



2010 Texas NENA Conference

Next Generation Emergency Communications Intelligent Migration

**A Well-Managed Path from
Enhanced 9-1-1 to Integrated
Next Generation 9-1-1 Services**



AVISTAS

Mart D. Nelson – Consulting Principal – Avistas
P.E., ENP, CISSP

Why are We Here?

- ◆ Review migration processes with regard to advanced Emergency Communications
- ◆ Examine issues related to various parts of Next Generation Emergency Communications
- ◆ Discuss probable time frames for new capabilities
- ◆ Ask questions and discuss individual situations

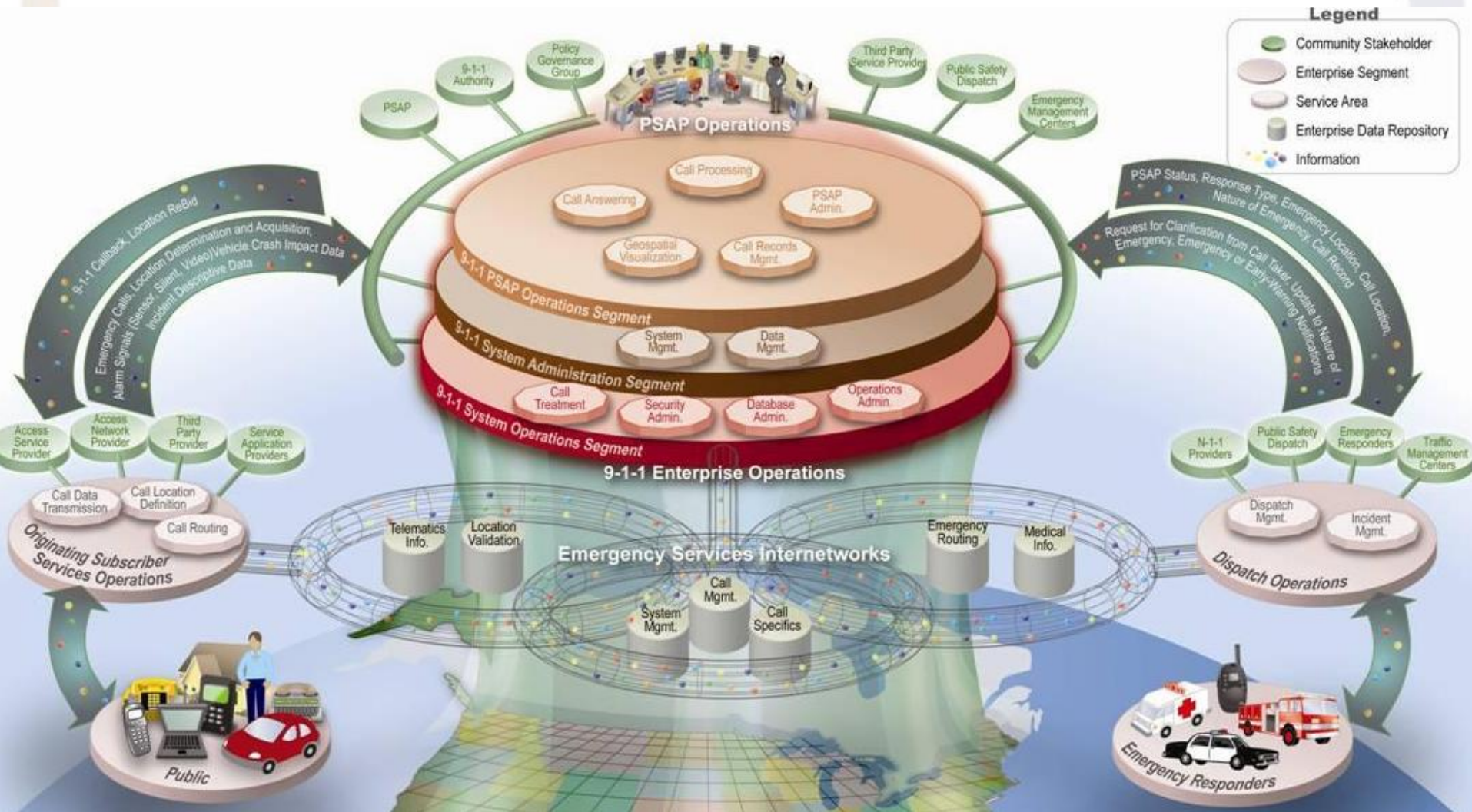
Agenda

- ◆ Nice to Know vs. Need to Know
- ◆ The “Big Picture” for Emergency Communications
- ◆ Major parts of Next Generation Emergency Communications
- ◆ NG 9-1-1 Timing
- ◆ Logical deployment process
- ◆ Discussion of deployment aspects
- ◆ Discussion of Key Issues
- ◆ Example of Migration Deployment Life Cycle
- ◆ Operational Model for Emergency Communications

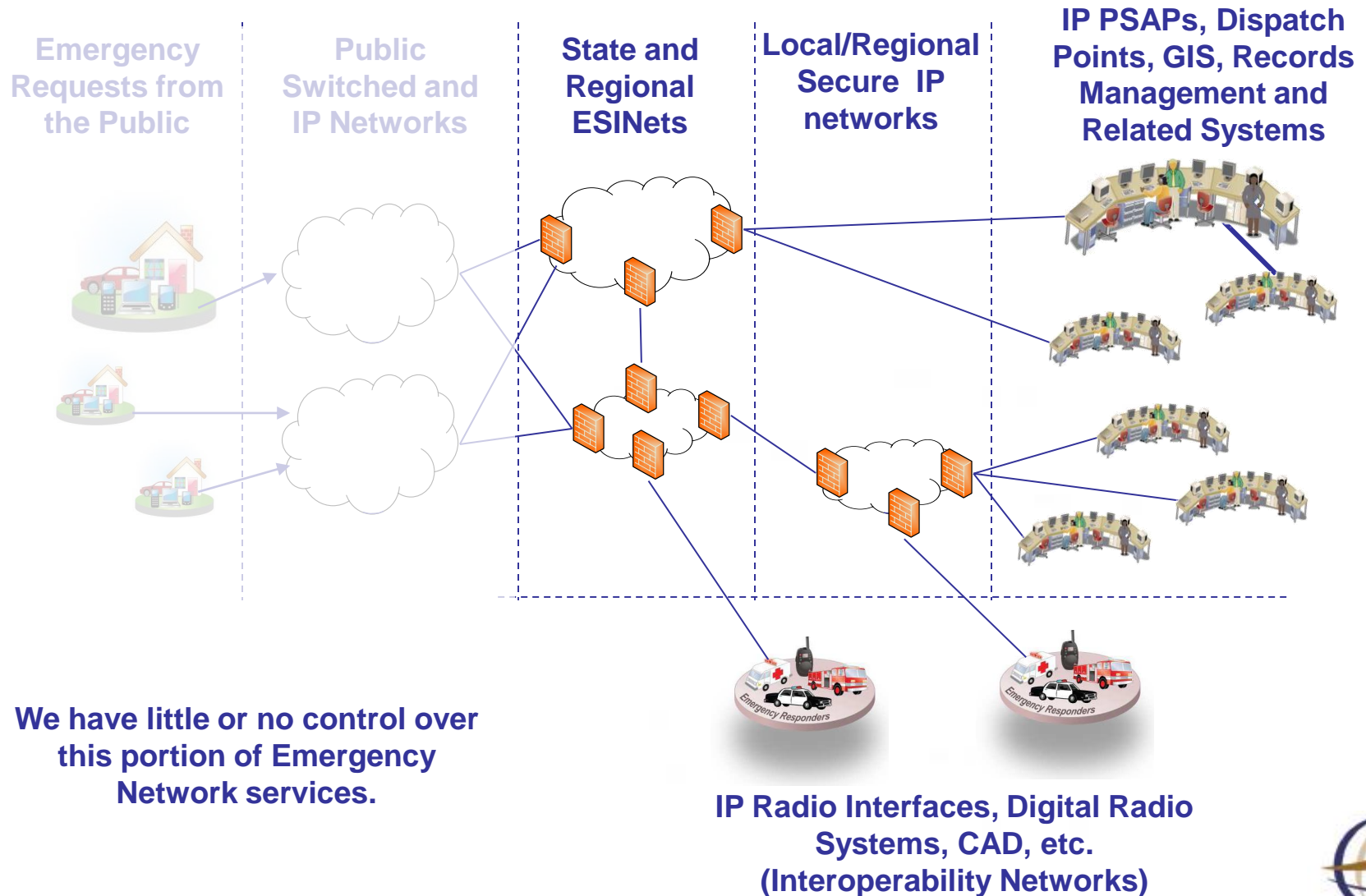
In migration to Next Generation Emergency Communications, it is important to know what you need to know vs. what is nice to know.

