

"Whole Community" Disaster Planning: Supported by Technology

Hurricane Katrina in Mississippi

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#### "Whole Community" Strategy

Focus on improving existing catastrophic event preparedness and associated response operations through more effective collaboration with all members of a community, to include: traditional Federal, state and local government partners, as well as engage more fully the private sector, non-governmental organizations and the citizens in and around the impacted area, and throughout the nation.

#### Whole Community Catastrophe Scenario

- Response requirements will overwhelm the existing state and local capacity quickly and require much greater engagement by the whole community in order to save lives and minimize losses.
- Likely to negatively impact productivity, health, and welfare for years.
- Expected to directly impact two or more million citizens in terms of sheltering, logistical resource requirements, etc.
- Will severely challenge traditional logistics, transportation, emergency team resources and require atypical solutions to address critical needs.
- May result in large numbers of casualties who require timely medical assistance.

"This is unlike what we have seen before"

#### Hurricane Katrina in Mississippi



#### Hurricane Katrina - August 29, 2005



Intensity - Cat 3 at landfall Wind – 180Km/h+ Rain – 254 mm Fatalities – 231 in Mississippi Storm Surge – 8.2m

Presidential Declaration on August 29, 2005

- Individual and Household Assistance 47 counties
- Public Assistance (Infrastructure) all counties
- Mitigation all counties

## Hurricane Katrina Storm surge 6 to over 8 meters



DigitalGlobe

Biloxi, Mississippi, 2005

Debris Line

#### Damage extended far inland from the coast

Hurricane Katrina was still a Category 1 hurricane when it hit Jackson, 240 km from the coast.

11 tornadoes were associated with Hurricane Katrina





Jackson, Miss.



Hattiesburg, Miss.



Nighttime satellite image showing areas of the Gulf Coast without power (red) versus areas with normal lights (yellow) on Aug 30, following the passage of Hurricane Katrina

800,000 households without electricity in Mississippi (55% of state)



Bodies were stored in refrigerated trucks in Biloxi, Mississippi. 231 fatalities



Over 70,000 Homes Destroyed



## Preparedness: Katrina Predictions and Warnings

#### National Hurricane Center

Predictions allowed for preparation and evacuation





Director Max Mayfield personally called Mississippi Governor Barbour to warn about Katrina because of his concern

## Technology: Forecasting and Predictive Modeling

- Forecasting is an important lifesaving measure
- Predictive modeling provides data on:

 Frequency, intensity, damage estimates, impact on infrastructure, development of cost estimates, examination of second and third order effects (economic impacts, etc.) of disasters

• Provides "Maximum of Maximum" scenarios for planning

#### Katrina Public Preparation and Evacuation

Coastal residents in Mississippi had experience with a Cat 5 hurricane – Hurricane Camille in 1969



152 shelters in Mississippi to house more than 16,354 people



#### Public preparedness and participation

Studies consistently provide data indicating that few people prepare for a disaster. We need to develop methodologies more effectively encourage preparedness by the public

Evacuation (both pre and post event)

- Evacuation Planning Behavioral studies contribute to understanding demographics and realistic planning, route analysis, shelter integration
- Evacuee/patient identification technologies
- Evacuation Planning Technologies Tracking vehicle densities, Traffic Management, Fuel planning

#### Katrina Search and Rescue

12 days after landfall (9/10/05) State and FEMA Search and Rescue, US Coast Guard, and Mississippi National Guard teams rescued over 4,823 people.





Moss Point, Mississippi, 2005

# Emergency Management Assistance Compact (EMAC)

#### Legal agreement between states to provide assistance in a disaster



Medical team, Florida sent over 6,000 responders to Mississippi



- •Mississippi received assistance from 40 other states.
- 24,500 responders in Mississippi from other states



Indiana Task Force 1 Urban Search and Rescue (US&R) team

#### Train, Exercise and Manage First Responders in Search and Rescue and Other Tasks

- National Incident Management System (NIMS) and Incident Command System (ICS) adoption and training
- US Fire Academy: Incident management systems training
- Exercise Simulations at all levels
- Use of GPS systems to track responders and survivors during search and rescue operations
- US National Grid System Google Earth and other mapping systems

#### Communications

During Katrina, virtually every system failed: Internet communications, radio transmissions, cell phones, even backup gear such as satellite phones.

Washington Post 12/10/05







#### Communications

Need redundant, resilient, reliable communications

- More than a technical/equipment issue
- Situational Awareness required from interagency field elements to the joint state – federal Unified Coordination Group at Joint Field Office
  - How are various departments, agencies, and teams in the field coordinating and communicating with each other?
  - Who needs to communicate directly with whom? Or.....what is interoperable communications?

#### Katrina Unified Response in Mississippi

- Focus on the mission and outcomes and the statefederal partnership allowed joint decisions to be made at all levels
- Cooperation of all agencies contributed to response



#### Emergency Management in US: Complex Jurisdictional Arrangements

- State is in Charge, Federal Government in Support: it takes a team (state, federal, NGO, private sector)
- The Stafford Act (President's authority to assist state governors) specifies that the federal assistance is in support of the state – the state assists local jurisdictions.
- Jurisdictional issues When a large city experiences a disaster: who is in charge – the governor or the mayor?

