

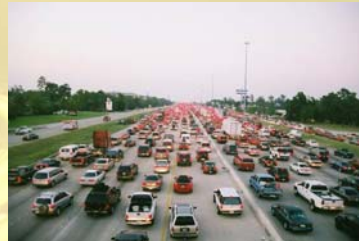
ITS Applications for Evacuations

(Hurricane Evacuation Route Monitoring)

Sally G. Wegmann, P.E.
Director of Transportation Operations
TxDOT -- Houston District

WHY? Hurricane Rita evacuation identified the needs.

- Decision makers/first responders (before/during/after) depended on data gathered by ITS.
- More traveler information for public was needed on evacuation routes.
- Bottlenecks in rural areas could not be seen by existing ITS reach.



Solution

- Expand camera and vehicle detection coverage to key locations in rural areas
- Use wireless (cellular technology) communications
- Build on existing central ITS system

Goals

- Urgency – be prepared for next event
- Knowledge – use known and proven technology
- Low cost and readily available products
- Existing funds
- Easy maintenance
- Easy access/operations



To Satisfy Goals

- Used already existing funding sources
 - Priority Corridor Critical Links Effort
- Used available infrastructure
 - Existing electrical power sources
 - Suitable mounting structures
 - Existing web based interfaces

Use Known/Proven Technology

- Cellular communication with existing contract already in place
- Existing field equipment specifications
 - VIVDS at traffic signals
 - CCTV Axis cameras
 - Traffic data – SmartSensor/RTMS
 - Common web interface for data access

Familiar? City of Houston Railroad Monitoring System and Construction Progress Cameras (IH 10) on www.houstontranstar.org

Lawndale RR from Telephone 2006-06-21 17:43:23



IH-10 Katy at Beltway 8 06/21/2006 17:28:26



Implementation

TxDOT / TTI

- What needed
- Where needed
- GOAL – facilitate information needed for evacuation route monitoring



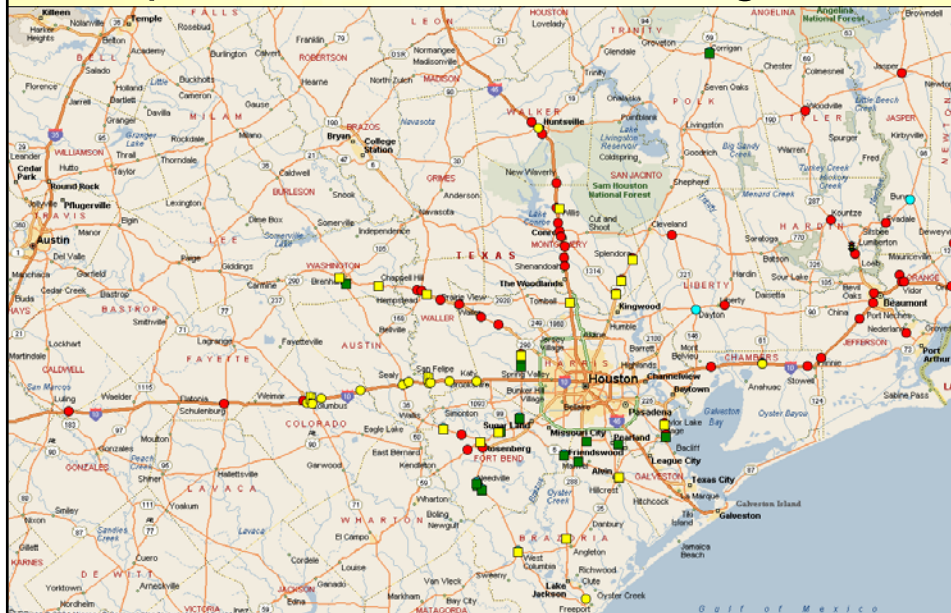
Implementation (cont)

III

- Inventory of cellular signal strength throughout region
- Existing Cingular TxDOT contract