This allows for better focus on the projects at hand and for better allocation of time, money and resources.

US DoT ITS NG EC Community Model (The Big Picture) (Lots of Nice to Know Information)



What are the Major Parts in NG EC?



We have little or no control over this portion of Emergency Network services.

**IP Radio Interfaces, Digital Radio Systems, CAD, etc.
(Interoperability Networks)**

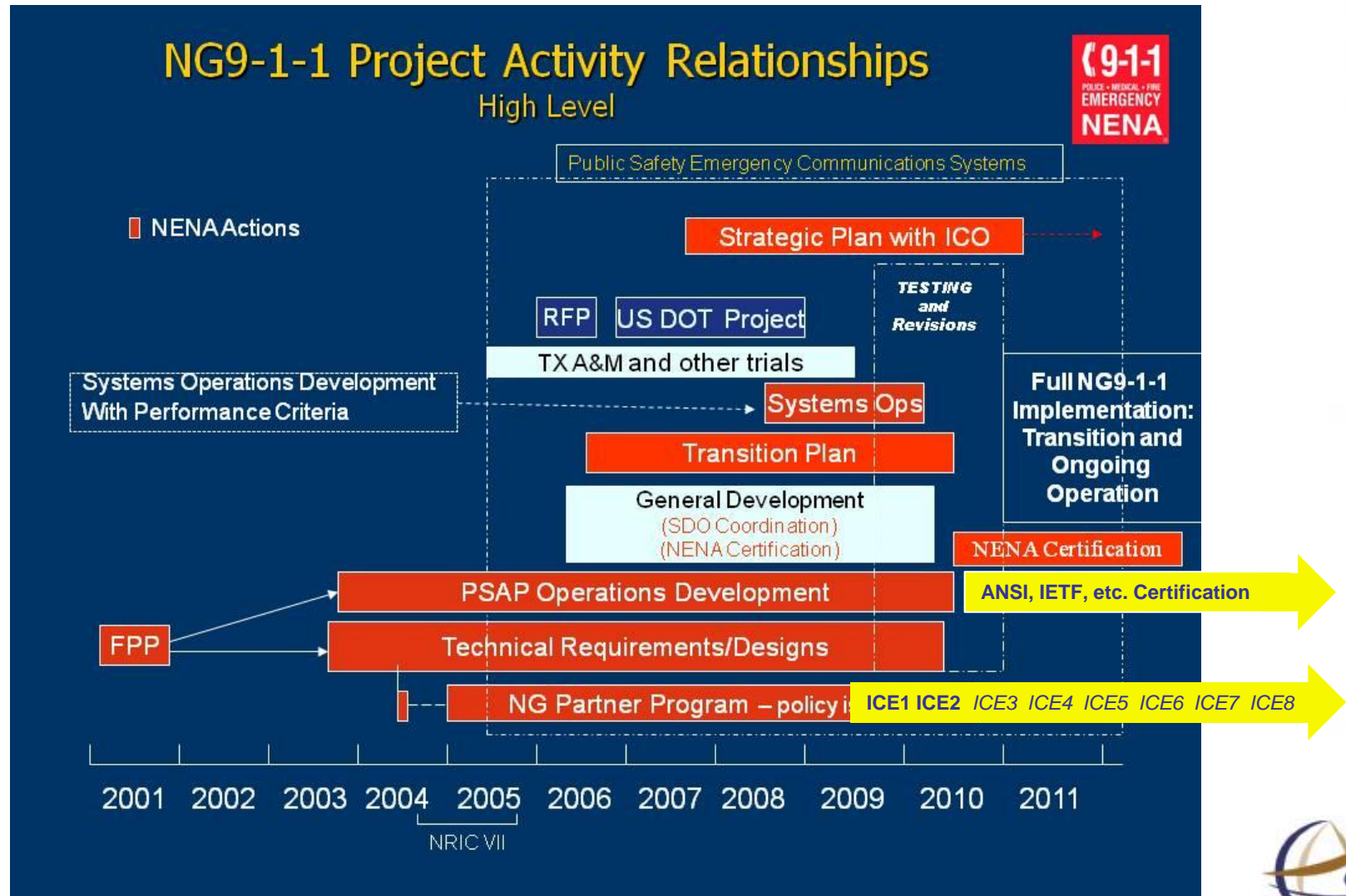
Where Are We in the NG9-1-1 Process?

