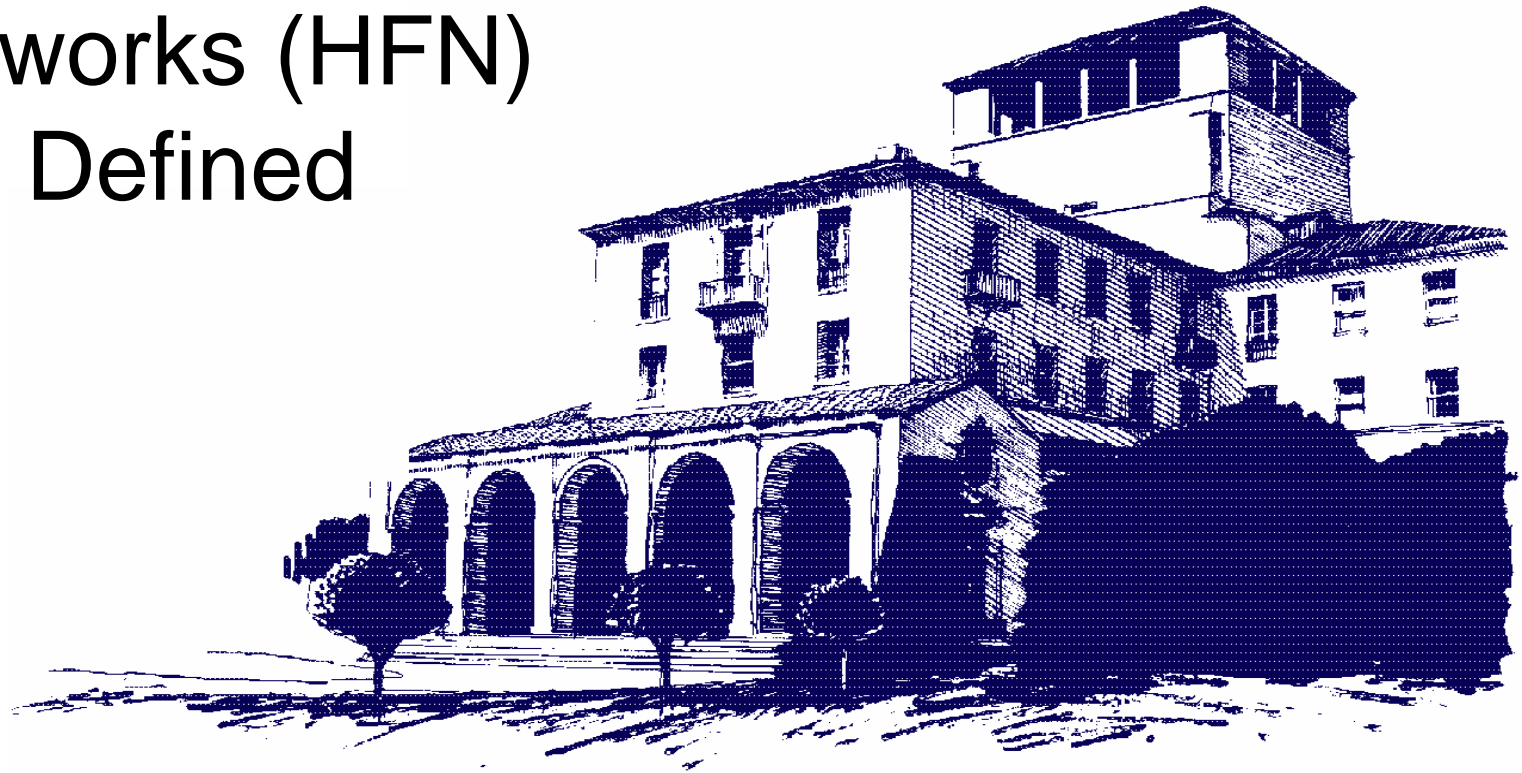




Naval Postgraduate School

Hastily Formed Networks (HFN) Defined



Unclassified Information Brief for the eCLIC and WCA
13 December 2006

Prepared by Professor Brian Steckler, Executive Director NPS HFN Center

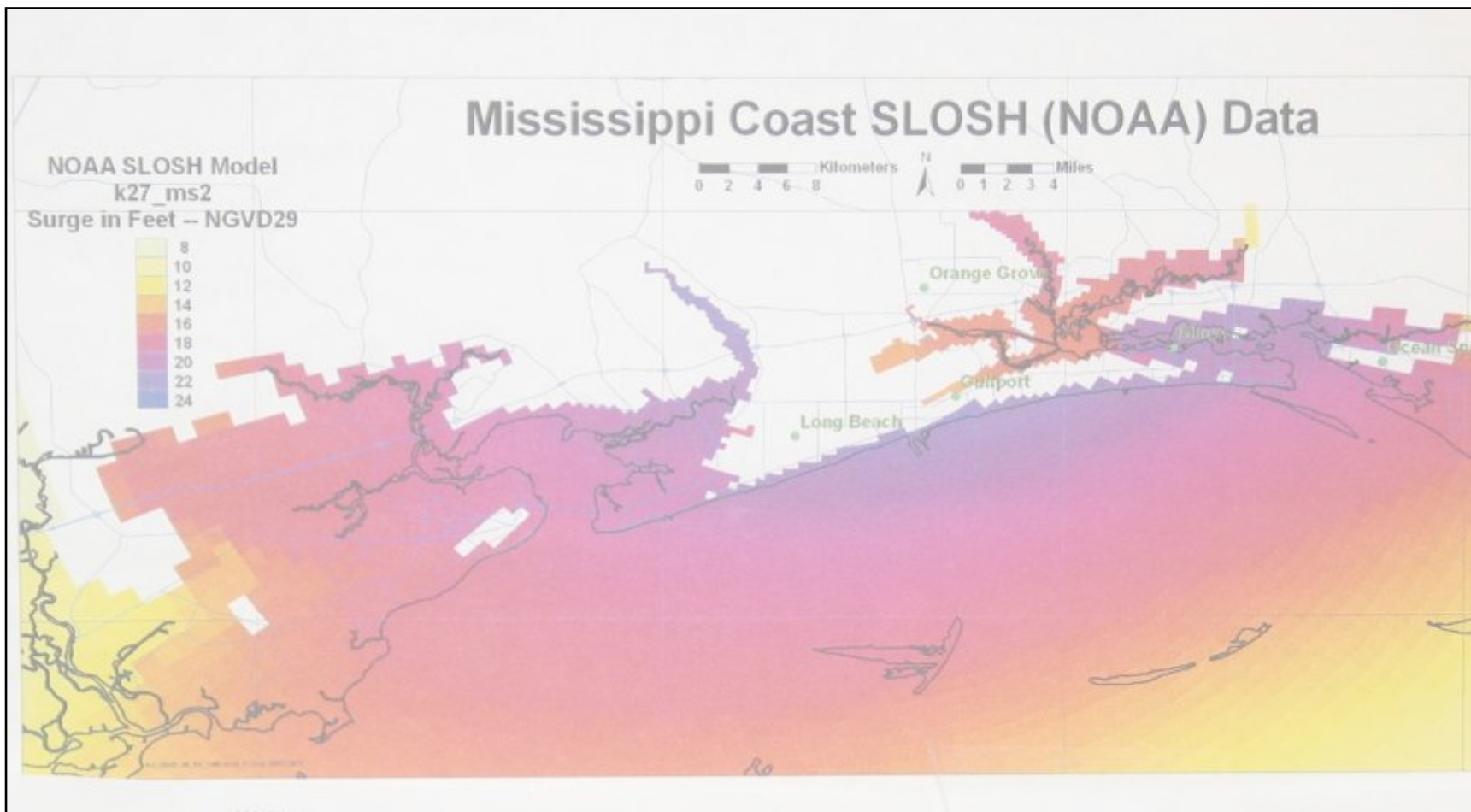


Purpose/Objective

- **Purpose:** To provide Congressman Rogers with a sketch of NPS's Hastily Formed Networks (HFN) capabilities, activities, and recent real-world deployments - Hurricane Katrina, Philippines, SE Asian Tsunami, and other HFN activities.
- **Objective:** To show relevance of HFNs and NPS's Humanitarian Assistance / Disaster Relief work to the global disaster relief community.



The Storm Surge.....



