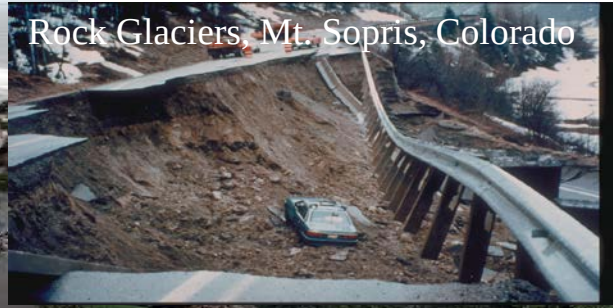
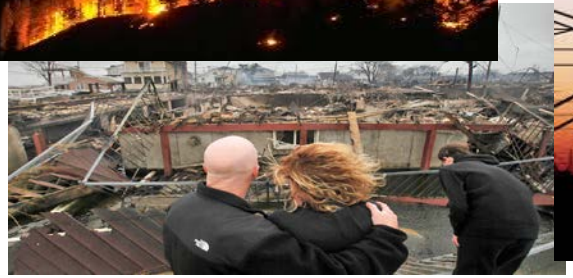
Resilient Emergency Communications

Disasters Are Bound to Happen





Disasters Are Bound to Happen

- Terrestrial networks: *Compromised*
- Cell networks: *Jammed*
- The Internet became congested and slow to respond
- Real-time communications stalled
- The government's ability to perform
  - Continuous operations of relief and recovery activities
  - Normal government operations...

    ...was *critically* diminished

The government is crippled when its ability to communicate is compromised!

10 States with the Most Disasters

10. Missouri

The Show-Me State has had disastrous w
the year: severe snow and ice storms in w
spring, summer and fall, and flooding at vi

Major disaster declarations since 1953: 53

9. Arkansas

Arkansas has been walloped by heavy rai
and flooding over the years and has even
tropical storm systems, though it's not a c
storms and tornadoes associated with Hu
streets with debris, damaged buildings, ro

2. California

The nation's most populous state also is one of the most disaster-prone due to wildfires, landslides, flooding, winter storms, severe freeze and even tsunami waves. But earthquakes are the disaster perhaps most closely associated with California. The worst in recent years have included a magnitude-6.9 quake near San Francisco in 1989 that killed 63 and a magnitude-6.7 quake in Southern California in 1994 that killed 61.

Major disaster declarations since 1953: 78

1. Texas

Within the Lone Star State's nearly 267,000 square miles (second only to Alaska in size), at least one major disaster is declared nearly every calendar year. Texas has dealt with tornadoes, floods, wildfires and regular coastal hurricanes. One of the deadliest and costliest in recent decades was Hurricane Celia, which tore up Corpus Christi in 1970. The storm left 13 dead and destroyed millions of dollars' worth of property.

Source: http://www.nbcnews.com/business/real-estate/10-states-most-natural-disasters-f6C10088195