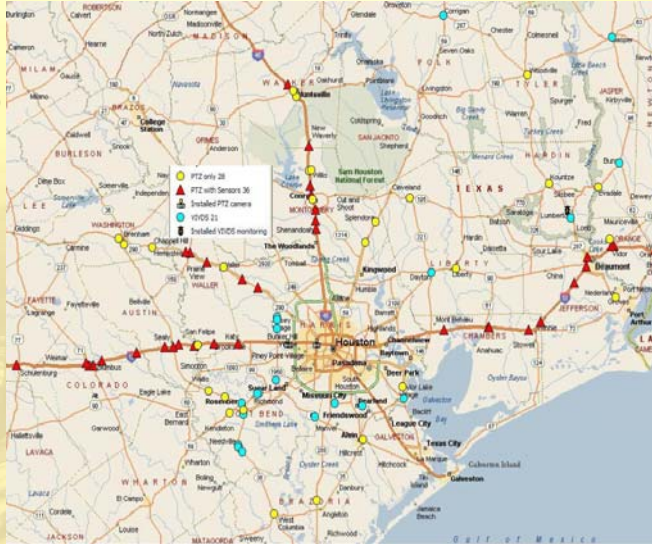


Scope of Evacuation Coverage Area



Identified Installation Requirements

- 94 Locations
 - 66 CCTV(PTZ)
 - 27 VIVDS
 - 31 Data Sites
- Est. Cost of \$550,000



Installation

- Installs by Houston and Yoakum Districts, TTI
- 94 Sites in All (CCTV, VIVDS, CCTV & Data Collection)
- Will have sites in 6 Districts
 - Houston
 - Yoakum
 - Bryan
 - Beaumont
 - Austin
 - Lufkin



CCTV Installation

- 2-person crew – 20 minutes
- Used existing poles
 - Axis PTZ camera
 - Pre-wired cabinet
 - Cellular Modem
- \$ 4,000 each



IH 10 W @ SH 71 In Columbus



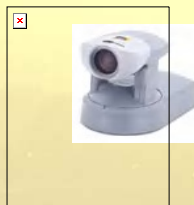
VIVDS Installation

- 1-person crew – 15-minutes
- 4 port video server
- Cellular modem
- Video splitter
- \$ 1,500 each



Parts List For Camera and Vehicle Detector Sites

- Axis Camera
- Raven Ethernet Modem
- Vehicle Detector
- Router



Traffic Data Collector Installation

- Traffic Sensor
 - Volume
 - Speed
 - Occupancy
- Small cabinet
- Cellular modem
- Ethernet router if CCTV installed
- \$ 6,000 each



Camera and Detector IH 10 W and FM 1463 in Katy



Information Dissemination

- Internet
- Allows:
 - Multiple connections
 - Multiple Locations
 - Mobility

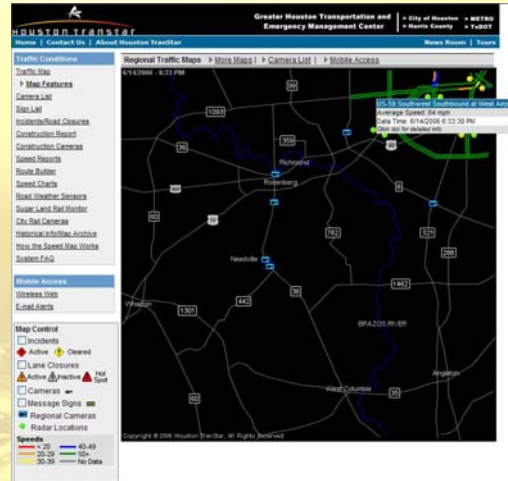
Accessing the Views and Data

- Houston TranStar website (Internal/External)
- Snapshot camera views to public
- CCTV camera control at TranStar and selected users with security clearance
- Snapshot views available to mobile devices [e.g., PDA's, Blackberry devices]