Areas of Operation



Network Infrastructure

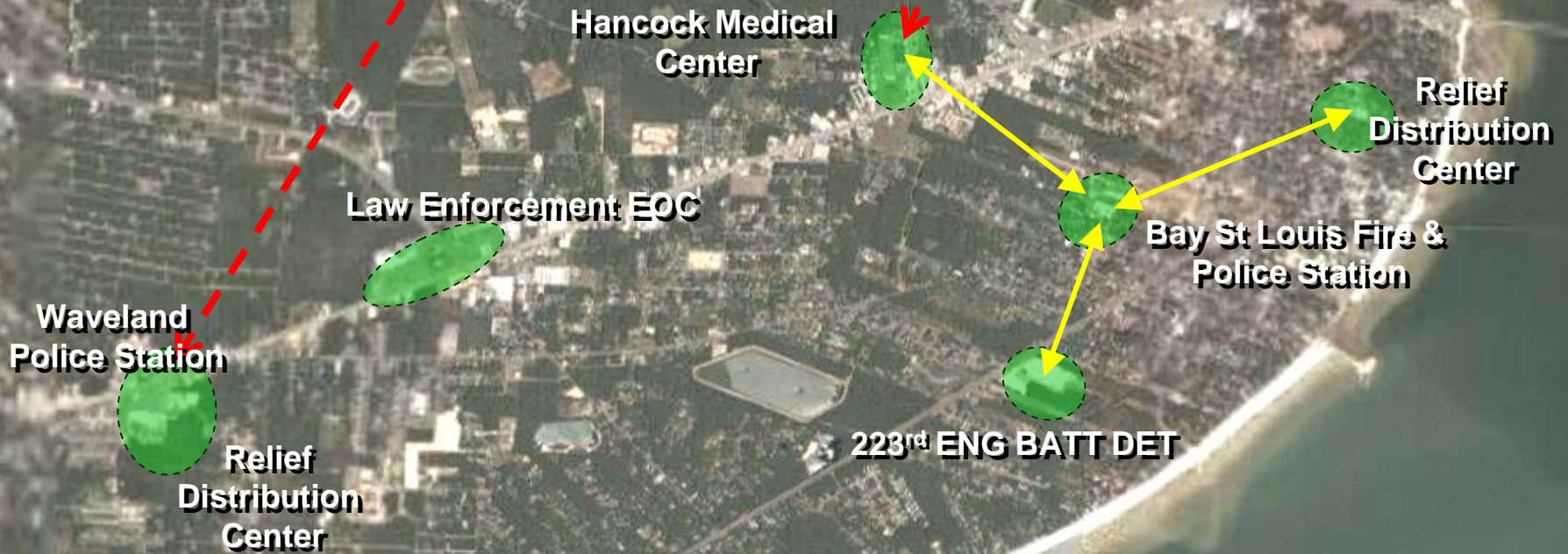


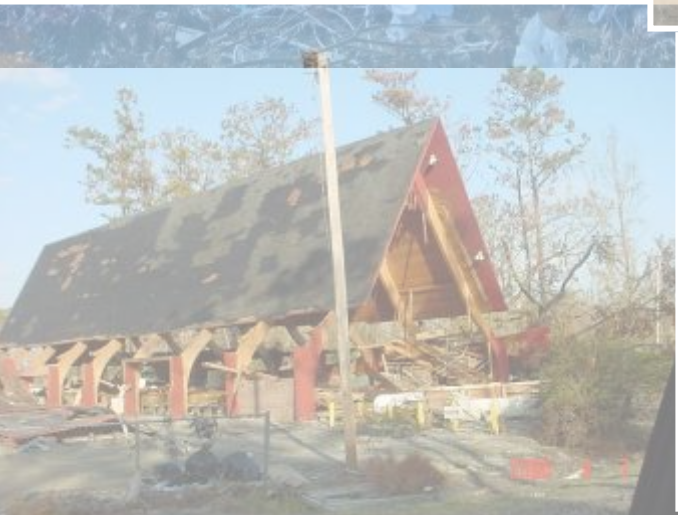
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NPS DET 1 NETWORK

