



# Naval Postgraduate School

## Joint Task Force Katrina Relief Effort



Unclassified

Information Brief

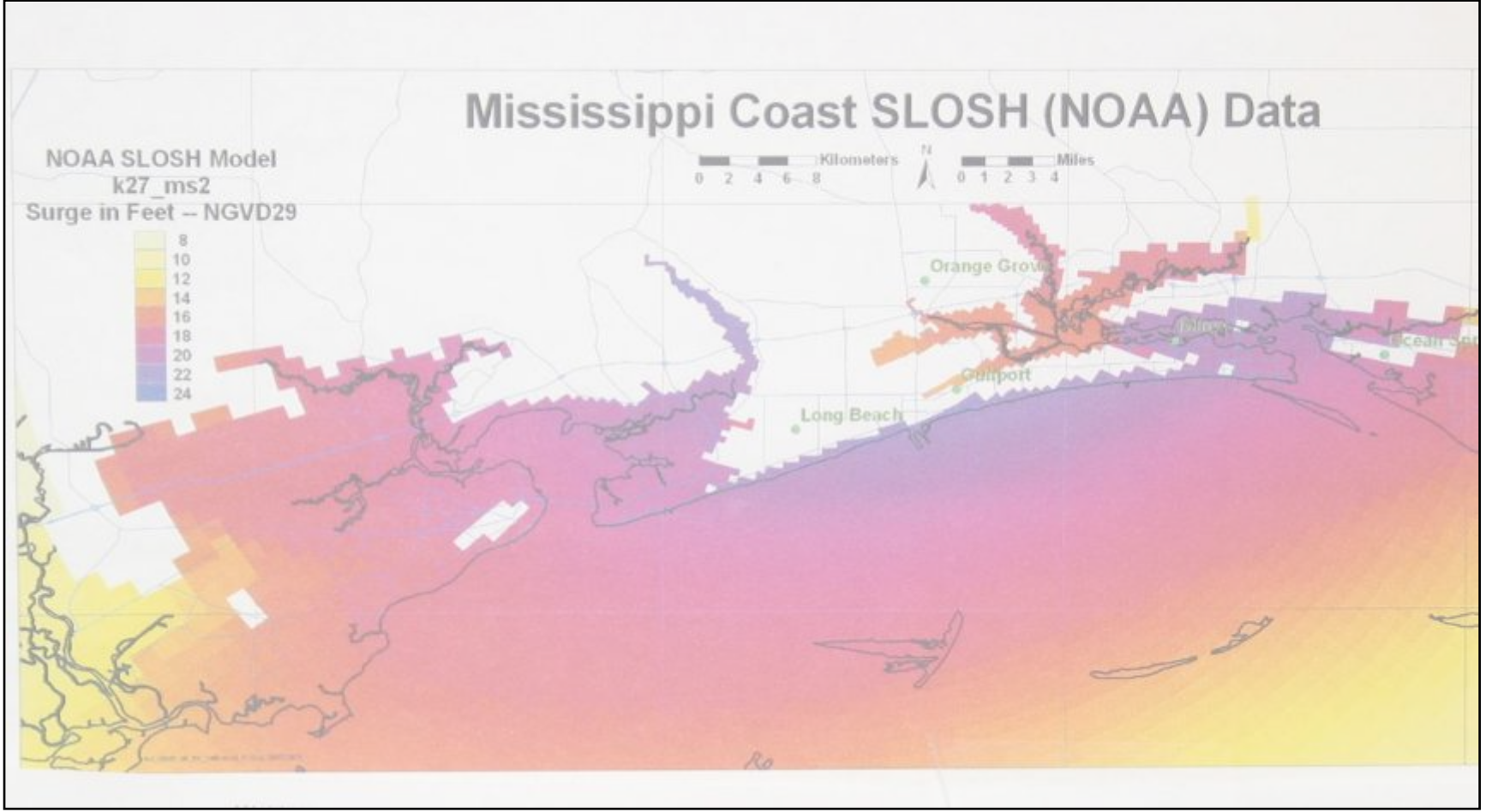


# Purpose/Objective

- **Purpose:** To provide the WCA a sketch of NPS's Hastily Formed Network deployed in support of the emergency response to Hurricane Katrina.
- **Objective:** To show that “we” have a lot of work to do with Humanitarian Assistance/Disaster Relief in the global humanitarian assistance community.



