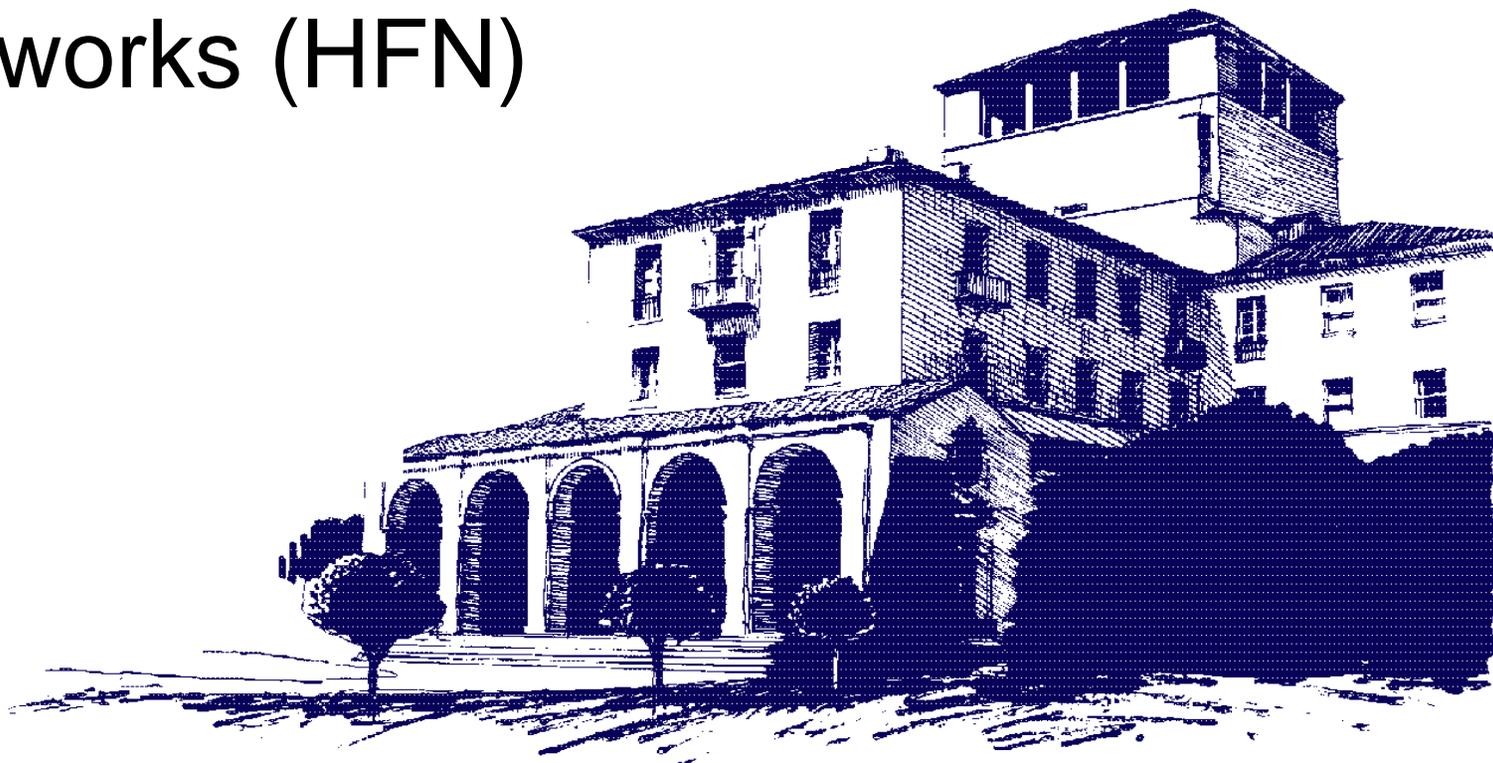


Naval Postgraduate School

Hastily Formed Networks (HFN)



Unclassified Information Brief 4 Oct 2011

Prepared by Brian Steckler, Director NPS HFN Research Group



Today's Agenda

- HFNs Defined
- NPS HFN Related Activities Past 5+ Years
- Example HFN for HA/DR Missions (Hurricane Katrina, Haiti Earthquake)



Practical Physical HFN

THE HFN PUZZLE...

Surrounded
by the Civil-
Military
Boundary...



.....and Improvisation !!

