

Communications Path Diversity: The Key to Connectivity in a Crisis

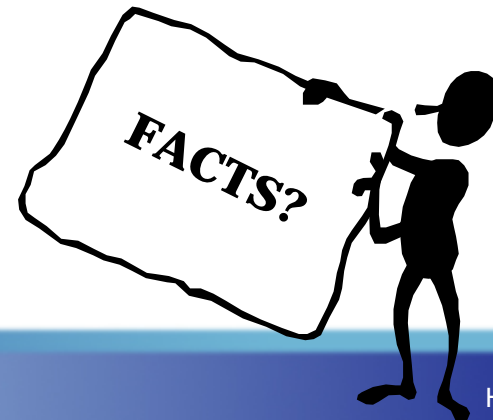
**Strategies for Resilience
CPM 2008 WEST**

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Opening Thoughts.....

- ❖ The events following the devastating impact of the "9-11" terrorist attacks and Hurricane Katrina made it clear that commercial entities and government agencies at all levels are not collectively as ready as they should be to effectively prepare, mitigate, respond and recover from a crisis of significant proportion.
- ❖ Both Industry and Government have recognized that a well-conceived emergency preparedness plan, built into network architecture is as, if not more, important than a nimble emergency response plan.
- ❖ Communications facilities are not yet where they need to be to properly handle a crisis. Not knowing how to protect your most vital buildings and systems -- and your employees -- should be your number one priority.



The Disaster Scenarios: What Do They Mean? How to react....

- ❖ Disasters and major events can be national, regional, or local

- Natural
- Accident
- Terrorist
- Pandemic

- ❖ Impact is felt by:

- First responders
- Emergency services
- Industry
- Commerce
- Consumers and the general population
- Federal government
- State government
- Local government
- Aid agencies



- ❖ Effective emergency communications requires essential components:

- Images: to right place at the right time
- Voice: crisp, concise, from/to people on the ground
- Data: what data? How should it be interpreted?
- Standardization and timeliness are key ingredients

Normal life must go on:

- Retailing
- Banking
- Communication to family and friends
- Government services

- ❖ The economy must survive, too

Terrestrial Communications Infrastructure is Vulnerable

- ❖ There are 35-45 circuits provided by landline networks per 100 users
- ❖ There are 25-35 circuits provided by cell networks per 100 users
- ❖ Towers are vulnerable to wind and flooding
- ❖ Towers are connected by landlines
- ❖ When failures occur, personnel on the ground cannot support repairs of this magnitude

An emergency communications infrastructure needs to employ resilient and redundant architectures including landline, wireless and satellite technology

The network should be available at all times, not only in times of emergency: uses, applications and experience will then be easily maintained

Continuity Planning

- ❖ **Continuity plans should focus on minimizing disruption of operations, maintaining organizational stability, and supporting orderly recovery after a disaster**
- ❖ **A good plan will:**
 - **Provide stakeholders with a sense of security**
 - **Minimize risk of delays in response and recovery efforts**
 - **Guarantee reliability of backup systems**
 - **Provide a standard for testing the plan**
 - **Minimize decision making during a disaster**

Continuity of Business Operations

- ❖ ***Keeping Essential and Non-essential Staff Working***
 - When COOP is activated, ERG members report to their established alternate site
 - Tele-work and Tele-coop will be options for non-ERG staff

- ❖ ***Best Practices in Preparedness***
 - Having a well-defined plan in the event of an emergency
 - Emergency plan must be well-documented and understood by employees
 - DHS' COOP plan focuses on enabling the Department to maintain mission-critical functions without interruption

What Does Industry Do?

Wal-Mart

- ❖ Satellite and terrestrial network to all distribution centers and stores
- ❖ Satellite systems 'in a box' for rapid deployment
- ❖ Voice and data communications

WalGreens

- ❖ Satellite and terrestrial networking to all stores

Advance Auto Parts

- ❖ Satellite backup to distribution centers

Lowes Stores

- ❖ Satellite and terrestrial network to all stores and data centers

BP, Shell, Exxon, Chevron

- ❖ Gas stations and convenience stores
- ❖ Satellite networks with terrestrial backup

Whole Foods

- ❖ Satellite backup to its stores

Emergency Preparedness at Work

How Businesses Can Prepare?

- Develop and practice an emergency plan
- Assess company functions to determine which are critical to maintaining operability
- Protect data and physical assets
- Promote awareness of emergency procedures among employees and partners



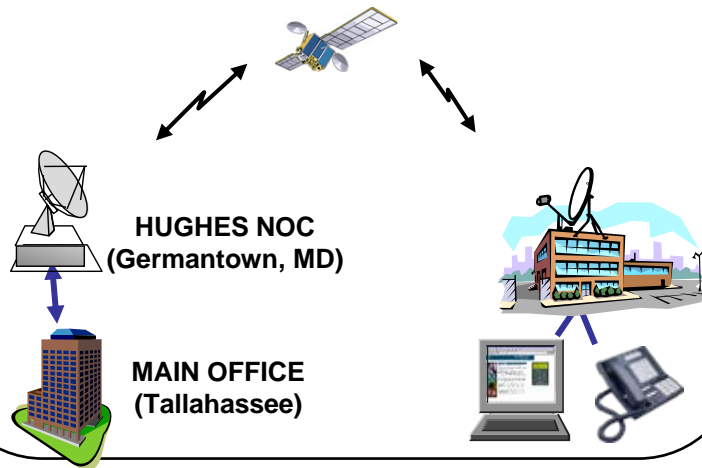
Continuity of Business Operations (cont.)