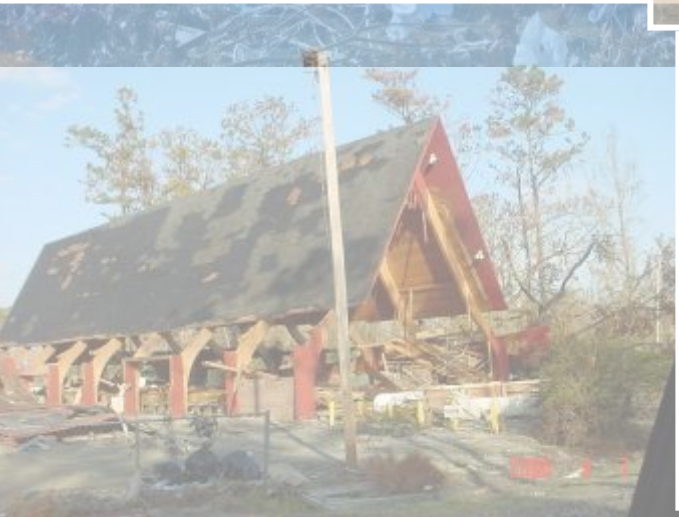
# The Storm Surge.....







# The Images.....



FROM THE PEOPLE  
OF WAVELAND

In appreciation and gratitude  
to all who gave of their time,  
energy, and money to help us  
recover from Hurricane Camille.  
On August 17, 1969 our city was  
devastated, but those who  
cared came to her rescue.

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# More Images.....







# More Images.....





# The Problem.....

- No power
- No fiber/copper infrastructure
- No push-to-talk comms to speak of
- Cellular services totally jammed
- Satellite phone service totally jammed
- Not enough satellite eqpt suites available
- No Internet access (web, email, VOIP)



# The Problem (cont'd).....

- Katrina knocked out
  - 2.8 million phone lines
  - more than 1,600 cell phone towers
  - more than 420,000 cable TV connections  
(that also served as Internet links)