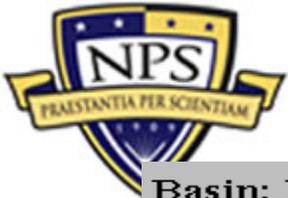


Past/Present NPS HFN HA/DR Activities

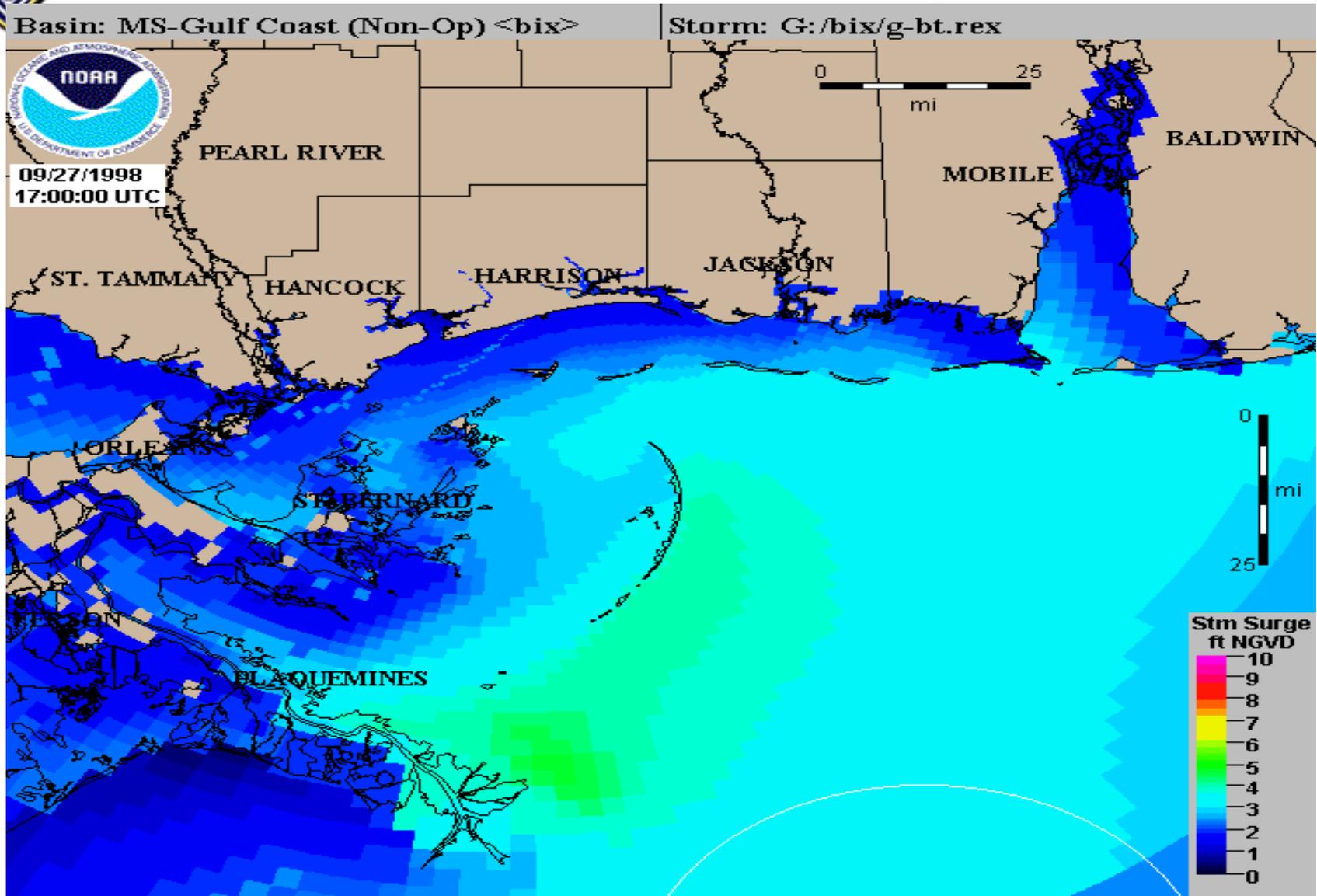
- SE Asian Tsunami (Jan-May 05)
- US Hospital Ships (USNS Mercy and USNS Comfort) - Humanitarian Missions in SE Asia and S America (Summers 06 and 07)
- Hurricane Katrina (Sep-Oct 2005) – EXAMPLE HFN
- Haiti Earthquake (January-May 2010) – EXAMPLE HFN



HURRICANE KATRINA



Katrina Storm Surge.....



SLOSH = Sea, Lake and Overland Surges from Hurricanes



Hurricane Katrina.....