- Tachyon Satellite 
- 802.16 Wireless 
- 802.11 Wireless 

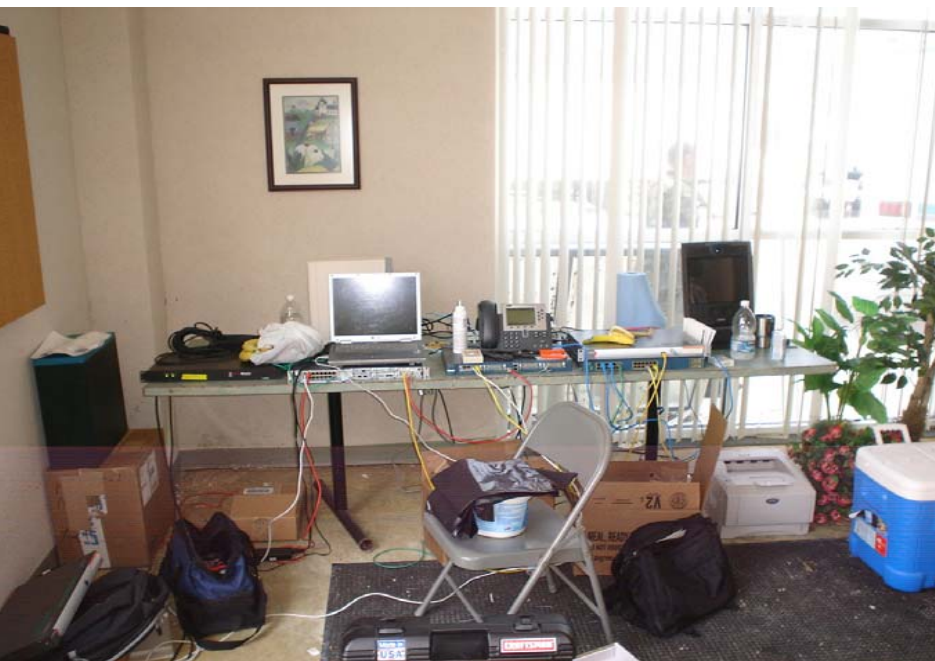
The Images.....



The Images.....



The Images...



The Images.....





The Problem.....

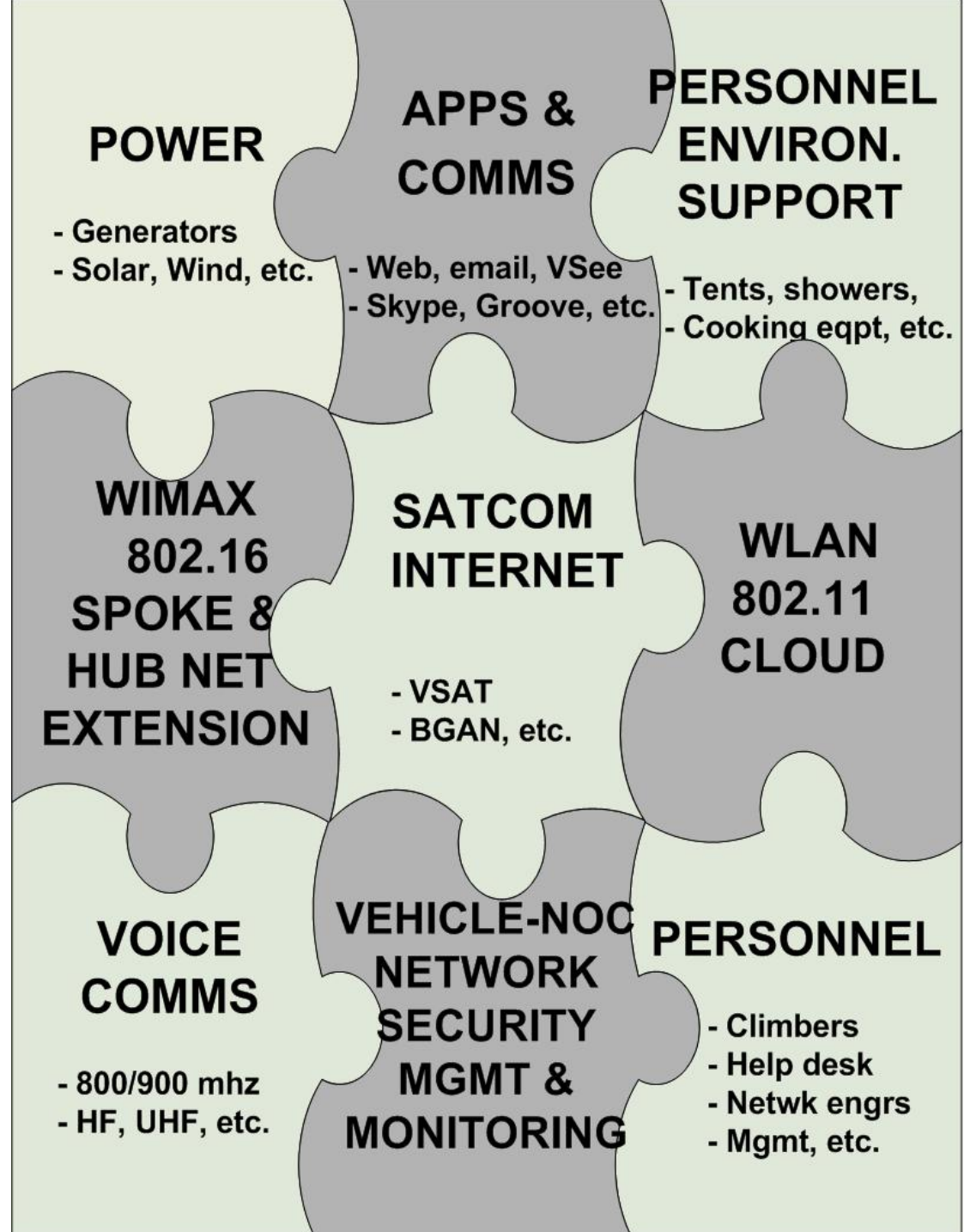
- **No power**
- **No fiber/copper infrastructure**
- **No push-to-talk comms to speak of**
- **Cellular svc mostly jammed / overwhelmed**
- **SatPhone svc mostly jammed / overwhelmed**
- **Not enough satellite eqpt suites available**
- **No Internet access (web, email, VOIP)**
- **No technical people resources available**