From a NENA September, 2008 paper – *What is NG9-1-1?*

“True NG9-1-1 will include the ability to support interactive text messaging, policy-based routing using location and several other factors, such as call type, target PSAP status, network status, and automatic acquisition of supportive data and its use within the system to control routing and other actions prior to delivery to the PSAP,”

- ◆ IP communications networks and services are at the core of NG9-1-1 and provide the transport and routing of information and emergency communications from the Public.
- ◆ Higher level capabilities, such as Location Services, ESINets, Border Control, Security, ESRP, PRF, etc. and related policies, procedures and management functions must be operational to enable the goals of Next Generation 9-1-1.
- ◆ All these services must conform to the NG9-1-1 and related technical standards from NENA, NIST, IETF, ESIF, ATIS, ANSI and others.

Where Are We in the NG9-1-1 Process? (continued)



What are Logical Steps in NG EC Deployment?

Planning requires establishment of capital and operating budget requirements and target funding sources, as required.

2011

2012

2013

2014

2015

and beyond

NG 9-1-1 “Ready” IP PSAPs Deployed
(in process in some jurisdictions now)

IP Networks Interconnecting PSAPs & Radio Systems
(in process in some jurisdictions now)

Connection to Regional ESINets
(ESINet development is in process)

Connection to Statewide ESINet
(planning is in process)

**Integration of Advanced Services
& New Internet Information Sources**
(will occur as standards and services are deployed)

Ongoing procedures updates and training to handle new communications modes, managing privacy of personal data, integration with fire, police and EMS systems, etc.

What are Logical Steps in NG EC Deployment?

i3 “Ready” TCP/IP PSAPs & Emergency Comm.

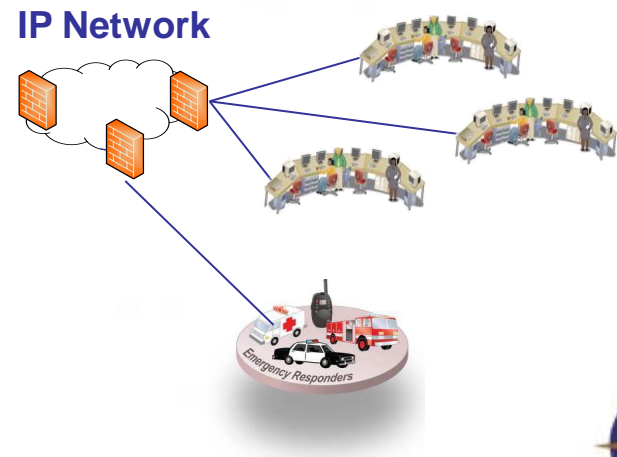
- ◆ Primary answering points capable of accepting VoIP SIP calls with location data
- ◆ Dispatch points/back-up answering points capable of accepting VoIP SIP calls and transferred SIP calls with location data
- ◆ Integration with current CAD, GIS, Records and other systems
- ◆ Integration with Radio Interoperability and digital radio systems
- ◆ Operations and procedures updates and staff training



What are Logical Steps in NG EC Deployment?