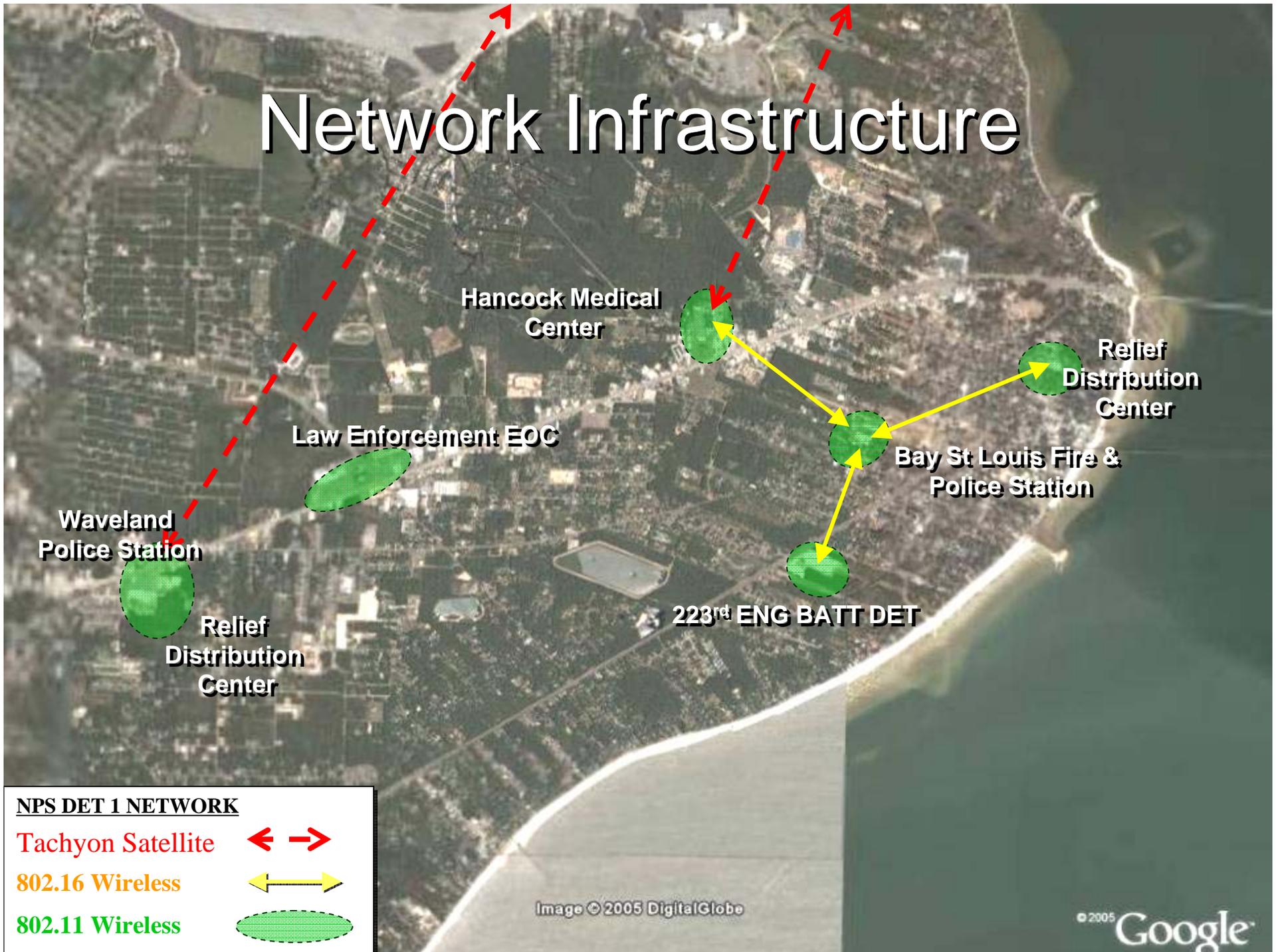
- The Problems:
 - No power
 - No fiber/copper infrastructure
 - No push-to-talk comms to speak of
 - Cellular svc mostly jammed / overwhelmed
 - SatPhone svc mostly jammed / overwhelmed
 - Not enough satellite eqpt suites available
 - No Internet access (web, email, VOIP)
 - No technical people resources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



HFNs - A Viable Comms Solution.....

- The HFN Puzzle Pieces
 - SATCOM Internet Reachback
 - 802.11 (WiFi) and 802.16 (WiMax)
 - Broadband Internet, Web, Email
 - Voice Over IP (basic dial-tone)
 - Skype (free internet phone)
- Airborne Wireless Delivery Option ???

Network Infrastructure





Katrina NPS

Key Lessons Learned

- **Effect of No Common Situational Awareness**
- **VoIP Was HUGE Benefit**
- **PTT Radio Interoperability a Growing Concern**
- **Pre-Positioning Assets and Contracts**
 - **Can't Negotiate in the Chaos !**
- **Providing Internet Access to the Public**



