

*FDOT Study of Multi-State  
Hurricane Contra-Flow and  
Evacuation Response*

Lessons learned; Best practices;  
Role of ITS

Rural ITS 2006 Big Sky, Montana

# Hurricane Evacuation & Disaster Response – Is It ITS?

The **Disaster Response and Evacuation (DRE) User Service** uses intelligent transportation systems (ITS) to **enhance** the **ability** of the surface transportation system to **respond** to and **recover** from natural disasters, terrorist acts, and other catastrophic events... **All** types of **disasters** are considered in this user service... **Every year**, natural **disasters** including hurricanes, floods, severe winter storms, and earthquakes **require** an effective **coordinated response** by agencies at the federal, state, and local level ....The **basic ITS** capabilities for disaster **response** and **evacuation** are essentially **the same** in all... Broad **inter-agency coordination** is **critical** in disaster scenarios...need to coordinate and integrate DRE activities within diverse organizations in order to improve the safety of the responders and the public at large, and improve the performance and effectiveness of the transportation system as a part of the overall disaster response... **disaster will create significant demands on the transportation system** in and around the disaster area.....



# FDOT Study

- Florida is very familiar with hurricanes
  - Hurricane history
- Florida has contraflow plans but realizes new lessons are learned every year
- In early 2006 PBS&J researched other state experiences, lessons learned, and best practices for FDOT to help develop updated plans

# Lessons Learned Alabama

- I 65 contraflow (MP31-MP167) 30 locations, 200 ALDOT, 60 state troopers- all normal northbound entrances & exits open, HAR at each end of route, contraflow exit only
- Activation trigger changed from traffic flow levels to time schedule established in response to specific storm scenarios



# Lessons Learned Georgia

- Contra flow plans for I-75, I-95, I-16 but not yet implemented; if implemented, daylight only; staffing shortage-unmanned barriers some locations; I-16 plan includes ADDCO SmartZone trailers and separate slow scan cameras
- I-75 & I-95 plans for 4 lane, when road becomes 6 lane, contraflow may go

# Lessons Learned Mississippi

- Two routes I-59(21 miles) & I-55(31 miles) Katrina 14 & 7 mile backups -spontaneous attempt to equalize by median crossing; self contraflow on I-59 southbound from Hattiesburg; staffed in 20 hour shifts, Highway Patrol on routes, DOT at interchanges; 70 mile back up to Gulfport from I-10 tunnel in Mobile
- Some cameras, 27 portable DMS phones at every interchange



# Lessons Learned North Carolina

- I-40 contraflow from Wilmington 90 miles, daylight hours day prior to landfall, contraflow not yet implemented
- Plan uses CB Wizard, HAR, VMS, Incident Management Patrol (IMAP), tow trucks, painted interchange numbers on pavement

# Lessons Learned South Carolina

- I-26 Charleston to Columbia, US 278 Hilton Head, US 501 Myrtle Beach; barrels-barricades-personnel; annual tabletop/field deployment exercise on selected route
- Portable HAR, flip down static signs, incident response vehicles, painted exit numbers on pavement, CCTV monitoring, assess traffic volume and flow, SATCOM to portable DMS



# Lessons Learned Virginia

- 3-phase evacuation plan Hampton Virginia Beach area- contraflow I-64 in third phase; daylight hours, set up predawn, table top implementation not yet actual field activation
- CCTV, DMS, vehicle detection, portable DMS, 168 barrier gates planned

# Lessons Learned Texas

- I-37 from Corpus Christi only preexist contraflow and initial phase shoulder-use route expansion only; I-10 & I-45 contraflow plan for Rita on the fly; US 69 & US 96 "self-contraflowed"- minor accidents no fatalities; formal plans developed for 2006
- CCTV monitoring, portable DMC, video to State EOC, 60-90 low cost cell data access IP cameras rural areas, painted hurricane symbol on special lanes, painted exit numbers, center to center coordination, voice, email, data



# CCR- Fundamental Issues

- Communications
  - Coordinating agencies
  - Field Staff
  - Public
- Control
  - Manage traffic flow
  - Manage responders
- Response
  - Disruptions to flow
  - Health & safety
  - Illegal & unsafe actions

# Communications Issues

- Network accessibility & availability
  - Every one has a cell phone
    - Capacity overload
  - Not everybody has a blackberry!
  - Coverage
  - Landline access
- Multiple Agencies controlling traffic
  - DOT, state, county, local, federal
  - Incompatible communications
- Understanding the message
  - Unfamiliar location & unknown location



# Control-Traffic Flow Issues

- Evacuation or Contraflow- It's physics
  - Once full, you can only add what you remove
  - Source & destination as important as capacity
  - People don't follow rules of the model
  - People follow leaders- good or bad
    - Spontaneous contraflow & exit generation
  - How do I get from here to there?
    - Unfamiliar with surroundings

# What is important to the Public

- Information
  - Next exit
  - Next two fuel locations
  - Next food & water
  - Next bathrooms
  - Where am I?
  - What is happening?