Network Resiliency: Three Key Points

Know what your weakest links are

so that you can

Take proactive steps to be prepared

in order to

Respond during the BAD DAY events

Networks That Rely on Terrestrial Communications

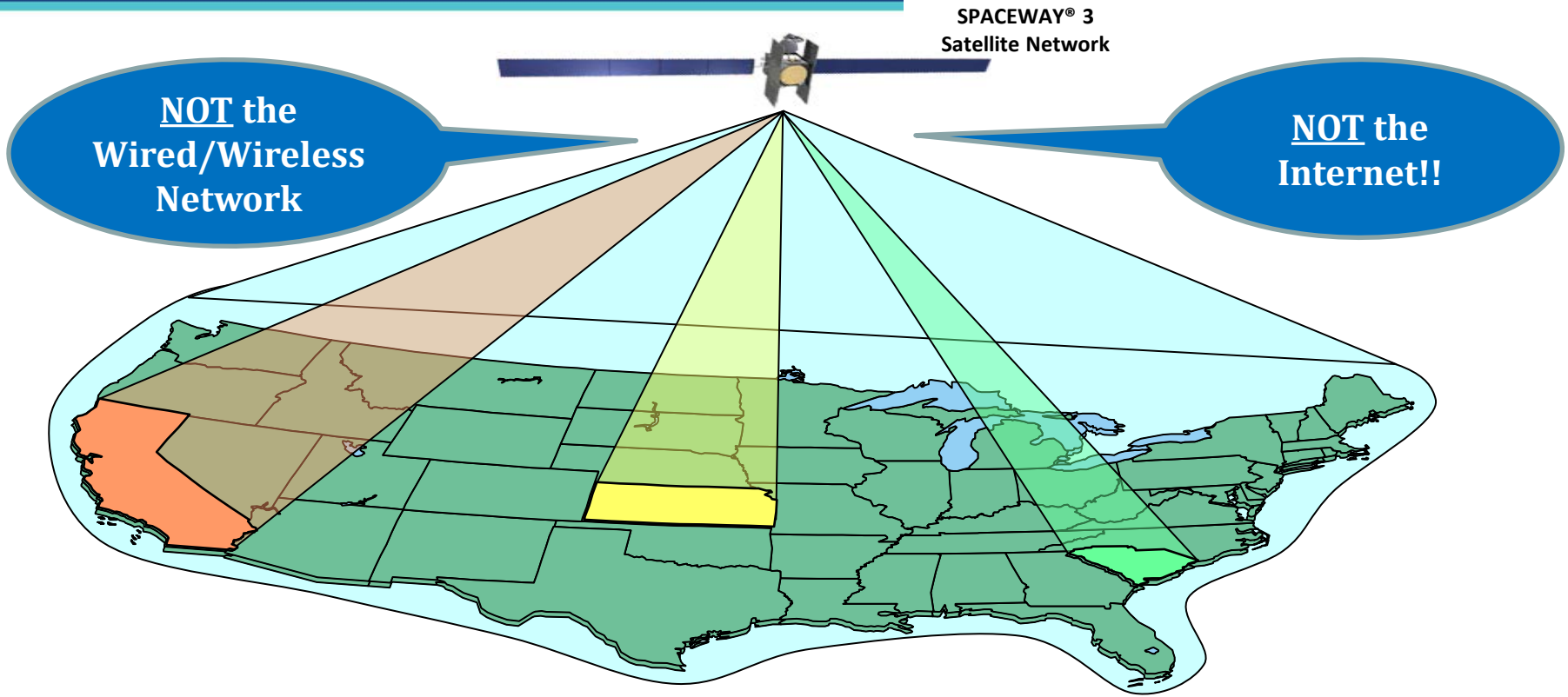
- Public Safety Answering Point (PSAP)
- NG9-1-1 Infrastructure/ecosystem