USNS MERCY AND USNS COMFORT

HUMANITARIAN ASSISTANCE MISSIONS





HAITI EARTHQUAKE



- EMBARKED ON COMFORT
- CAMPING AT AMEMB/JTF HAITI HQ
- OUT IN ECONOMY WORKING WITH NGO'S















EMBASSY OF THE
UNITED STATES OF AMERICA



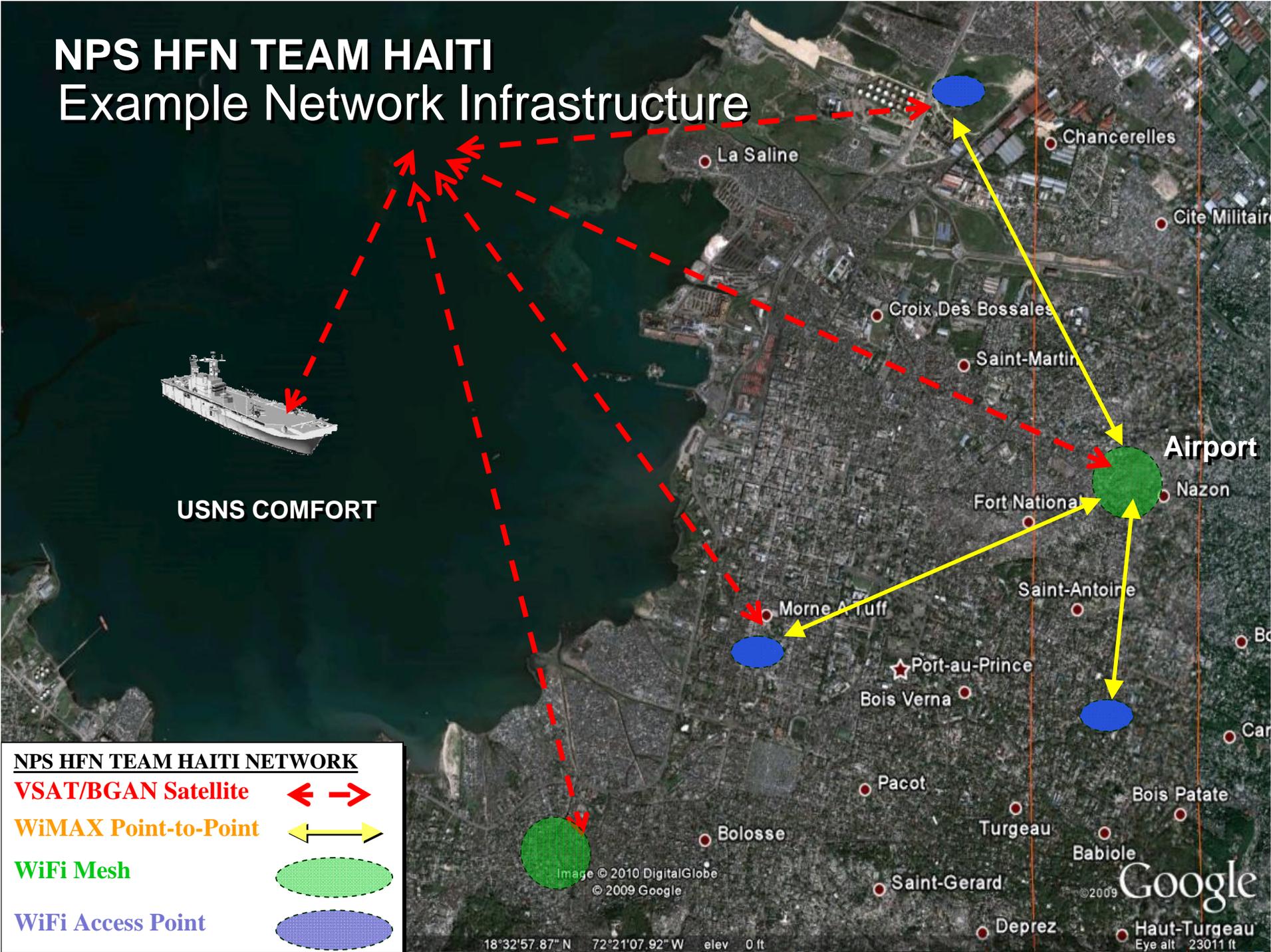
*AMBASSADE DES
ETATS UNIS D' AMERIQUE*





NPS HFN TEAM HAITI

Example Network Infrastructure



NPS HFN TEAM HAITI NETWORK

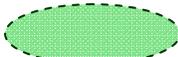
- VSAT/BGAN Satellite** 
- WiMAX Point-to-Point** 
- WiFi Mesh** 
- WiFi Access Point** 