Keys to Maintaining Business Continuity

- A comprehensive COOP plan that addresses systems, facilities, and personnel
- Critical systems require:
 - Planned redundancy, including processing capability, duplicate storage, and back-up servers
 - Failover capability. i.e., duplication of the entire system at an alternate site
- Personnel: personnel must be trained in their COOP responsibilities and confident in performing them during COOP activation
- A Common Operating Picture (COP) has been established across the federal government and in coordination with state and local partners to ensure that decision makers can maintain functionality in an emergency

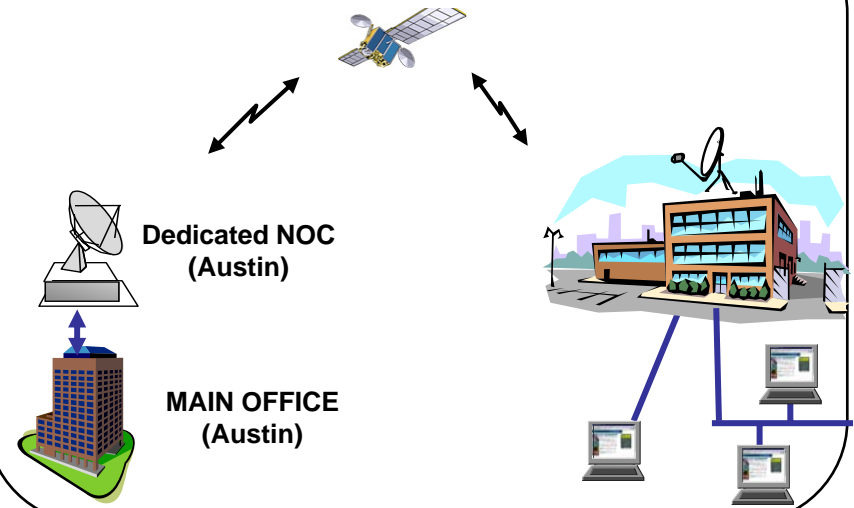
Government Customer Applications

Florida Emergency Management



- ❖ 130 sites state wide and 10 transportable units
 - County Communications Centers
 - National Weather Service
 - Emergency Alert System
- ❖ Network in service 8 years
- ❖ Applications include both voice and high-speed data