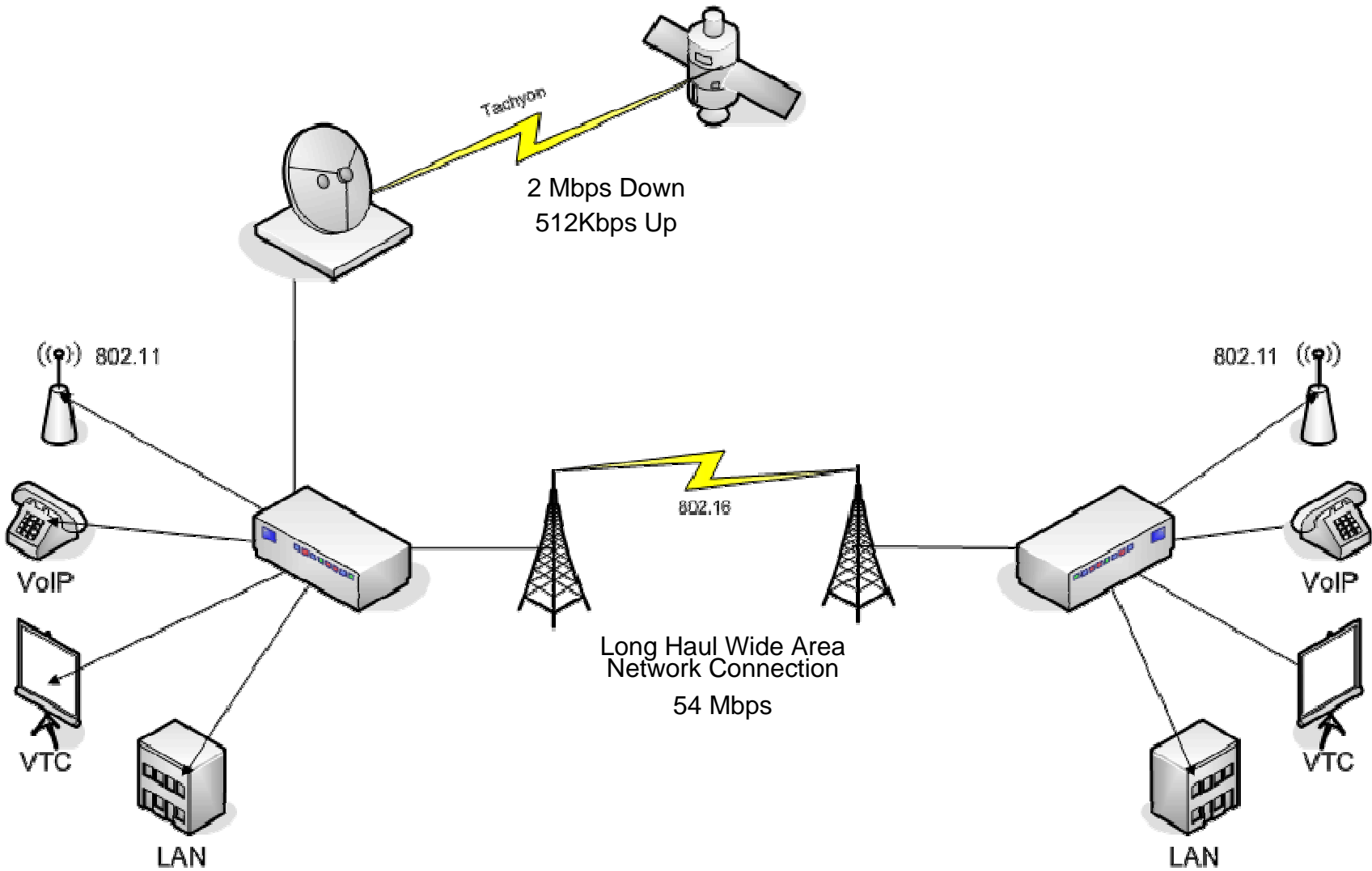


# The Solution.....

- SATCOM Internet Reachback
- 802.11 (WiFi) and 802.16 (WiMax)
- Broadband Internet, Web, Email
- Voice Over IP (basic dial-tone)
- Skype (free internet phone)
- Groove (collaboration solution)



# Employed Technologies





# The Team.....

- **NPS Faculty Members (2)**
- **NPS Students (19)**
  - Information Warfare, Information Systems and Technology, Joint C4I Systems, Space Systems Operations, Space Systems Engineering
  - Multi-service, Multi-designator
- **Others:**
  - **Naval Reservists (5)**
    - Naval Security Group Reserve
  - **OSD NII Observer**
    - Active Duty Commander, USN
  - **Corporate Partners**
    - Cisco, Microsoft, Redline, Tachyon, Mercury Data Systems, Rajant Corp.