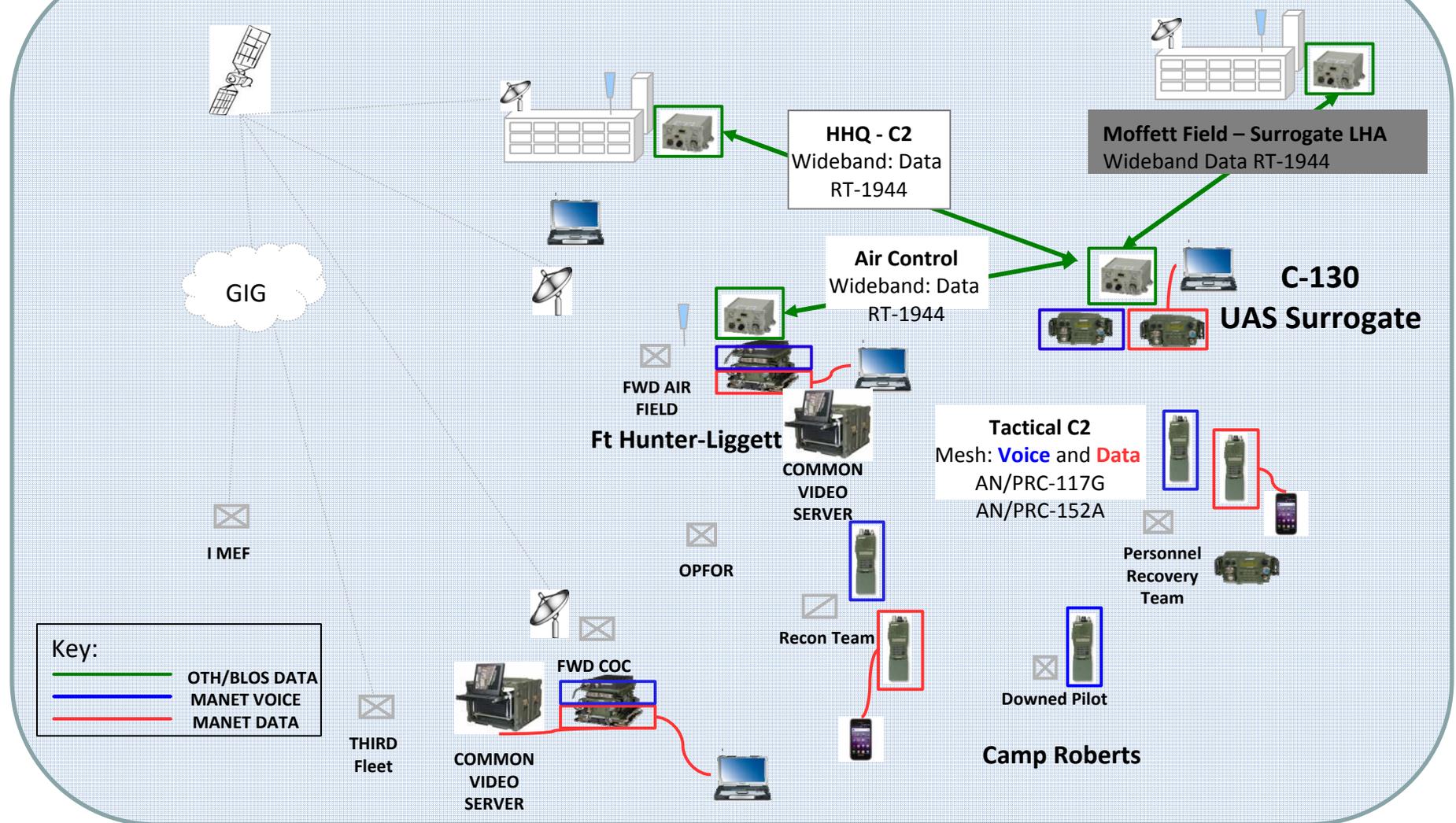
Image © 2010 DigitalGlobe
 © 2009 Google
 18°32'57.87" N 72°21'07.92" W elev 0 ft

Google
 ©2009
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TACTICAL NETWORK TOPOLOGY 12-1 SYSTEMS VIEW



- Provide over-watch and force protection
- Over-the-Horizon (OTH) & Beyond-Line-of-Sight (BLOS)
- SATCOM and Aerial Relay

- Extend Robust Data/Voice Networks
- High Throughput: Use Existing Digital Wideband Systems
- Improved MAGTF Responsiveness: Plug Info Shortfalls
- Timely, Shared, Accurate Personnel and Asset Location





NPS FLYAWAY KITS:

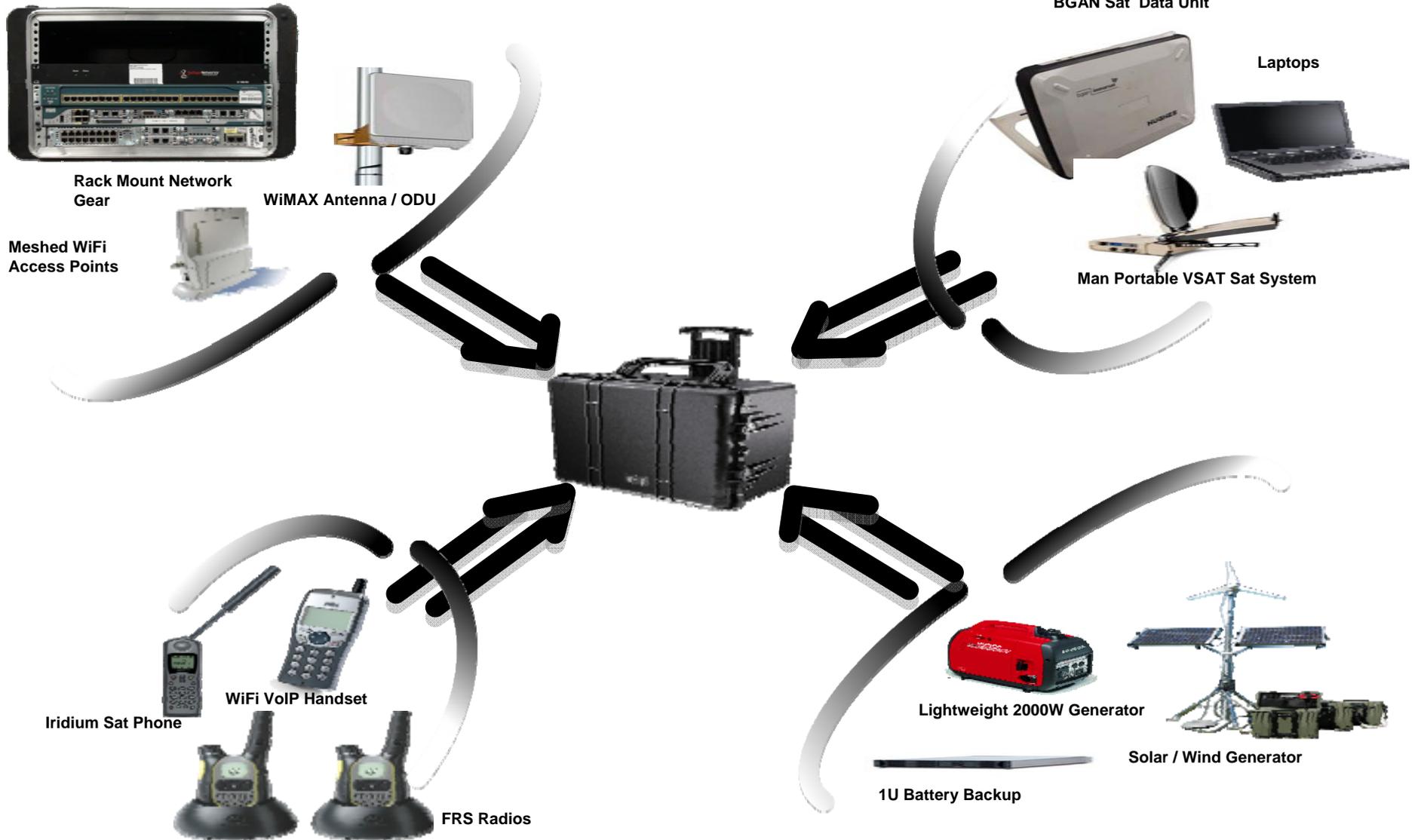
COMMS
POWER
VISUALIZATION
MASLOW

Communications Fly Away Kit (FLAK)

Challenge

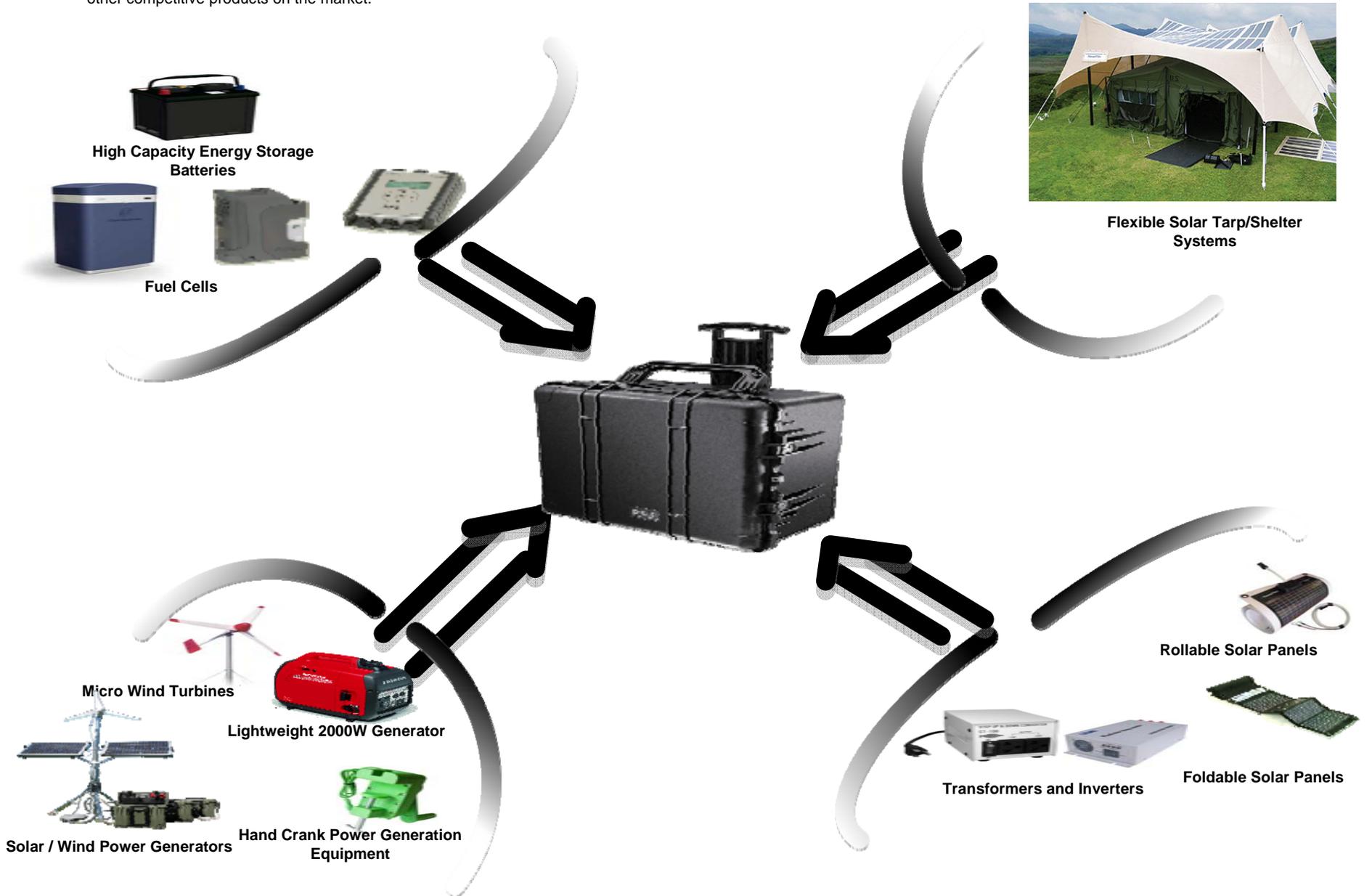
• Rapidly deploy diverse communication equipment into Humanitarian Assistance / Disaster Relief scenarios where most or all existing infrastructure is inoperable.

