Objectives for the Session

Attendees will gain an understanding of the following:

- What are Intelligent Transportation Systems (ITS)?
- What are the benefits of Intelligent Transportation Systems (ITS)?
- What are some examples of Intelligent Transportation Systems applications and technologies?
Presentation Overview

- Transportation challenges
- What are Intelligent Transportation Systems?
- What do Intelligent Transportation Systems do?
- What are the benefits of Intelligent Transportation Systems?
- What are some examples of Intelligent Transportation Systems applications and technologies?
- City of San Antonio ITS efforts
  - Where are we now?
  - Where are we going?
  - How will we get there?

Transportation Challenges

- Limited capacity of existing roadways
  - Inadequate lanes at intersections to meet traffic demands
  - Lack of available ROW
- Limited roadway construction dollars
- Keeping traffic moving across multiple jurisdictions
  - Equipment incompatibility across multiple jurisdictions
  - Conflicting priorities
- Enabling motorists to make more informed decisions
  - Rerouting traffic during incidents to help relieve congestion
  - Reducing secondary incidents
How Can These Challenges be Addressed?

- Encourage a common understanding of the transportation environment and its challenges among stakeholders
- Create a plan that complements the transportation system plan of other partners
- Integrate transportation elements to achieve operability, efficiency, and effectiveness.
- Maximize mobility utilizing existing infrastructure before opting to add new infrastructure – “Manage First, Build Second”

“Manage First, Build Second”

- Get as close as possible to 100% utilization of existing transportation infrastructure before investing in new construction
- Achieve the greatest benefit for the least capital investment by optimizing the use of existing facilities
- Invest in new construction that compliments management of existing infrastructure.
“Manage First, Build Second”

How?

Use ITS

What are ITS?

- Intelligent Transportation Systems (ITS)
  - A broad range of diverse technologies that provide the information necessary to enable people and goods to move more safely and efficiently through a state-of-the-art, intermodal transportation system.
What are the Benefits of ITS?

- Enables motorists to make smarter travel choices
  - Through advanced accident/incident notification
- Increases Mobility
  - Reduces stops and delays (*5% - 42%)
  - Leads to a reduction in motorists frustration
- Improves the Environment and Saves Energy
  - Reduces fuel consumption (*2% - 13%)
  - Leads to improved air quality
- Improves safety
  - Save lives
  - Allows for efficient incident management
- Reduces construction cost
  - Allows for the optimization of existing infrastructure
  - Traffic Signal Retiming typically has a Benefit/Cost of 40:1*

*Sources: www.itsbenefits.its.dot.gov; ITE journal

Examples of ITS Applications

- Arterial Management
- Freeway Management
- Emergency Management
- Road -Weather Management
- Roadway Operations and Maintenance
- Incident Management
- Traveler Information/Information Management
Examples of ITS Technologies

- Video & Monitoring
  - Video Imaging Vehicle Detection Systems
  - Closed Circuit TV
  - Low Water Monitoring System
- Information Dissemination
  - Dynamic Message Signs (DMS)
- Lane Management
  - Reversible Flow Lanes
  - Lane Control Signals

Examples of ITS Technologies

- Communications Networks
  - Fiber Optic Communications
  - Wireless Communications (Spread Spectrum Radios, WiFi mesh networks)
- Computational Technologies
  - Traffic Signal Coordination/Optimization
  - Traffic Modeling
- Traffic Control
  - Advanced Signal Systems
  - Emergency Vehicle Preemption
  - Transit Signal Priority
  - Pedestrians – Countdown and Audible Signals
  - Uninterruptible Power Supply (UPS)
  - Ramp Metering
City of San Antonio

1,050 Lane Miles of Freeways
564 Lane Miles of Principal Arterials
11,102 Lane Miles of Minor Arterials, Collector and Local Streets
Population of 1.2 million (7th largest US City)
Over 400 Square Miles
Multiple Jurisdictions
1153+ CoSA Traffic Signals
163 Texas Department of Transportation (TxDOT) Traffic Signals

City of San Antonio Traffic Control Infrastructure

74 Coordinated Signal Systems (785 signals)
- 47 Signal Systems with communication link to TransGuide
  - 39 signal systems with dial-up (651 signals)
  - 8 signal systems with fiber optic link
- 27 signal systems with no communication link to TransGuide
341 Isolated traffic signals
2 Reversible Lane Systems (27 signals)
- Dial-up communication link to TransGuide
850 School Zones with Flashers
ITS Applications for Traffic Signals