# The Team.....



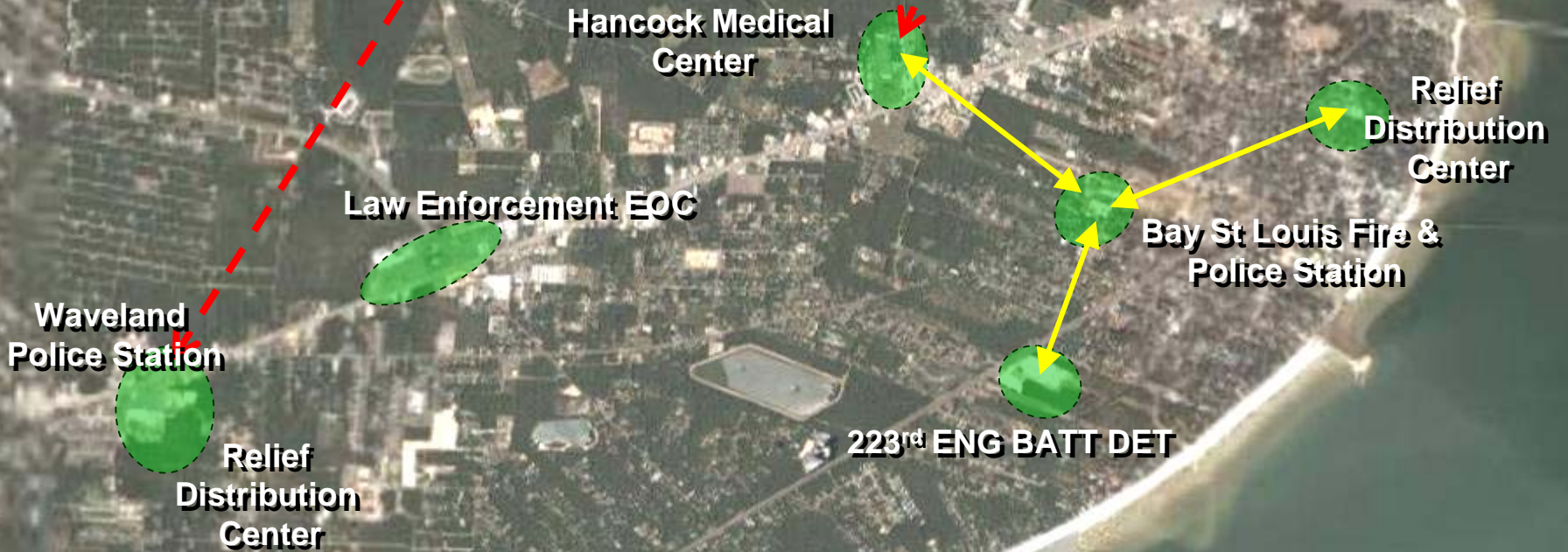
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# Network Infrastructure



## NPS DET 1 NETWORK

- Tachyon Satellite 
- 802.16 Wireless 
- 802.11 Wireless 





# Accomplishments

- Created and extended full scale, timely, and self contained wide area network in an austere environment
- Expanded upon prior research
- Ran a more diverse and comprehensive set of applications than had been tested at NPS
- Valuable student real world application of technology



# Detachment 2

- NPS Faculty Members (2)
  - Dr. Alex Bordetsky, Professor
  - Eugene Bourakov, Research
- NPS Students (2)
  - CDR John Looney, US Navy
    - Department of Information Sciences
    - PhD Student
  - CPT Maria Vedder, US Army
    - Department of Defense Analysis
    - Civil Affairs