• NOTE: NPS and the U.S. Gov't do not endorse or promote specific products – these are examples only. There are other competitive products on the market.



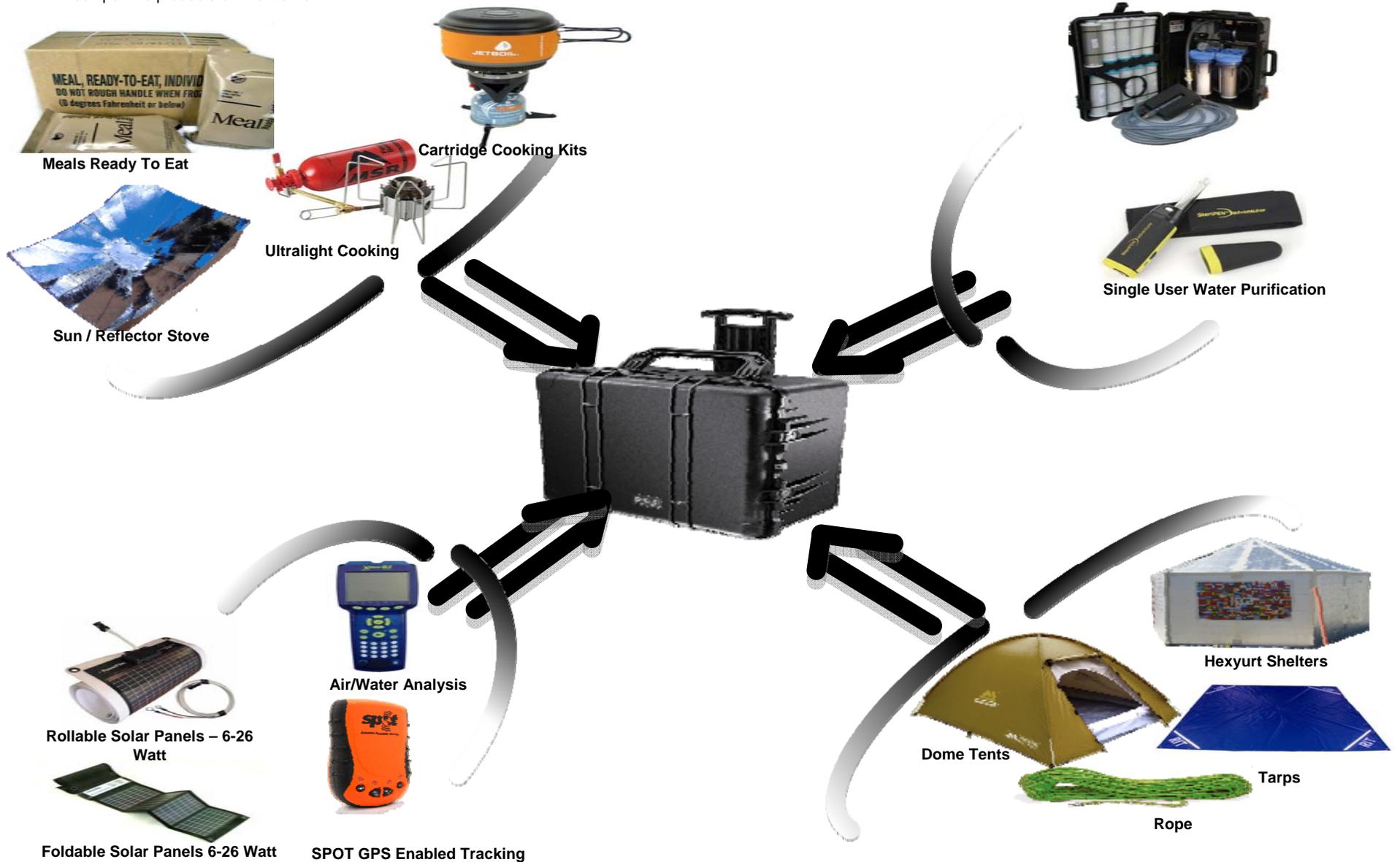
Power Fly Away Kit (FLAK)

• NOTE: NPS and the U.S. Gov't do not endorse or promote specific products – these are examples only. There are other competitive products on the market.



