The Michigan Bay Region ITS Plan, The Genesee County Regional ITS Plan and The Flint Mass Transportation Authority ITS Implementation Plan.

Michigan Bay Region ITS Plans

The Michigan Bay Region ITS Architecture and Deployment plan provides a guide for development of ITS in the MDOT Bay region to ensure compatibility of the regional system.

The Bay Region includes Tuscola, Sanilac, Saginaw, Midland, Lapeer, Isabella, Huron, Gratiot, Gladwin, Genesee, Clare, Bay and Arenac Counties. The plan has a regional focus meaning it will look to improve traffic operations through the region as a whole rather than focusing on details in each county. Each county should have a specific ITS plan to address local issues. Genesee County has the Genesee County Regional ITS Architecture and the MTA ITS Architecture and Deployment Plan to identify and address the ITS needs of the County.

Genesee County Metropolitan Planning Commission staff was involved in the development of the Bay Region ITS plan to ensure regionally significant projects in Genesee County were included in the plan and that the regional system would be compatible with the plans in Genesee County.

Genesee County Intelligent Transportation Systems

The Genesee County Regional Intelligent Transportation Systems (ITS) Plan is a roadmap for transportation systems integration in Genesee County. The plan provides methods to make the most out of technological advances by developing a strategy for deployment and a framework, or architecture, for linking the region's transportation systems. This plan covers all the Cities, Villages, Road Commission, MTA, MDOT and other local stakeholders. The purpose of this plan is to conduct a strategic assessment of new and/or enhanced opportunities for the implementation of ITS applications in the County, with a focus on improving the safety and efficiency of the regional transportation network.

Mass Transportation Authority ITS

The Flint Mass Transportation Authority (MTA) is working to identify and adopt appropriate Intelligent Transportation System (ITS) solutions to improve the effectiveness and efficiency of transit service in Genesee County. The *Intelligent Transportation System Architecture and Deployment Plan* is a major initiative by the MTA to plan short and long-term approaches to deploying Intelligent Transportation Systems technologies. The Plan will improve the enterprise productivity of current operations, while providing enhanced service to the customer. The Plan further sets the foundation for broader deployment by other interested parties in Genesee County.

Recent ITS Projects in Genesee County

ITS Projects	Project
City of Flint	Downtown Signal Replacement & Interconnect
GCRC	Miller Rd - Dye to Ballenger (Signal Modernization)
MDOT	I-75 off ramp @ Bristol Rd (Signal Modernization)
MDOT	M-15 @ Flint Street (Signal Modernization)
MDOT	M-57 (M-54 to Nichols - Signal Interconnect)
GCRC	Genesee & Linden Rd Locations (Signal Modernization)
GCRC	Bray/Stanley (Signal Modernization)
GCRC	Carpenter Rd @ Selby & Detroit St (Signal Modernization)
MDOT	M-15 (Hegel to Main St. - Signal Optimization)
City of Flint	Saginaw St. (Saginaw St. Signal Interconnect)
City of Flint	Ballenger Hwy. (Signal Optimization from Miller Rd. to Welch)

MDOT	M-57 (Signal Modernization and Interconnect from M-54 to Nichols Rd.)
City of Grand Blanc	Saginaw Street Corridor - Signal Modernization, Interconnect and Optimization
GCRC	Pierson Rd. – Signals - Elms Rd. to Clio Rd. - Signal Modernization, Interconnect and Optimization
GCRC	Hill Road – Signals - Torrey Rd to Saginaw Rd - Signal Modernization, Interconnect and Optimization
MDOT	M-54 Signals – Saginaw to Mt. Morris Rd. – Signal Modernization, Interconnect and Optimization
MDOT	M-21 – Signals - Morrish Rd. to Ballenger Hwy. - Signal Modernization, Interconnect and Optimization
MTA	Acquire Support equipment – ITS Deployment

Future ITS Projects

MDOT	I-475 (Dynamic Messaging System at various locations on I-75, I-475 and I-69 in Genesee County)

Genesee County ITS Objective

The Genesee County ITS Objective is to continue to collaborate with Michigan Department of Transportation, Mass Transportation Authority, Genesee County Road Commission and other agencies to avoid duplication of effort and to ensure integration of ITS systems. It is also the objective to encourage ITS components in the Transportation Improvement Program Call for Projects, Safety Call for Projects and Congestion Mitigation Air Quality Call for Projects.

Recommendations

Revisit and revise the Genesee County Architecture every five years to ensure its ongoing consistency with actual conditions.

Work with regional and statewide partners in the evaluation and endorsement of regional ITS standards, to ensure that the interoperability objectives of the architecture are carried through to the detailed technical design of project deployments.