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
Implementation

**TxDOT / TTI**

- What needed
- Where needed
- GOAL – facilitate information needed for evacuation route monitoring
Implementation (cont)

TTI

- 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
Data Sensor Access

Pop-up window for data from traffic sensors

Mobile Access/Portable PC
Mobile Snapshot Access/PDAs

Mobile Snapshot Access
Mobile Snapshot Access

- 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

CCTV Streaming Video
Art imitates life. Questions?
Impact of Hurricane Rita on Signs, Signals, Roadside Flashing Beacons, Delineation and Illumination

Presented by
Janet Manley, P.E.
Director of Transportation Operations
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