IP Networks Interconnecting PSAPs & Other EC Systems

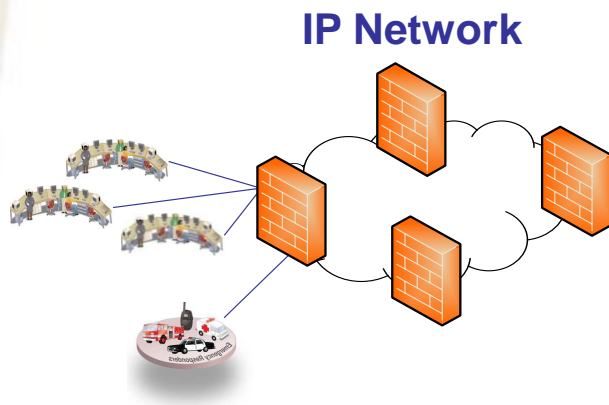
- ◆ Security, reliability and Quality of Service
- ◆ Combinations of private fiber, microwave, wireless LAN, and public carrier including TEX-AN MPLS services.
- ◆ IPv6 protocol for better security and US government compliance
- ◆ Support for Secure DNS services (DNSSEC)
- ◆ DHCP controls, SNMP security, NTP security, etc.
- ◆ Locally managed call transfers
- ◆ Integration with Radio Interoperability Networks, as appropriate
- ◆ Operations and procedures updates and staff training



What are Logical Steps in NG EC Deployment?

Connection to Regional Emergency Services IP Network (ESINet) Processing Site(s)

- ◆ Call overflow backup and policy routing functions
- ◆ Backup locations and routing outside the immediate area
- ◆ CAD and GIS access for distant backup PSAPs
- ◆ Integration with Emergency Communications Interoperability Networks, as appropriate
- ◆ New agreements for inter-local support and mutual aid
- ◆ Procedures updates and staff training



Regional Emergency Services IP Network Data Center(s)

- Border Control Function (BCF)
- Location Validation Function (LVF)
- Emergency Call Routing Function (ECRF)
- Emergency Services Routing Proxy (ESRP)
- PSAP Gateway
- Legacy Network Gateway (LNG)
- Radio Interoperability Servers

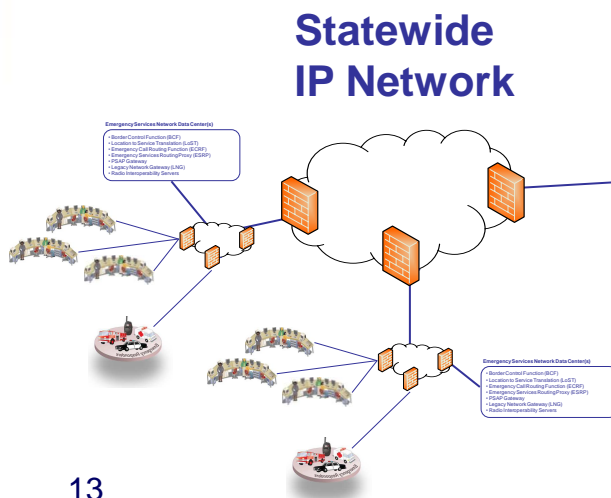
What are Logical Steps in NG EC Deployment?

Connection to Statewide ESINet Processing Site(s)

- ◆ Possibly regional shared back-up locations to minimize complexity
- ◆ Integration with location and multi-media services as they come on line
- ◆ Ongoing integration of features and services
- ◆ CAD and GIS access and integration for back-up PSAPs
- ◆ Integration with EC Interoperability Networks, as appropriate
- ◆ Definition of and integration with enhanced data sources
- ◆ Procedures updates and staff training (ongoing)