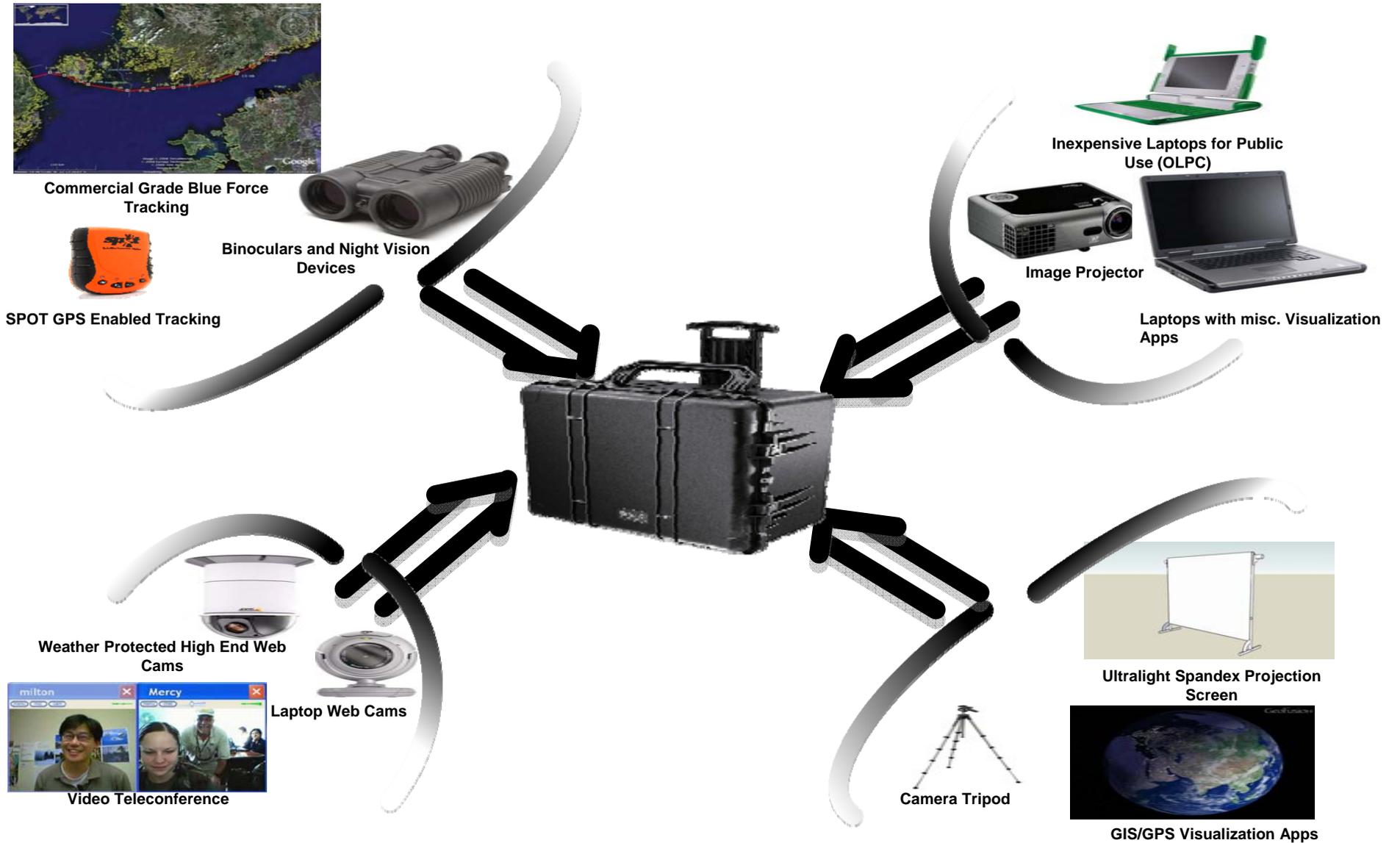
Maslow (Personnel Survival/Support) Fly Away Kit (FLAK)

• NOTE: NPS and the U.S. Gov't do not endorse or promote specific products – these are examples only. There are other competitive products on the market.



Visualization Fly Away Kit (FLAK)

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QUESTIONS ?

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NPS Hastily Formed Networks Center

Main HFN portal:

<http://www.hfncenter.org>

Katrina Interactive Report:

<http://faculty.nps.edu/dl/HFN/index.htm>

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