- Land Mobile Radio (LMR)
- Cellular (3G/4G/LTE)
- Public Switched Telephone Network (PSTN)
- Data networks
- The Internet

Issues with Terrestrial or Wireless "Redundancy"

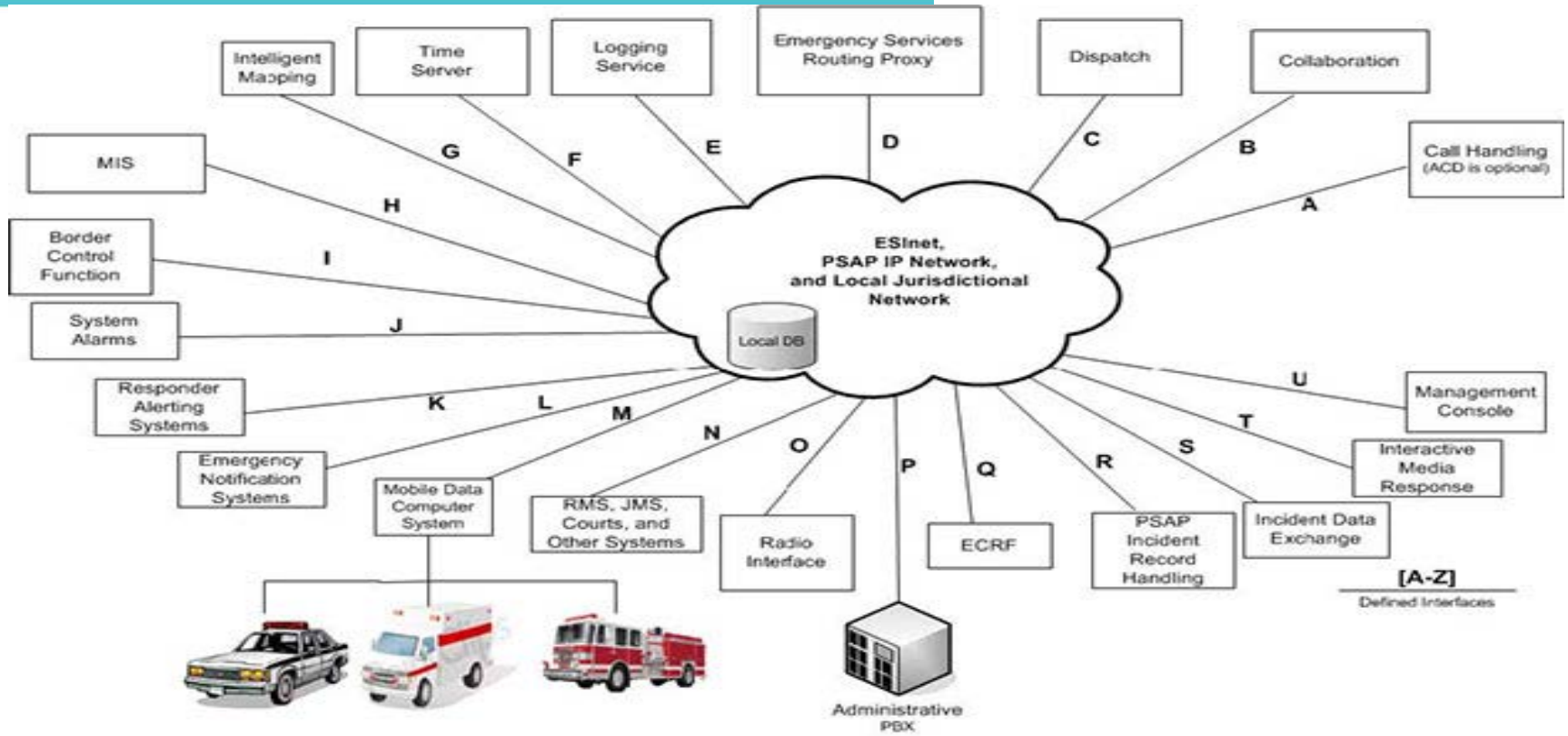
- Same "right of way"
- Outages can affect multiple carriers
- Use of same central office
- Wireless requires terrestrial backhaul