Texas Public Safety

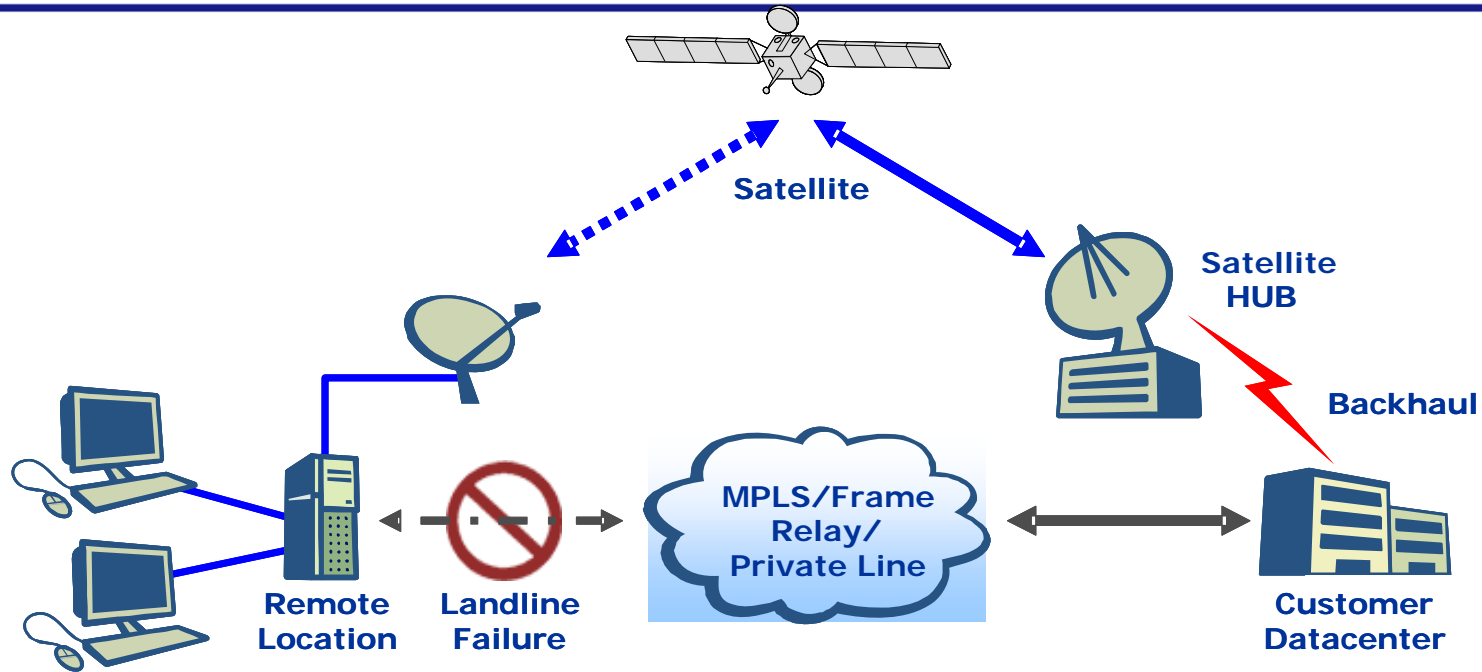


- ❖ Connects 1,500 law enforcement offices
- ❖ Common platform for other state/federal agencies - DOT, FBI, ATF
- ❖ Supports both SNA/SDLC, async, and TCP/IP traffic
- ❖ Multicast data requirement

Planning for the “next time” for government continuity.....

- ❖ Most government agency networks characterized by:
 - One-vendor relationships (“single throat to choke”)
 - Separate voice and data networks
- ❖ Some migration to dual-carrier networks in recent years:
 - Reaction to industry uncertainty
 - Desire to achieve diversity, redundancy and high availability (under the GSA “Networx” contract)
 - “Last mile” diversity generally not obtained
- ❖ Recent disasters proved that dual-carrier terrestrial networks can and do fail.
- ❖ Path diversity provides the critical ability to achieve COOP

Continuity Network - Architecture



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Designed to be used as a back-up network when the primary terrestrial connection (frame relay, MPLS, T1, etc.) is not available.

Routing Overview:

- Routes traffic over wire-line or satellite paths based on policy based rules
- Loss of primary path will result in all traffic being re-routed over the other path
- Upon restoral of primary link, all traffic re-routed back to primary path

SPACEWAY™ 3

Launched August 14, 2007

- ❖ 10 Gbps gross throughput
- ❖ Multiple spot beams with flexible capacity allocation and on-board routing
- ❖ Full small-dish-to-small-dish capabilities
- ❖ Enterprise, Consumer, and SMB applications
- ❖ All new technology successfully tested in orbit

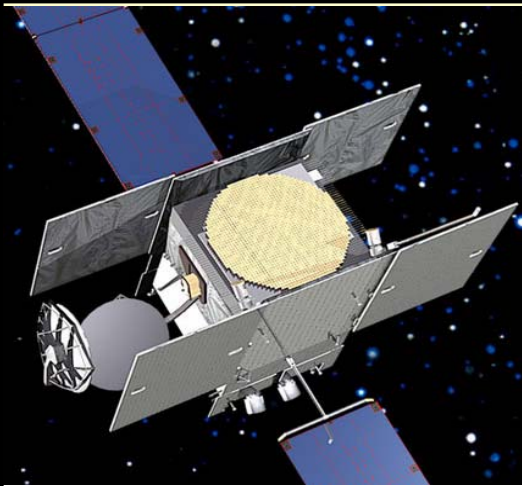


SPACEWAY Overview

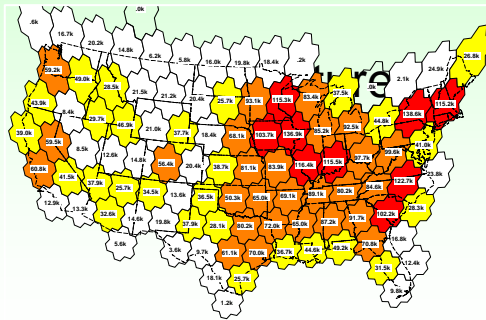
Key Attributes

- ❖ First full mesh commercial satellite system
 - 10 Gigabits/second capacity
 - Core IP VPN service plans and Bandwidth-on-demand