Detachment 2

- Area of Operations
  - Pascagoula, MS



USNS Comfort, Pascagoula City Dock

- Gulfport, MS



View from I-10 Bridge

# Areas of Operation

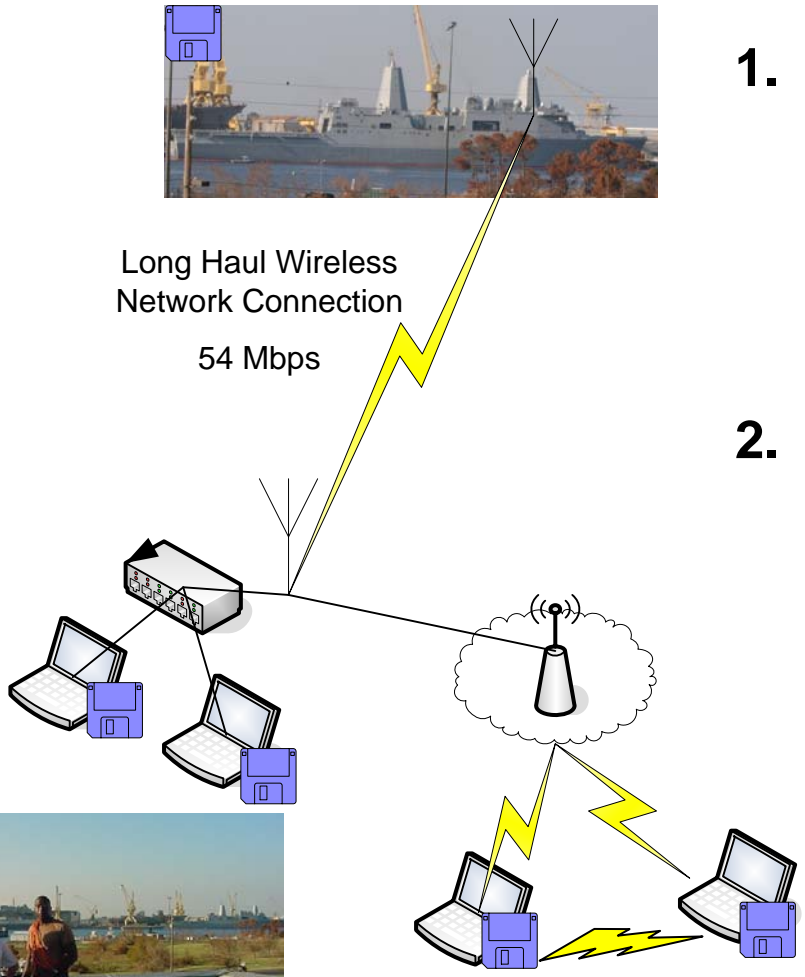






# Employed Technologies

## TNT Solution



### 1. OFDM System

- Used Orthogonal Frequency Division Multiplexing (**OFDM**)/802.16 wireless link to established a long haul ship-to-shore communications link from PCU SAN ANTONIO (LPD 17) to the base HQ at Naval Station Pascagoula.

### 2. Wireless Mesh

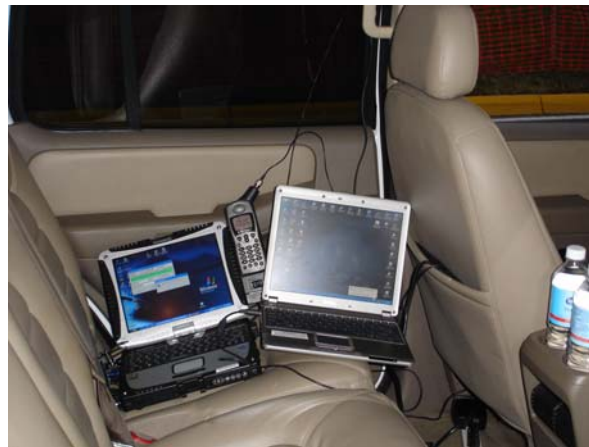
- Extended the network beyond a single point by utilizing the **wireless mesh** capability. Total wireless network extends for approximately 4 kilometers above the water





# Accomplishments

- Low cost, Low Burden, High Payoff
- Proof of Concept
- Adaptable for employment in austere environments
- Evolving collaborative network





# Lessons Learned

- NPS:
  - Truly a Proof of Concept
  - Practical value for students and faculty
  - Enhanced research opportunities and theses insights
  - Team
  - Marketing Opportunity
- Navy:
  - Network Capability is a first responder necessity
  - Time Matters
  - Adaptability
  - Applicability
- Joint:
  - Collaborative Environment



# Conclusion and Challenge.....

- “We” must do better
- Who are “We” ?
- How do “We” proceed ?
- Are we ready for Wilma, California’s “big one”, Avian Flu Pandemic, etc ?
- Need scalable, robust, interoperable comms !!
- DoD and DoN have a role !!

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