Another terrestrial circuit is not necessarily a true physically diverse path!

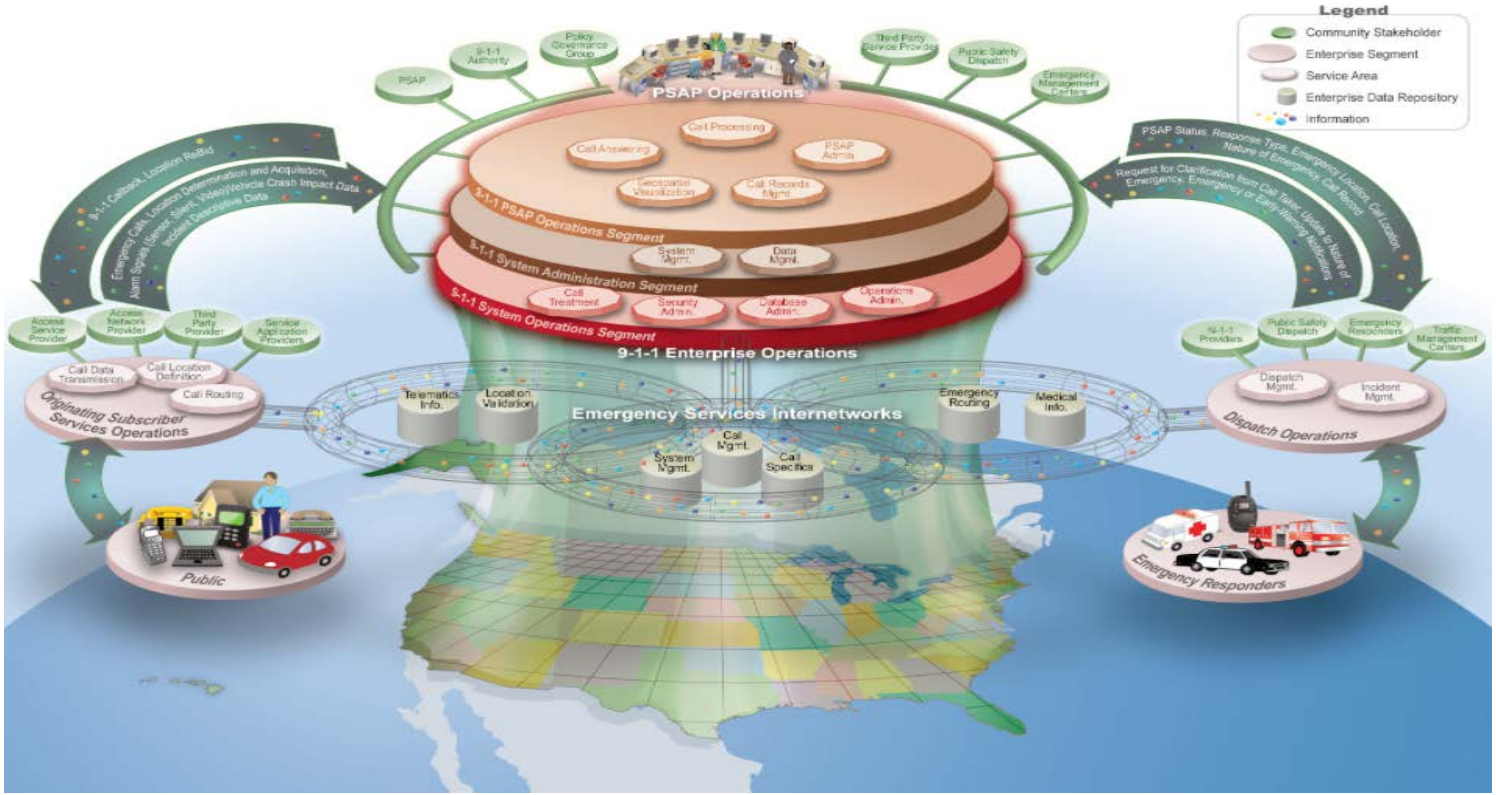
Maintaining Communication During an Emergency