# Decision Quality

- Decisions only as good as data
- Communication is a two way process
- Hearing and understanding are not the same
- Data or Information
  - If it is not essential to make a decision then it is only data
    - Data is a distraction

# Florida-What's Been Done Since

- Deployment of CCTV cameras statewide at key locations
- Additional Plan Development
- Recommendation of best practices to Florida for application to their plans:
  - 2-lane crossovers
  - Gates
  - Highway Advisory Radio
  - Exit numbers on pavement
  - Flip-down signage
  - Enhanced public information
  - Enhanced plan logistics



# Outside Florida: Best Practices

- Coordination with Alabama and Georgia is critical
  - Coordination goes both ways, due to 9/11
  - If one state implements contraflow and adjacent state doesn't, both look foolish
- Other states
  - **Alabama I-65**
    - Politics, not numbers
  - Georgia I-16, I-75, I-95
    - I-16 manual gates to close ramps
    - ITS implementation along route
    - Georgia-Navigator.com has graphics to clarify contraflow operations
  - **Louisiana I-10 and I-12**
    - Multiple contraflow plans
  - Mississippi I-55 and I-59
    - Fold-down signs
    - Implement only at Louisiana's request
  - North Carolina I-40
    - Media events, handouts
    - Strong logistics plan
  - South Carolina I-26
    - On-line maps explaining contraflow operations, handouts for motorists, routes on state hwy map
  - Texas I-37 (and I-10 and I-45)
    - Shoulder use plan
  - Virginia I-64
    - Is installing manual gates

# Texas 2006 Actions

- Exit mile markers painted on roadway
- Contraflow signs & hurricane symbols on shoulders
- Low cost cameras and radio data self installed
  - Existing luminaire poles, DMS structure



# How can ITS Inform

- Portable DMS
  - Static Info, Deploy & Forget
    - Next exit, bathrooms, radio stations
    - Sign access low importance- location hi importance
  - Changing Info, Deploy & Update
    - Food, fuel locations
    - Who will change messages?
    - How do they access?
      - Place at closed exits
      - Easily accessible (short travel time)
      - If radio, will comm be available?

# Communications with the field?

- How to communicate with people manning closure points and monitoring traffic?
  - Cell phone reliability?
  - Wireless data communications?
  - Power for field responder devices
  - If all else fails- call the local burger place
    - *Preselect local businesses as spotters*
      - *Speed derived from time to pass reference points*
      - *Lat-Long would be nice*



# Maximize Your Investment

- Technology selection- Decision or nice to have?
  - Video
    - Remote incident response decisions
      - Hi quality video, hi frame rate
    - Que length and traffic flow
      - Reduced quality video, reduced frame rate
  - Traffic speed, classification, count
    - May be important at entry exit points but speed may be only important route data
  - Who will use the information, what will they do with it?

# Selected FDOT Evacuation and Contraflow Related Web Pages

- Florida DOT Traffic Operations Web site
- <http://www.dot.state.fl.us/trafficoperations/ITS/ITS.htm>
- Florida DOT ITS GEC Web Site
- <http://www.floridait.com>
- February 2006 Contra Flow Evacuation Workshop
- <http://www.teachamerica.com/ContraFlow/index.html>



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Lap Hoang has been the State Traffic Operations Engineer and Manager of the Traffic Engineering and Operations Office since 2002. He is known nationally in the field of signal systems and operations, and has served on the Transportation Research Board Signal System Committee since 1994. Under his leadership, the Intelligent Transportation Systems (ITS) Strategic Plan was adopted by the Department in 2000, and has since become a major program within the FDOT. He spearheaded Traffic Incident Management into an organized statewide program, and helped build the Road Rangers Service Patrol into a major component of this program. He helped advance the Traffic Engineering Research Laboratory into a nationally recognized facility in ITS standards testing, communications technology, and traffic control innovation. Lap served on the AASHTO Subcommittees on Traffic Engineering and Systems Operations and Management.

# Questions?

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