Satellite



Flexible Capacity Allocation

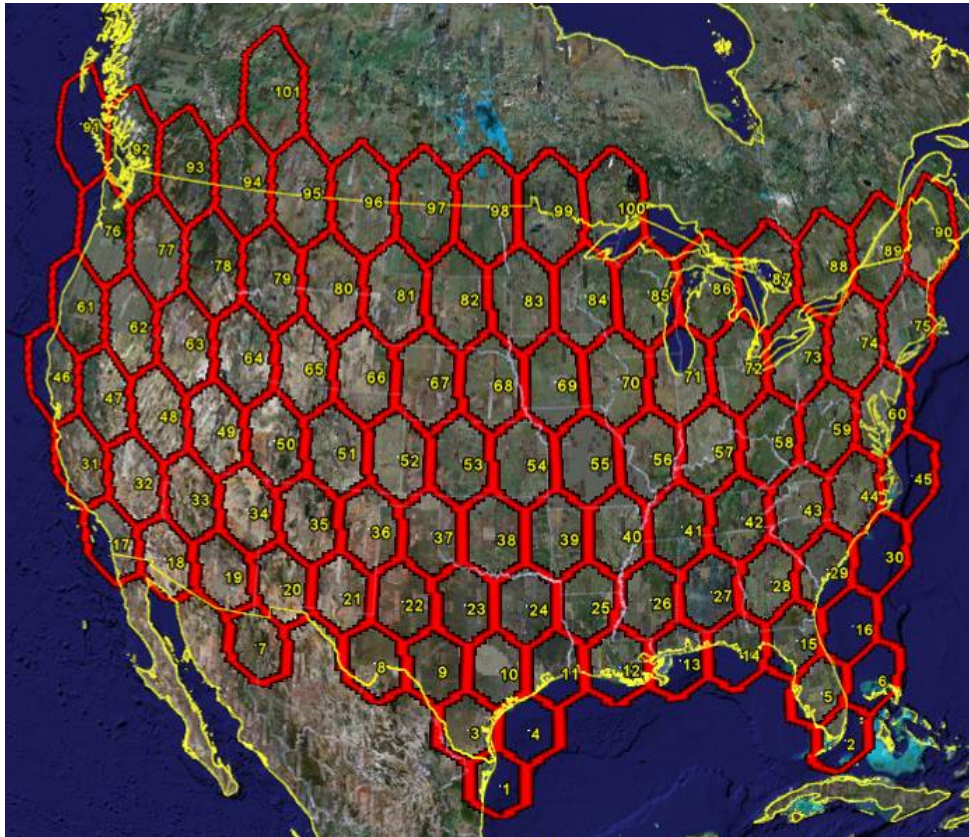


Base Capabilities

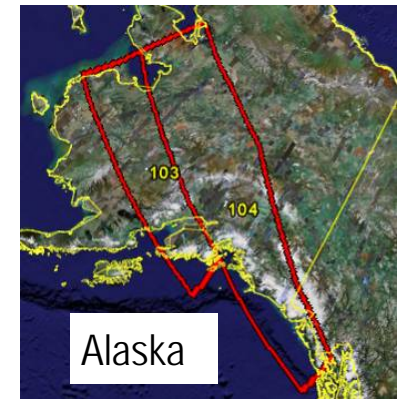
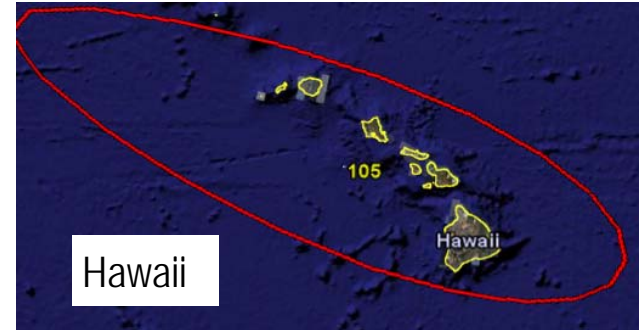
- ❖ Uplink speeds
 - 2 Mbps
 - N x 16 Mbps
- ❖ Downlink carrier speeds:
 - 440 Mbps
- ❖ On-board packet replicator

VSAT Model	Usage	Uplink	Radio	Antenna
HN9500	Branch offices, small business	2 Mbps	1W, 2W*, 4W, & 10W PBU	98*cm, 1.2m, 1.8m
HG9000	Large sites, data centers	nX16 Mbps	250W SSPA	3.5m tracking

Coverage



No capacity planned for other off-conus beams
(eg South America)