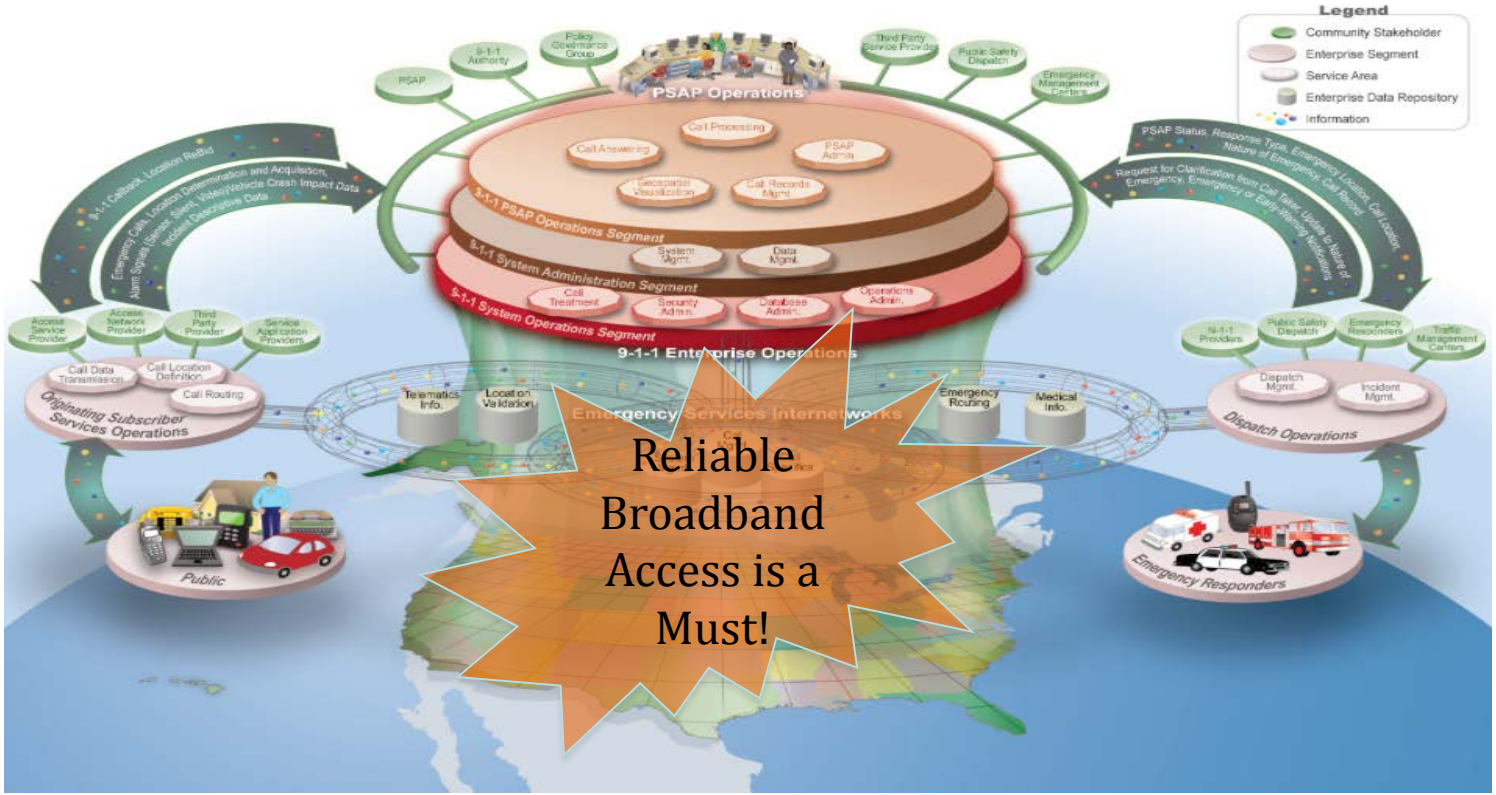
911 Network Evolution…. Next Gen PSAP



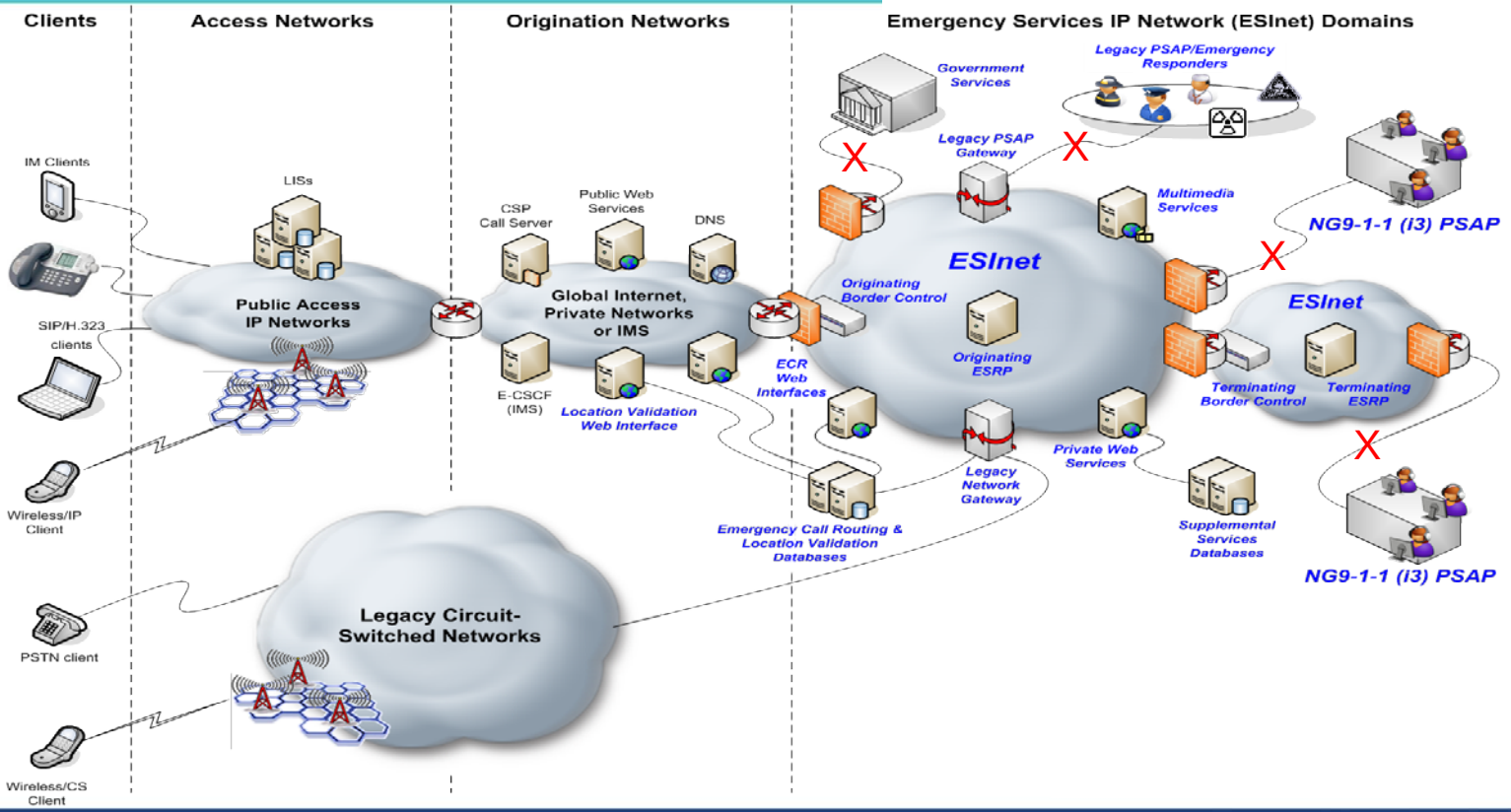