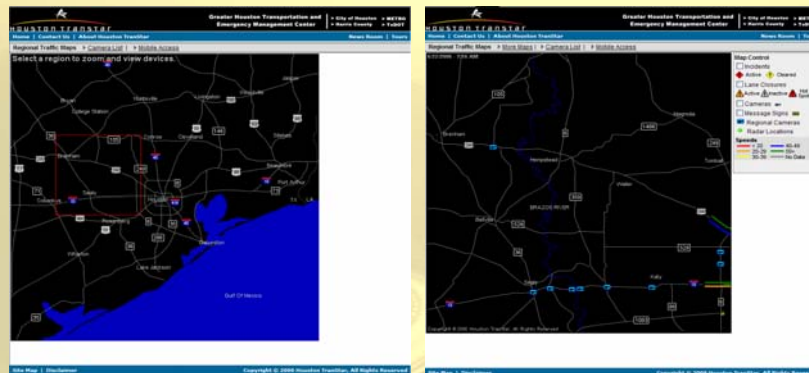
Public Access

Area Maps

- CCTV Camera views
- Traffic Data Information
 - Speed
 - Volume
 - Occupancy

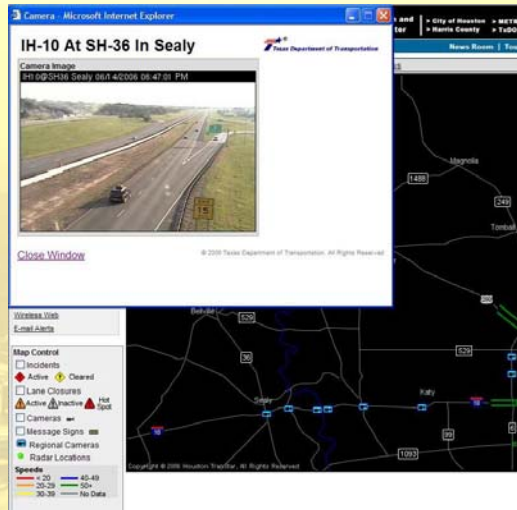


Map View



PTZ Snapshot Access

Pop-up window for
camera views (PTZ)