Typical VSAT Configurations



Transportable Deployment

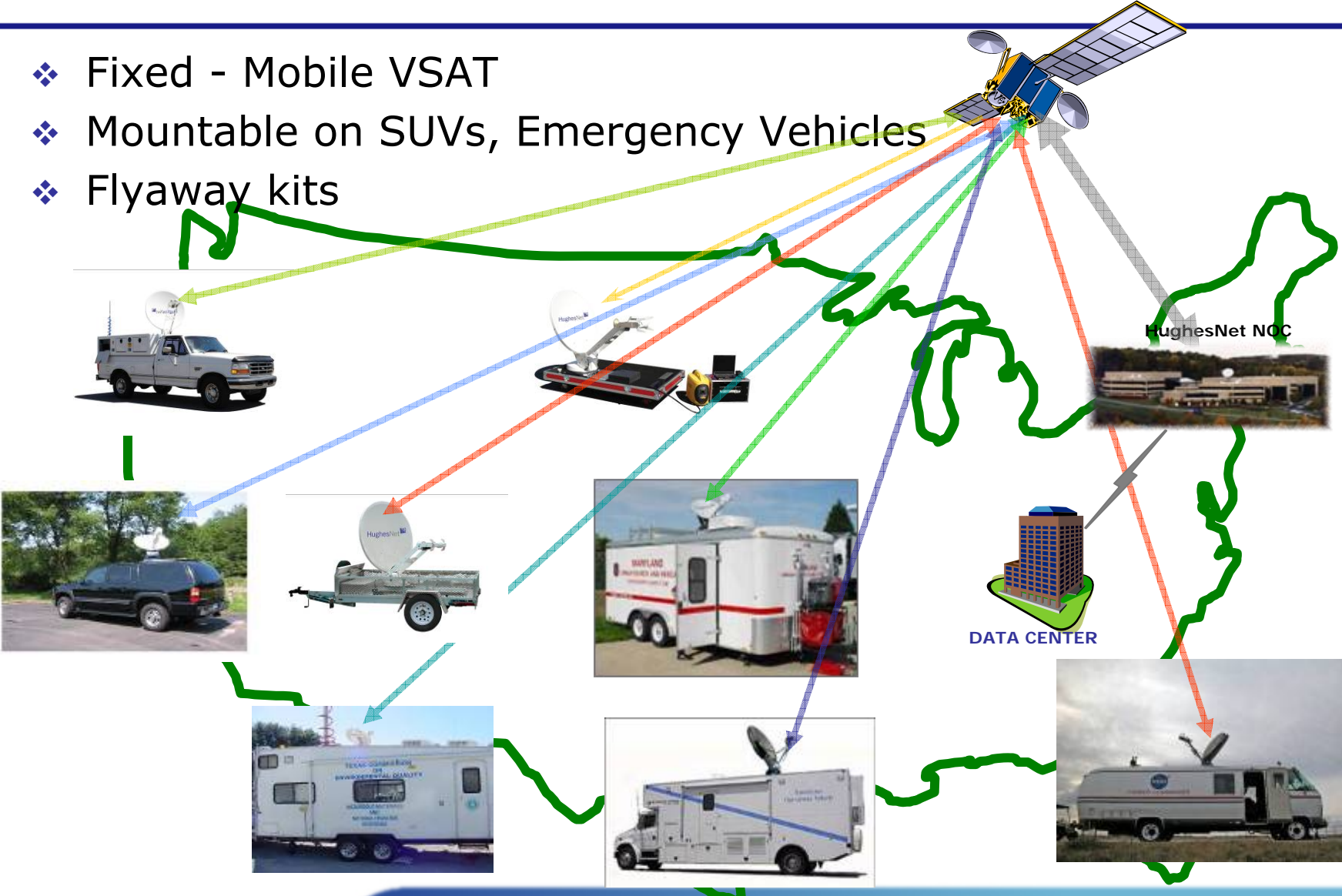


Fixed/Stationary Deployment



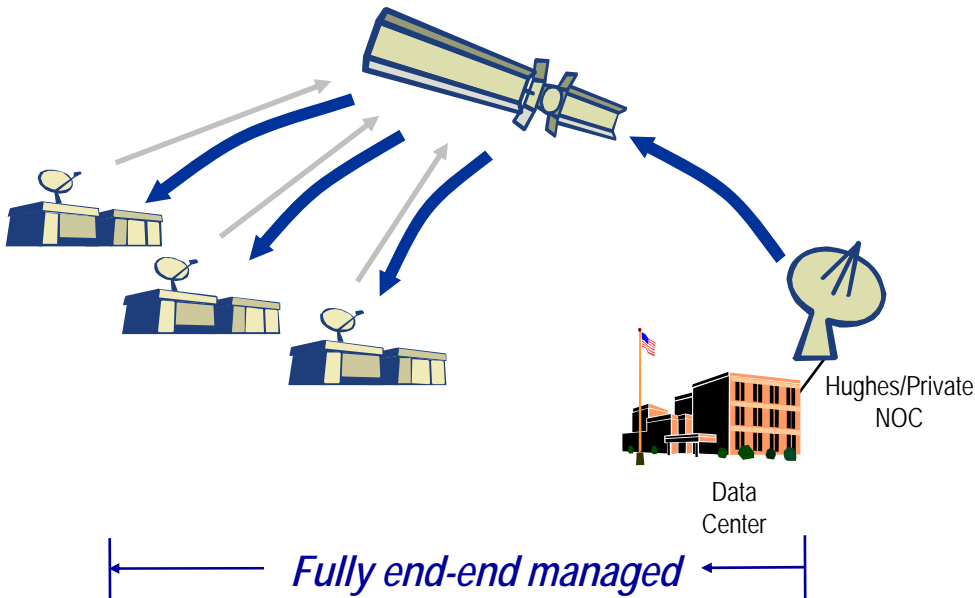
HughesNet Mobile Solutions

- ❖ Fixed - Mobile VSAT
- ❖ Mountable on SUVs, Emergency Vehicles
- ❖ Flyaway kits



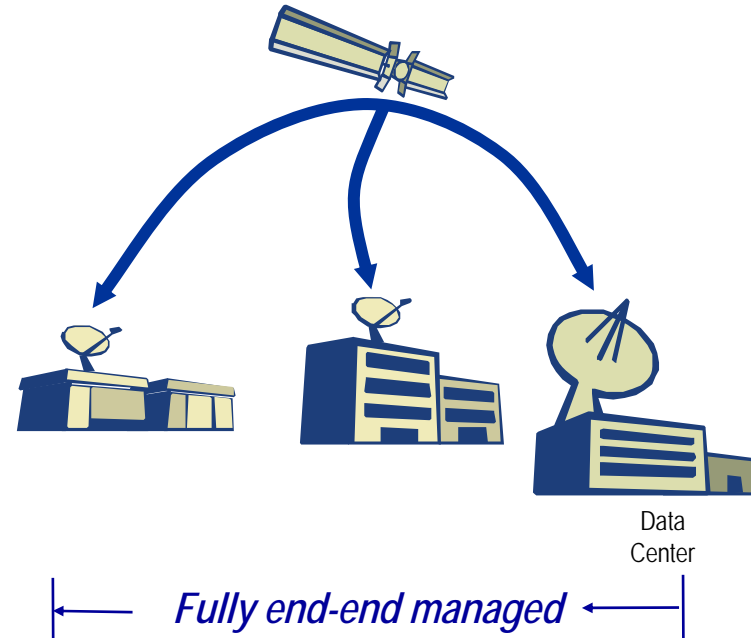
HughesNet/SPACEWAY™ Technology Platform

Available now (Ku-band)