Evolution Continues….
NG911 Community



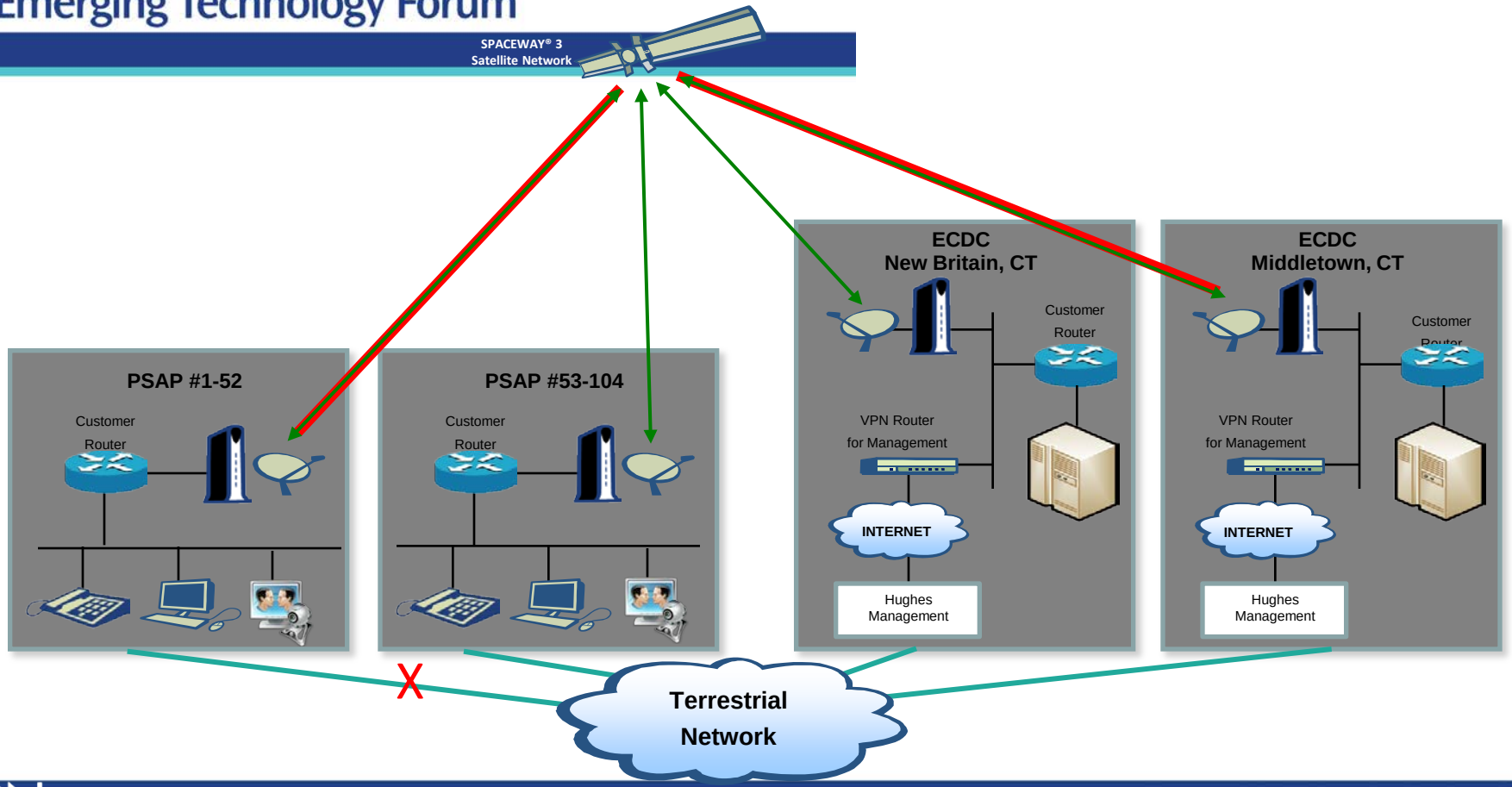
Evolution Continues….