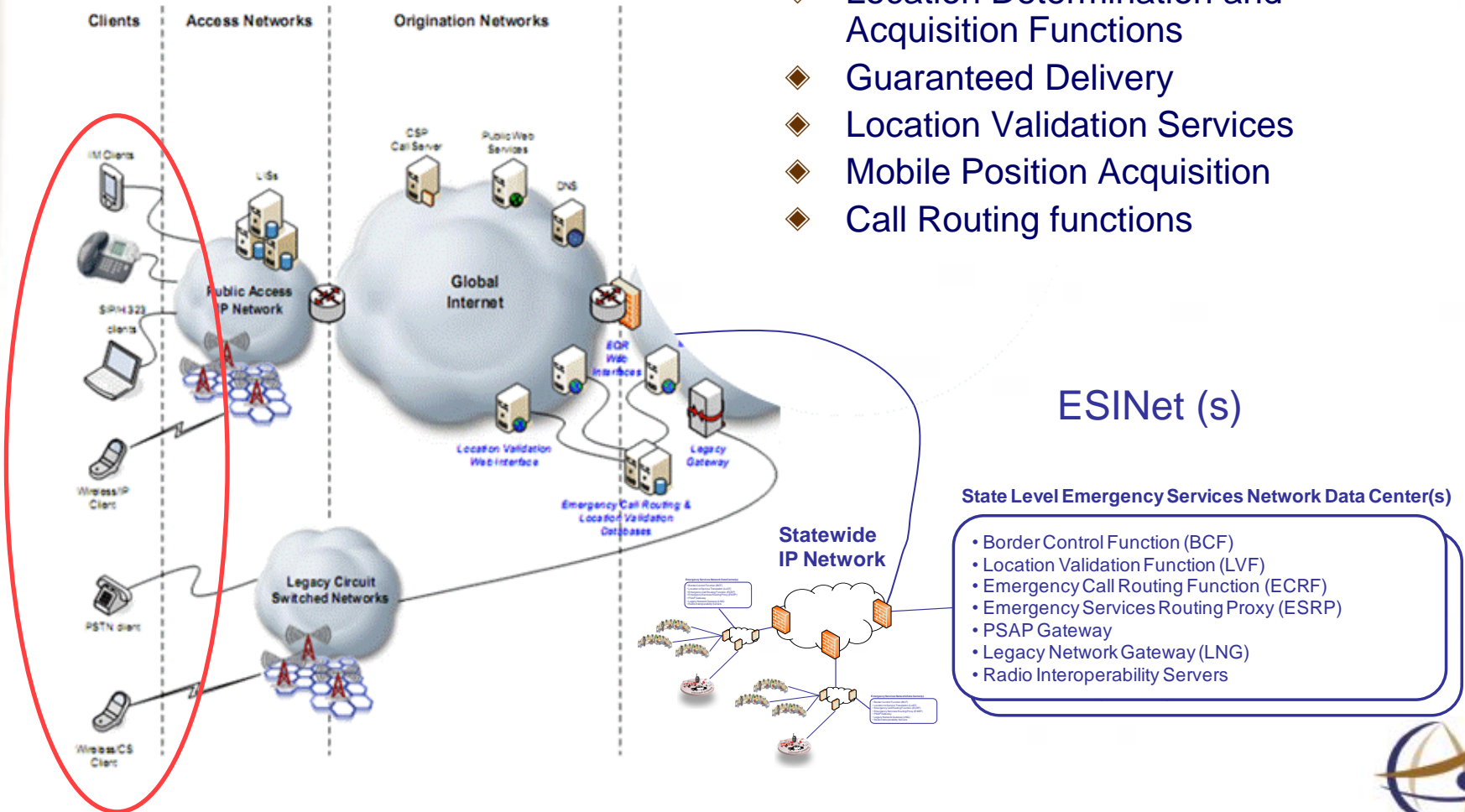
State Level Emergency Services Network Data Center(s)

- Border Control Function (BCF)
- Location Validation Function (LVF)
- Emergency Call Routing Function (ECRF)
- Emergency Services Routing Proxy (ESRP)
- PSAP Gateway
- Legacy Network Gateway (LNG)
- Radio Interoperability Servers



What are Logical Steps in NG EC Deployment?

Delivery of Emergency Calls via IP from the Internet and Public Networks



- ◆ Location Determination and Acquisition Functions
- ◆ Guaranteed Delivery
- ◆ Location Validation Services
- ◆ Mobile Position Acquisition
- ◆ Call Routing functions

ESINet (s)

State Level Emergency Services Network Data Center(s)

- Border Control Function (BCF)
- Location Validation Function (LVF)
- Emergency Call Routing Function (ECRF)
- Emergency Services Routing Proxy (ESRP)
- PSAP Gateway
- Legacy Network Gateway (LNG)
- Radio Interoperability Servers

What are Logical Steps in NG EC Deployment?