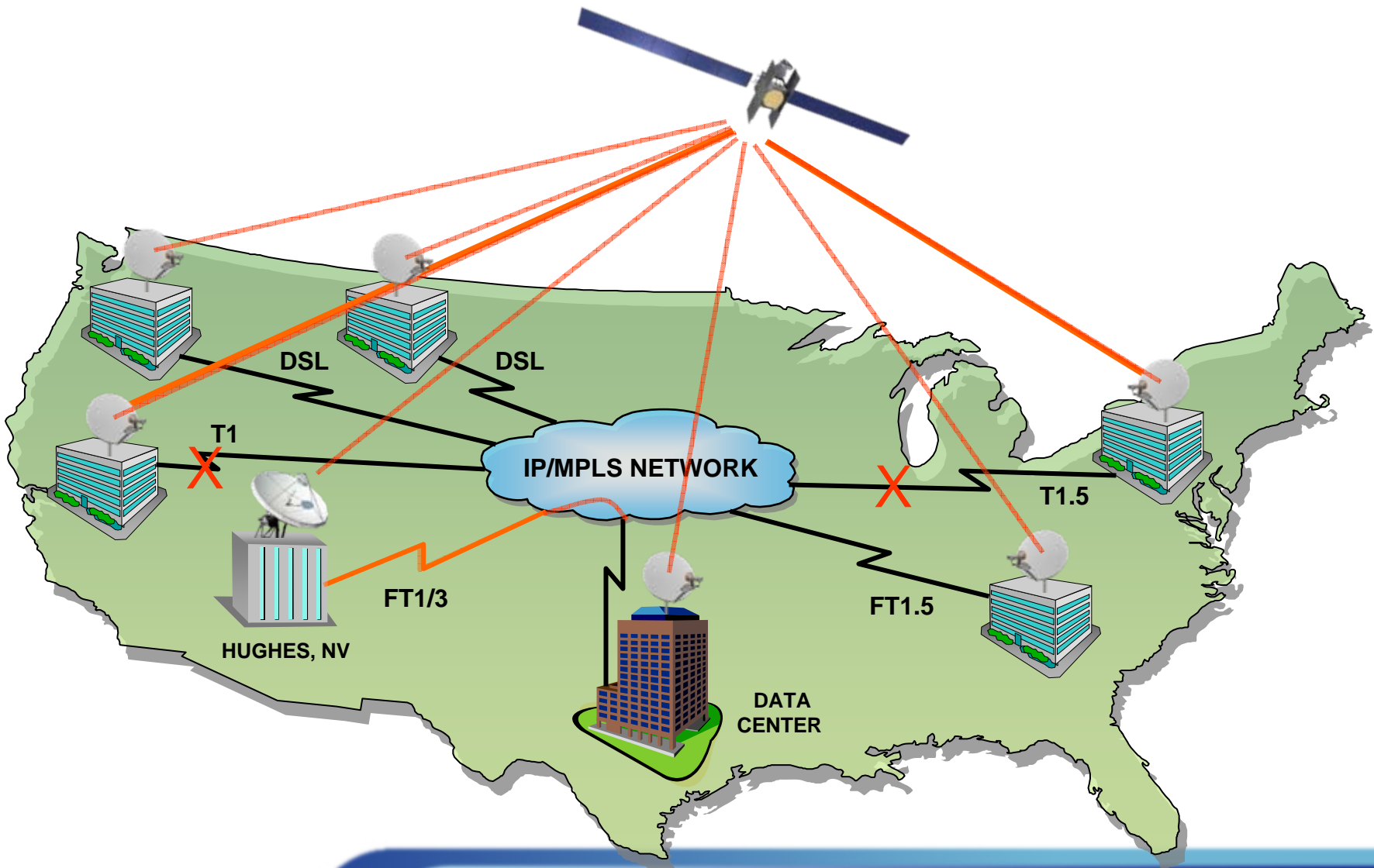
- ❖ 1Mbps max upstream
- ❖ 45 Mbps downstream
- ❖ Star topology networks
- ❖ Broadcast and multicast services
- ❖ Small dishes

Available 2Q/08 (Ka-band)