NG911 Community



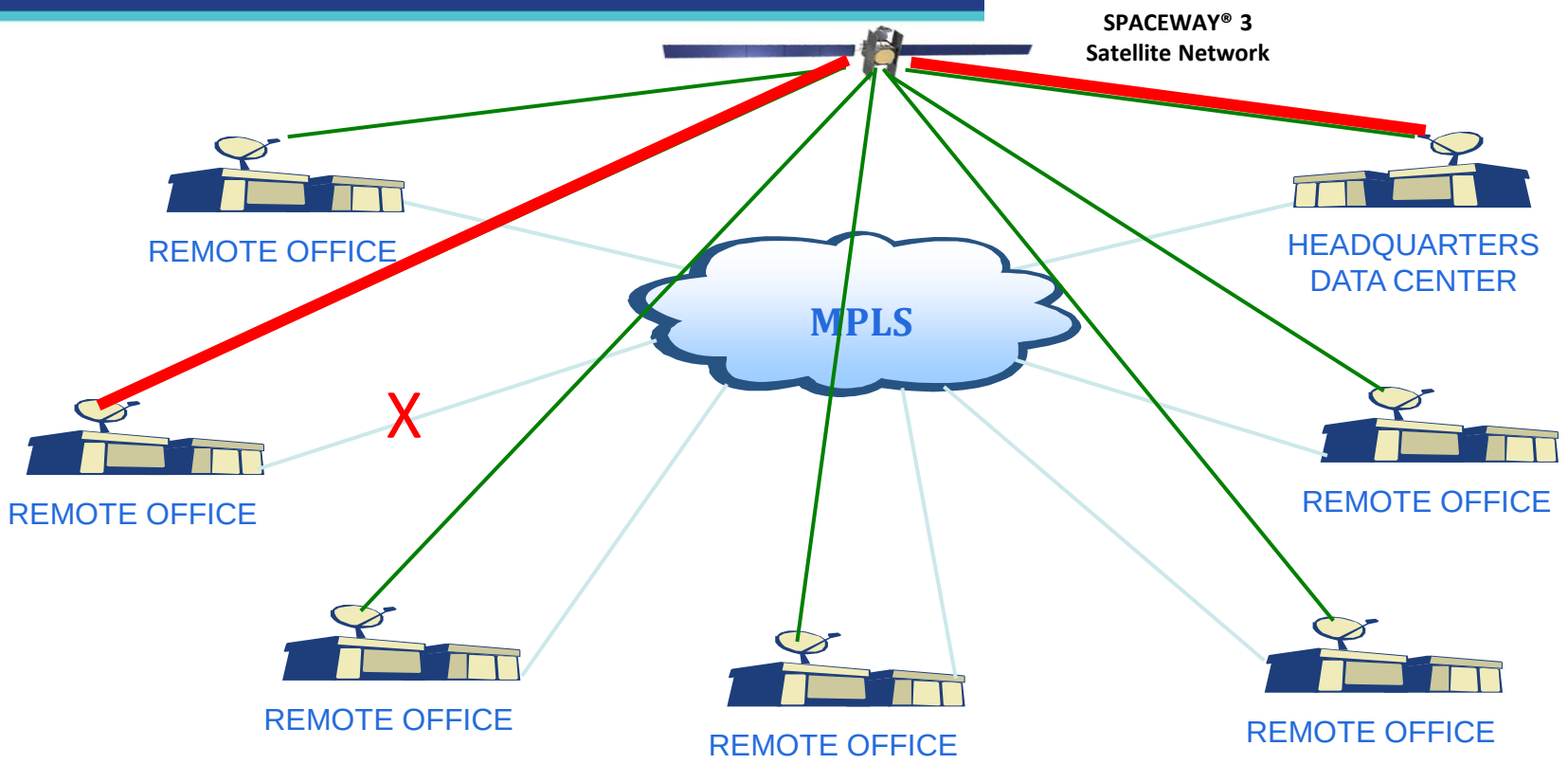
Single Points of Network Access Failures