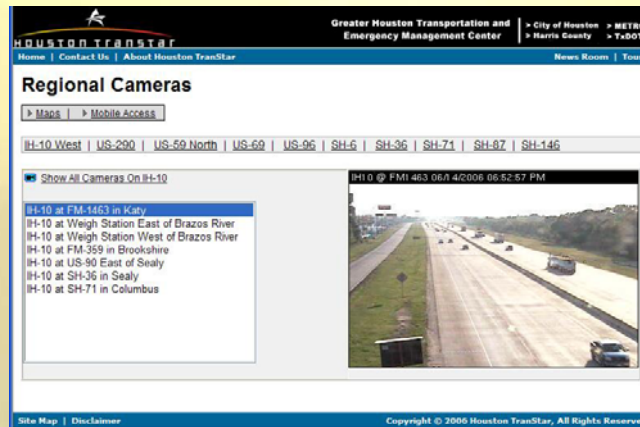


VIVDS Snapshot Access

Pop-up window for VIVDS
camera views



Corridor Snapshot Access



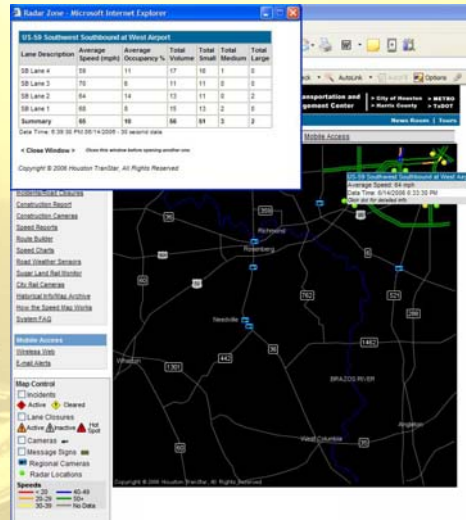
Camera List option

View All Snapshots on Roadways

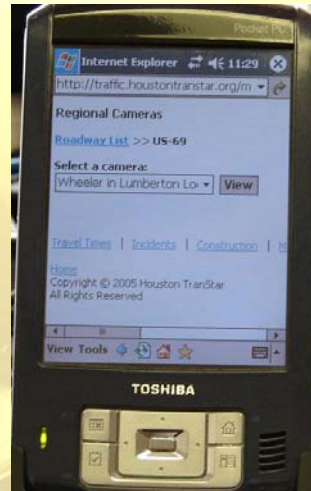


Data Sensor Access

Pop-up window for data from traffic sensors



Mobile Snapshot Access/PDAs



Mobile Snapshot Access



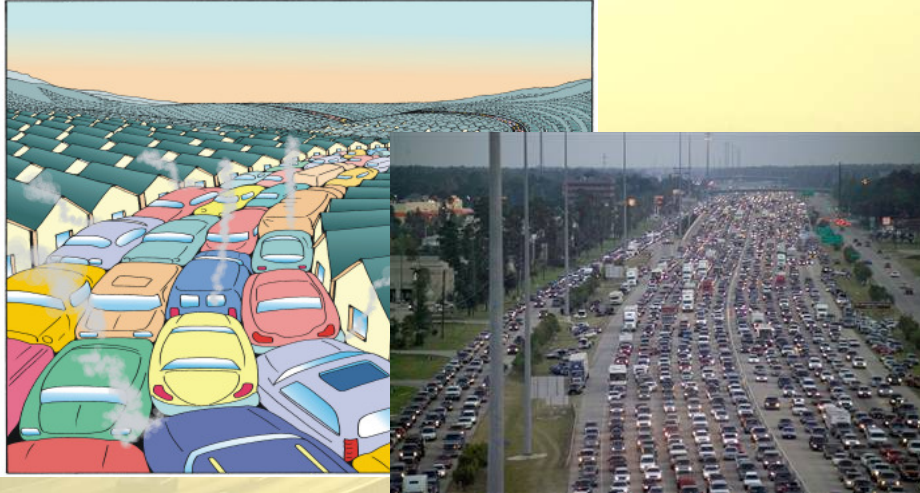
Mobile Snapshot Access



CCTV Streaming Video

- Currently under development (Prototype working/waiting on hardware to expand access capability)
- View all system cameras via personal computers at remote locations
- Will be available to selected users only due to bandwidth requirements
- Requires high speed internet access
- Not broadcast quality video

Art imitates life. Questions?



Impact of Hurricane Rita on Signs, Signals, Roadside Flashing Beacons, Delineation and Illumination

Presented by
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Texas Department of Transportation - Beaumont District

Obvious Impacts

- Small Roadside Signs
- Large Roadside Signs
- Traffic Signals
- Flashing Signs
- Delineation
- Illumination













State Forces

- Determination of materials needed
- Material Sources – warehouse and vendor
- Delivery of materials
- Coordinating purchasing
- Scheduling of signal crew rotations
- Emergency Signals
- Generators

Emergency Contracts

- Traffic Signal
 - Non-site specific - items to address locations throughout the area
 - Site specific - targeted specific signals that were completely destroyed
- Roadside Flashing Beacons
 - Locations were specified
- Large Roadside Signs
 - Sign Damage - included supports and signs
 - No Sign Damage - addressed supports only

Transitioning

- Beginning of sign crew rotations
- Continued operations as problems and damage were discovered after the initial response
- More contracts

Recovery

- We are not there yet
- Determined to return to Pre-Rita Status, if not better

Lessons Learned

- Be open to outside assistance
- Establish and maintain a written and pictorial inventory of your traffic control elements
- Be determined to the end