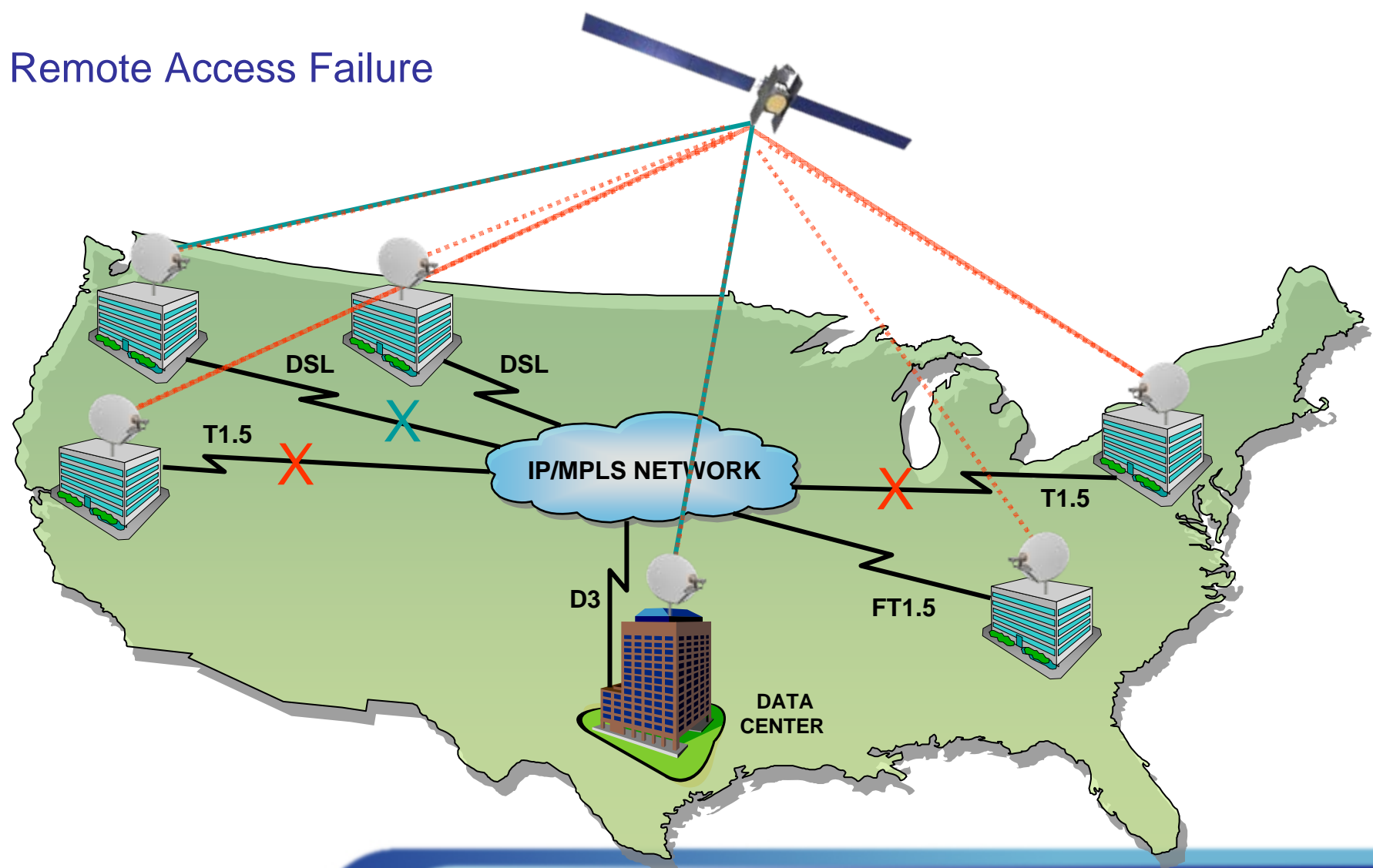
- ❖ 512 kbps–16 Mbps upstream
- ❖ 440 Mbps downstream
- ❖ Full-mesh or star topologies
- ❖ Broadcast and multicast services
- ❖ Small dishes
- ❖ Layered security architecture