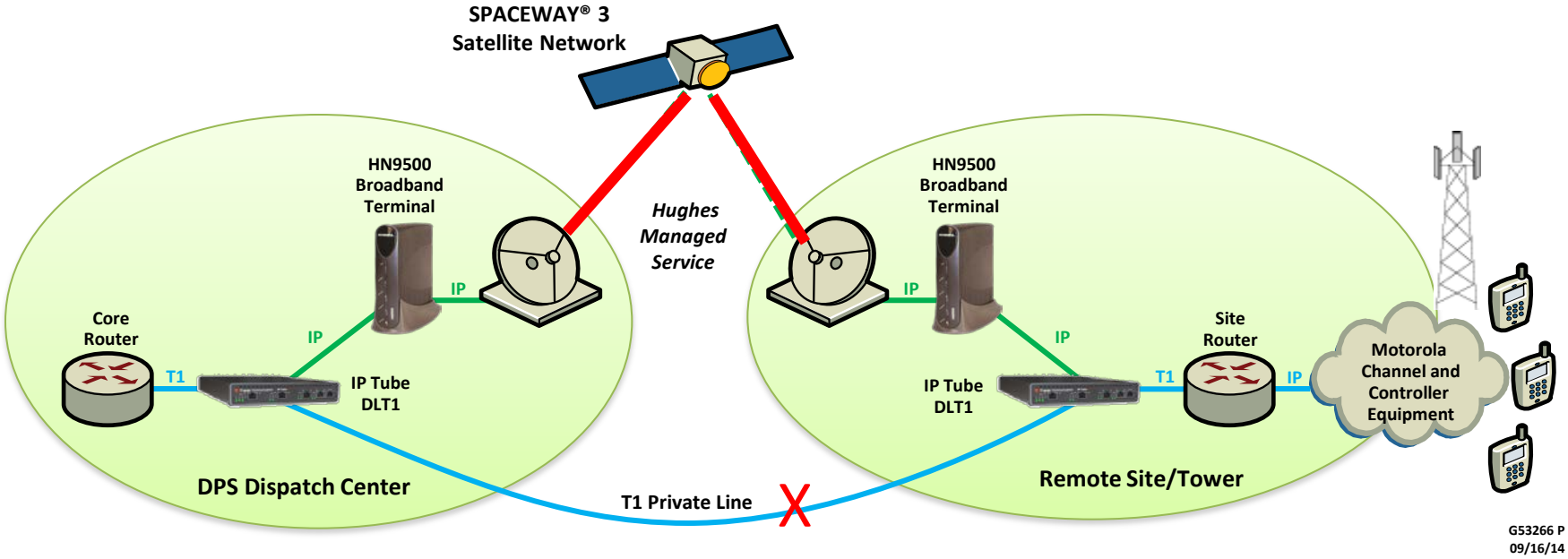
SPACEWAY for NG911 COOP



SPACEWAY for Key Locations COOP



SPACEWAY for LMR Backup



Emergency Response

Broadband (VSAT)

Narrowband (BGAN)

Supporting FEMA during Sandy
(20 DRC's in NY/NJ)

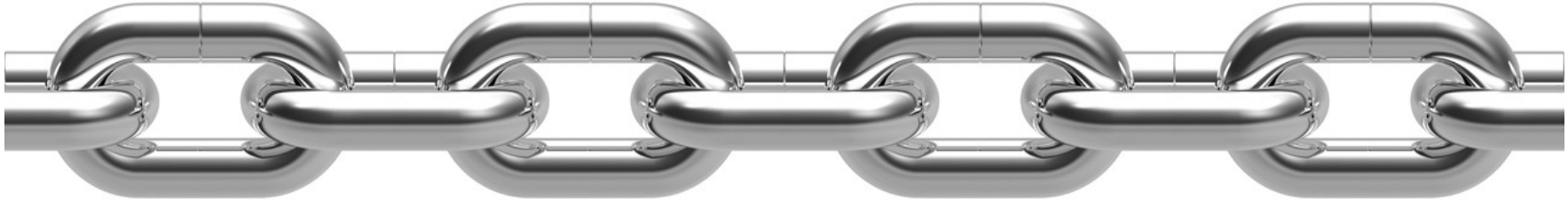
- Expectations
  - Anticipated October 29, 2012, landfall of Hurricane Sandy
  - Expectation that wireline/wireless communications would be devastated
- Concern
  - Response and recovery efforts for Hurricane Sandy would require communications networks for a greater amount of FEMA Disaster Recovery Centers

- Hughes solution
  - Full turnkey solution (store, install, deploy, and deinstall VSAT equipment)
  - 48-hour emergency deployment of VSAT/WiFi/8 Voice lines
  - Unlimited Internet and Voice usage
  - 20 DRCs were enabled with
    - Hughes Spaceway (2x8 Mbps IPVPN) and
    - JUPITER™ (1x15 Mbps Internet Access)

Three Key Points Revisited

- ✓ Know your network's weakest links
  (prepare for the worst)
- ✓ Take steps to be prepared
  (establish a Plan B)
- ✓ Respond during the BAD DAY events
  (business as usual)

Thank You



Questions?

Ned Kazor, Sr. Director – HUGHES
301-601-7308
ned.kazor@hughes.com