- Updated traffic signal control equipment
- Communications Systems
- Data collection and analysis
- Coordinated signal systems
- Responsive traffic signal systems/timings

Video Imaging Vehicle Detection System (VIVDS)

VIVDS Installed
Emergency Vehicle Preemption

- Enhances time-critical travel by allowing emergency vehicles to request and receive green time
- Used by the Fire Department and EMS
- Currently installed at most intersections in Medical Center Area and the Central Business District

ITS Technologies For Pedestrians

- LED Vehicle and Pedestrian Signal Heads
- Countdown Pedestrian Signal Heads
- Audible Pedestrian Pushbuttons
Standard Traffic Signal Installation

Traffic Signal Coordination & Optimization

- Provides the greatest benefit to the public for each dollar spent
- Typical Benefit Cost Ratio of 40:1
Coordinated Traffic Signal Systems

School Flasher System

- Solar-powered
- Operated through a Paging System
Reversible Lane System

- Lane Management application that maximizes utilization of available traffic lanes by reversing traffic flow to meet travel demand.
- Allows vehicles to travel in the peak direction during rush hour.
- Existing System at AT&T Center.
- Possible future corridors - San Pedro, Fredericksburg Rd.

CoSA’s Existing Traffic Management Communications Network

- Local Intersection Controllers (Type 170).
- Dial-Up (39 Systems).
- Fiber Optic (8 Systems in CBD area).
- Hardwire/Spread Spectrum Interconnect.
CoSA Traffic Management Center
Located at TransGuide

CoSA’s ITS Future

Traffic Signal Installation Standards
- 2070 Traffic Signal Controller
- Dedicated communications link (Fiber Optics)
- Video Imaging Vehicle Detection System – Detection and Data Collection
- CCTV
- Uninterruptible Power Supply
- Emergency Vehicle Traffic Signal Pre-emption
- Changeable Lane Assignment Signs (as needed)
- Dynamic Message Signs (as needed)
- Transit Priority (as needed)
- Internally Illuminated Street Name Signs
CoSA’s ITS Future

Advanced Traffic Signal Control System (2070 Traffic Signal Controller Environment)
- Central and local control software and hardware that will meet CoSA functional requirements
  - Dynamic Coordinated Traffic Signal System Assignments
  - Integrated Systems – Traffic Signals, DMS, CLAS, Reversible Lane Systems
  - Bus Priority

Comprehensive Communications Network
- Dedicated communications link (Fiber Optics/WiFi) to all devices including those currently with dial-up
  - Provide sufficient bandwidth for all video and data needs – Real time
  - Will allow for optimum use of devices deployed
    - VIVDS – video, data collection
    - Reversible Lane System
    - Dynamic traffic signal systems
  - Improve collection, storing and sharing of critical information
- A fully integrated multi-agency communications network
  - Provide direct links to integrate designated systems and centers
Proposed Traffic Signal Communications

State-of-the-Art Traffic Management Center
- Housing the advanced traffic signal system
  - Allow for monitoring and adjusting signal systems as needed
  - Video wall to allow for multiple camera-location monitoring
  - Center to center direct link – EOC, Dispatcher

Extensive use of Computational Technologies
- Regularly scheduled timing updates for all signals (ITE recommends every 3 years)
- Continued modeling effort updated as needed
Future Traffic Signal System

CoSA TRAFFIC MANAGEMENT CENTER AT TRANSGUIDE

- 2070 Controller
- Coordinated Signal Timings
- Dynamic system assignments
- Transit Priority
- Uninterruptible Power Supply (UPS)

Corridors for Initial Deployment
Benefits

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<tr>
<td>Average Fuel Cost per Household</td>
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Current CoSA ITS Expansion Efforts

- ITS Integration Study
- City-wide Communications Network
- Traffic Signal System Software & Hardware Upgrade
- Citywide Traffic Signal System Coordination and Optimization
- Regional Fiber & Communications Sharing Agreement with TxDOT
- Traffic signal installation standard upgrade
- Integrated Corridor Management – CoSA, TxDOT & VIA
- Regional ITS Architecture Upgrade
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Questions
But wait...
There’s More!

Drive through Reversible Lane System

Regional ITS Efforts
– Brian Fariello, P.E.
  Traffic Management Engineer
  Texas Department of Transportation
  San Antonio District

TransGuide Tour