#### ICS and Incident Action Planning in Katrina in Mississippi

## The IAP is developed by Unified Coordinating Group, the IAP is the engine that drives the response/recovery effort



#### **Emergency Management in US**

#### **Emergency Support Functions**

- ESF 1 Transportation **Department of Transportation**
- ESF 2 Communications FEMA / National Communications System
- ESF 3 Public Works and Engineering- U.S. Army Corps of Engineers
- ESF 4 Firefighting- **Department of Agriculture, Forest Service**
- ESF 5 Information and Planning FEMA
- ESF 6 Mass Care FEMA
- ESF 7 Resource Support General Services Administration & FEMA
- ESF 8 Health and Medical Services: DHHS
- ESF 9 Urban Search and Rescue FEMA
- ESF 10 Hazardous Materials Environmental Protection Agency
- ESF 11 Food Department of Agriculture
- ESF 12 Energy **Department of Energy**
- ESF 13 Long Term Recovery FEMA
- ESF 14 Public Safety and Security **Dept of Justice**
- ESF 15 External Affairs FEMA

#### **Common Operating Picture**

- Key decision makers ("Whole Community") require access to the same critical information.
- Emergency information systems (WebEOC, ETeam, Previstar, others) must be interoperable
- Need systems that incorporate "real time feeds" into a format that can be used for situational awareness
- Critical Information requirements (CIR) must be developed and collection responsibilities assigned to technical or human resources
- Automated information sharing via cell/smart phone technologies must be better understood and leveraged

#### Katrina Logistics (delivery of commodities)

- Distribution of water and food to the survivors was difficult
- Insufficient commodities arrived in the state to cover the demand
- In multi-state events need system to prioritize limited resources
- 72 hours self sufficiency doesn't apply when homes are destroyed







#### Logistics Technologies

- Resource tracking from point of origin to "last mile"
- Predictive modeling to support logistics planning by developing requirements
- Route selection using up to date imagery
- Networking all sources: Government and private sector partners work to get businesses re-established
- Information to survivors regarding commodity and services locations via smart phones, etc.

#### Katrina Temporary Roofing Program

Allows people to return to their homes even if the roof is damaged

Over 1000 temporary roofs day installed; 50,000 total



Ocean Springs, Miss., October 30, 2005 FEMA/Mark Wolfe





Prepositioned roofing material

#### **Temporary Housing**

Even though housing was provided at a record rate, it was not enough. Different solutions are needed:





- Permanent housing
- Prefabricated
- Utilities an issue



35,000 trailers and manufactured housing units occupied in Mississippi

#### **Temporary Housing Technologies**

- Damage assessments imagery
- Efficient, easily installed, cost effective alternatives
- Quick, efficient establishment of utilities infrastructure to support temporary housing solutions
- Required: Pre-event planning for housing survivors after a disaster



Katrina Cottage

## Mitigation





MEMA and FEMA display at a local home improvement store explains mitigation techniques.

Sole surviving mitigated home stands in Long Beach, Mississippi

## Mitigation

- Support development of building codes and standards
- Cost / Benefit Analysis models
- Digitized flood mapping
- Post-event studies on infrastructure impacts
- Development and dissemination of mitigation "Success stories"
- Behavioral studies to assist future planning

#### Whole Community Involvement Have Better Plans for Integrating Contributions of Nongovernmental Organizations, Individuals and Private Industry



Red Cross & other NGO's



**Private Industry** 



HMCS Athabaskan, Toronto and Ville Quebec deployed to the US Gulf Coast International



Faith Based Groups and Other Volunteers



Animal Rescue



**Cultural Groups** 

## "Whole-Community" Process

#### Specific Actions

#### **Planning Activities**

**Risk Assessment &** Use best available information (existing plans, modeling, National Predicted Consequences Planning Scenarios, etc) to define/quantify needs Based on a 72-hour timeline Requirements - Use systems analysis to ID needs & Engage ESFLG, IP, states, to conduct staff estimate and determine requirements Outcomes and outcomes **Basic Capabilities** Preparedness and Operations lead efforts & - establish working groups Deltas - develop Whole Community plan - integrate atypical partners - Deltas will inform LOOs such as NEP, **Other Preparedness** Force Structure, RCGP, HSEEP, CAT Planning Components - LOOs are charged to fill the Deltas Organizing/Staffing, Equipping, Training, Exercising, Evaluating, and Improving

Need to more fully integrate technologies into pre-event preparedness, response, recovery, and mitigation strategies and techniques:

- Communications must have robust, redundant systems using up-to-date technologies and restoration of cell service
- Building codes and standards to strengthen communities
- Use of Social Networking to gather and disseminate critical information
- Common Operating Picture using enhanced technologies
- Situational Awareness through "data mining" and incorporation of live "feeds" from all appropriate sources
- Post-event long term recovery planning using modeling and behavioral studies
- Integrate the "Whole Community" into response and recovery: Private sector, NGO's, survivors, government

#### **Going Forward**

- "Team approach" all levels of government, volunteer agencies, private sector + non-traditional solutions = "Whole Community"
- "Survivors are not victims" they can be resources
- "Plan for community, not what is easy" children, frail, disadvantaged
- "Think big, go big, go fast" in large scale disasters there are never sufficient resources and situation must be stabilized in first 72 to 96 hours
- Plan for the "maximum of maximums" in terms of requirements