COOP Network : HughesNet



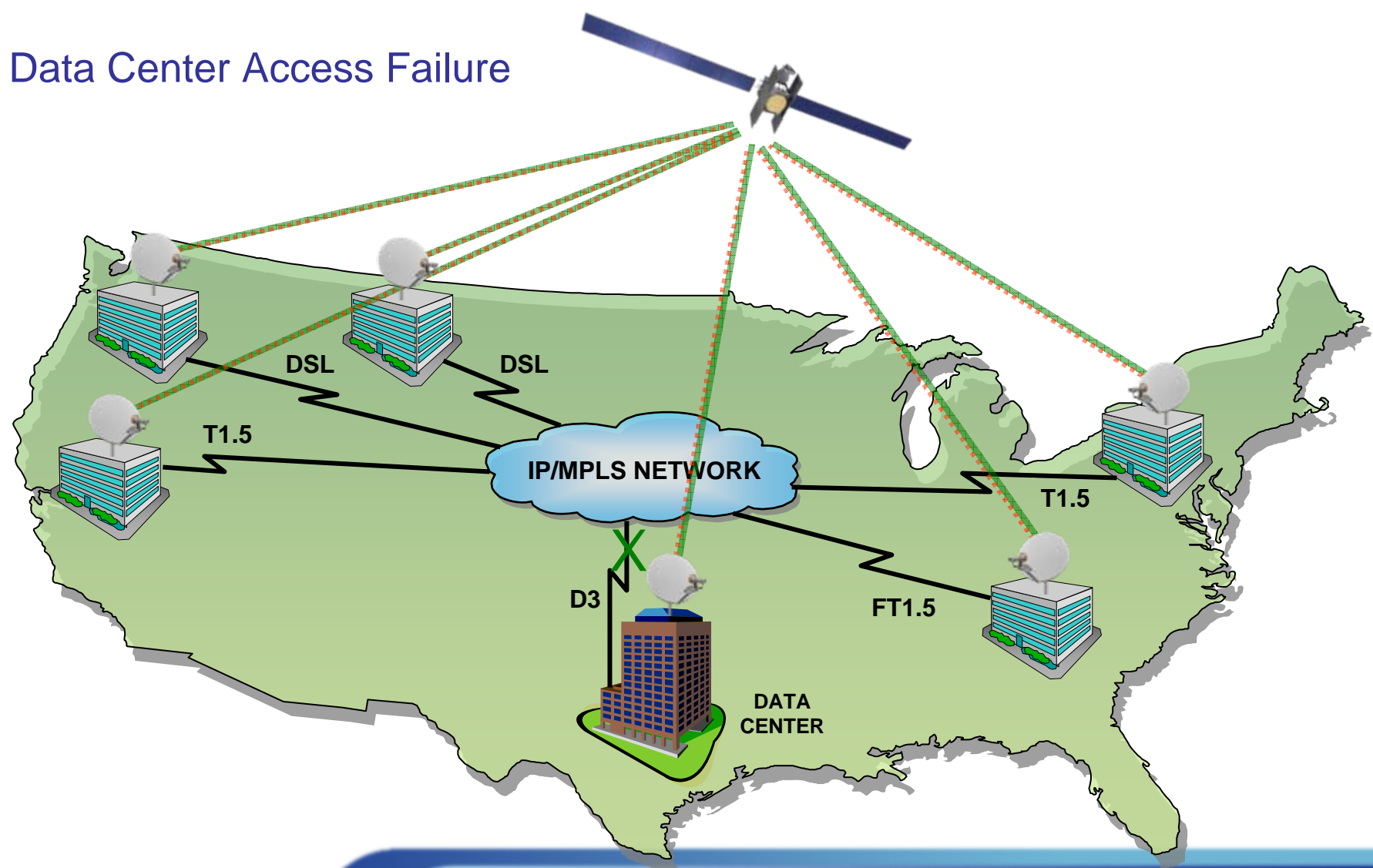
COOP Network : Spaceway

Remote Access Failure



COOP Network : Spaceway

Data Center Access Failure



EA/DR Solutions: Transportable HughesNet

Flyaway Kit



Vehicle Mounted



Emergency Communications



A National Plan

- ❖ **Vertical Interoperability**
 - Federal
 - State
 - Local
- ❖ **Team Interoperability**
 - Police
 - Border
 - Medical
- ❖ **Expanded COOP strategy**
 - Executives
 - Teleworkers
 - 1st Responders
- ❖ **Featuring Greater Use**
 - Wireless
 - Fixed mobile
 - Satellite



SOURCES: NSTAC report to the President on Emergency Communications and Interoperability. Various State Government State of the Union and Published Technology Strategies

Satellite Technology Infrastructure is...

Critical To The Economy

- ❖ Backbone of national TV, radio, and print media distribution
- ❖ Billions of data, credit, banking transactions daily
- ❖ Allows decentralized telecommunications and document storage for a variety of financial institutions and global trading operations
- ❖ Broadly used for inventory management, point of sale data collection, credit-card validation and e-mail delivery.

WAL*MART



Critical to Homeland Security

- ❖ Not subject to physical damage that terrestrial networks are exposed to
- ❖ Lifeline for emergency workers, first responders, government and military planners
- ❖ News organizations rely on satellite phones and satellite trucks to report from the scene
- ❖ Enable data telemetry which monitors US infrastructure in remote areas
- ❖ Public safety dispatch – improves response time by locating emergency calls
- ❖ Primary information source to millions of Americans



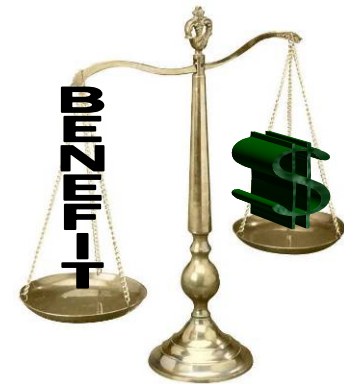
Critical to Disaster Relief and Recovery



- ❖ Physical damage and enormous demand stressed terrestrial networks during attacks
- ❖ Satellite phones became a lifeline for emergency workers, government and military planners
- News organizations relied on satellite phones and satellite trucks to report from the scene
- Satellite broadcasters supplied NY cable companies with local broadcast signals using DBS, once their terrestrial networks were damaged

Benefits of Satellite Broadband

- ❖ When combined with terrestrial networks, satellite broadband can offer resiliency, redundancy and high availability via “PATH DIVERSITY” in a way that a back-up alternative terrestrial provider cannot
- ❖ Emergency satellite services can be brought in quickly to re-establish service to affected areas
- ❖ Satellite broadband can be implemented virtually anywhere bringing high-speed access to remote users and teleworkers
- ❖ Service plans and SLAs exist to fit a variety of needs and budgets



Emergency Preparedness

**How can business and government
afford not to???**