THE PUZZLE.....

Surrounded
by the Civil-
Military
Boundary....

and
Improvisation





One Viable Comms 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)



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.



Accomplishments

- **Created and extended full scale, timely, and self contained wide area network in an austere environment – expanded from Tsunami work**
- **First communications capability for *many***
- **Learned about civil-military boundary issues CONUS versus International from Tsunami work**
- **Valuable student real world application of technology (learned by doing – live lab work)**



Lessons Learned

- **Effect of No Common Situational Awareness**
- **VoIP Was HUGE Benefit**
- **Physical Access Was a Challenge**
- **PTT Radio Interoperability a Growing Concern**
- **Creature Comforts – You're on Your Own**
- **Pre-Positioning Assets and Contracts**
 - **Can't Negotiate in the Chaos !**
- **Force Protection**
- **Active Military versus Nat'l Guard (or both)?**
- **Providing Internet Access to the Public**



Ongoing NPS HFN Research

- **Hastily Formed Networks that Enable.....**
 - **Noncombatant Evacuation Ops (NEO) Tracking (NPS/DMDC R&D and Proof of Concepts)**
 - **Patient / Victim / Body Tracking Systems**
 - **What will we do if we have 500,000 or 1 million victims ?!**
 - **HFNs from Ship to Shore - US and International**
- **Voice Radio Interoperability – DoD, DHS/FEMA/Nat'l Guard, Others**
- **More US / International HA/DR Opportunities:**
 - **Upcoming missions on US Warships, Hospital Ships, Joint US/Australian Navy Exercises, the Next Real-World Disaster**
- **Smaller Form Factor Comms Suites, VSAT Internet Reachback, Alternate Power Sources, Situational Awareness (Focus on POWER, LIFT, COMMS)**
- **Security, Stability, Transition and Reconstruction (SSTR) Tip of the Spear Support**



Conclusion and Challenges.....

- **“WE” must do better !**
- **Who are “WE” ?**
- **How do “WE” proceed ?**
- **Are WE ready for the next hurricane season, international disaster, Japan’s “big one”, Global Avian Flu Pandemic, etc ?**
- **Need scalable, robust, affordable, interoperable comms !!**
- **Int’l Community, Private Sector, DoD and DHS all have roles !!**

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<http://www.nps.navy.mil/disasterrelief>**



My Summer Cruise.....





**Bottom Line:
A Better Way to Run A Railroad is Needed!!**