Integration of New Call sources and Advanced Services

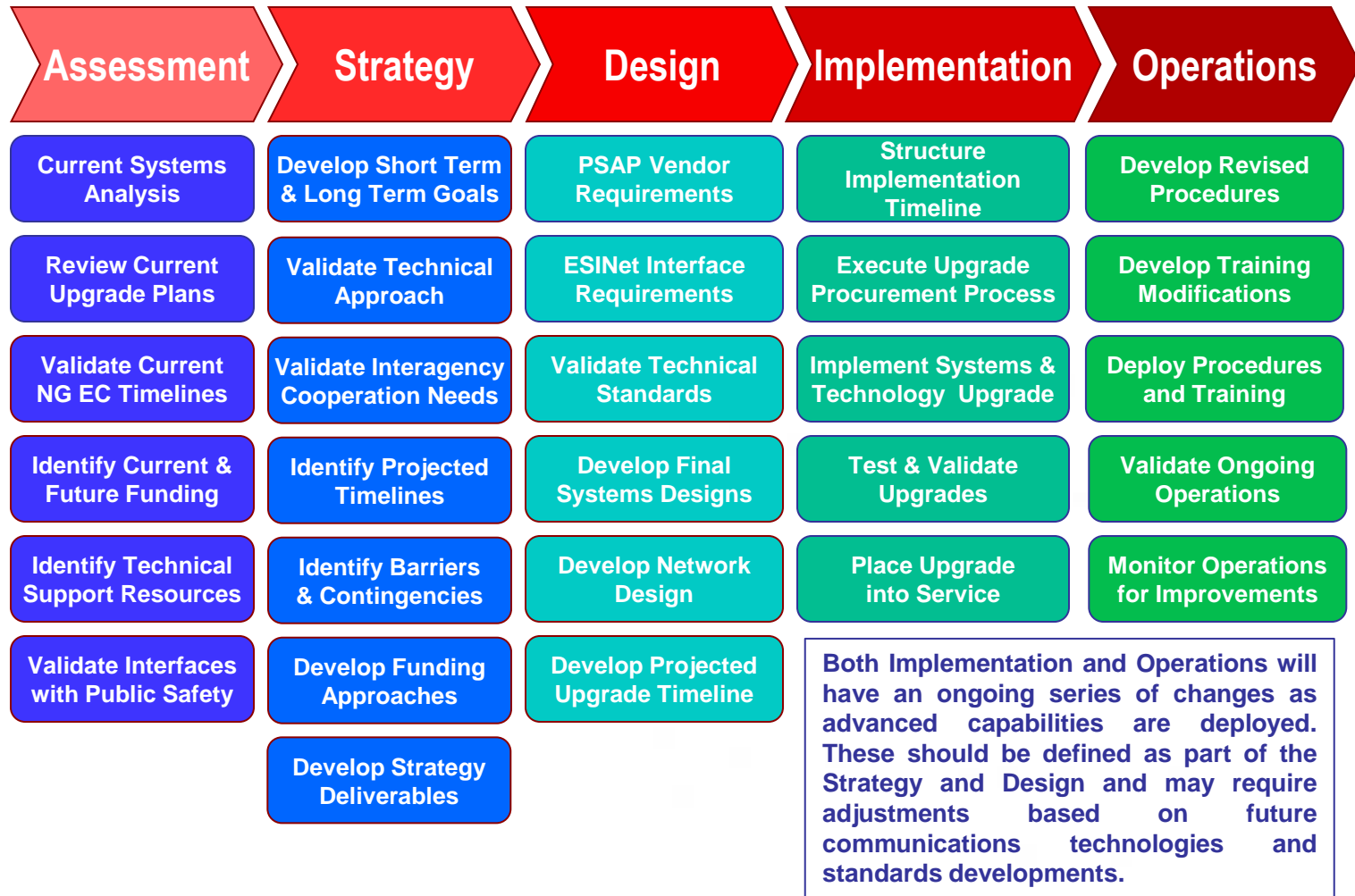
- ◆ Text messaging from cellular devices
- ◆ E-mail, Instant Messaging, photos and video from the Internet
- ◆ Event driven data, including auto and truck telematics from an accident, ShotSpotter gunshot location data, etc.
- ◆ Call routing preference definitions (language, disability, etc.)
- ◆ Automated calls for assistance from health monitoring systems, vehicle systems, etc.
- ◆ Medical data integration, including real-time data from home based or personal health monitoring systems
- ◆ Additional customer supplied data, such building drawings, truck cargo data, etc.
- ◆ Access to public surveillance systems and private surveillance (with permission)



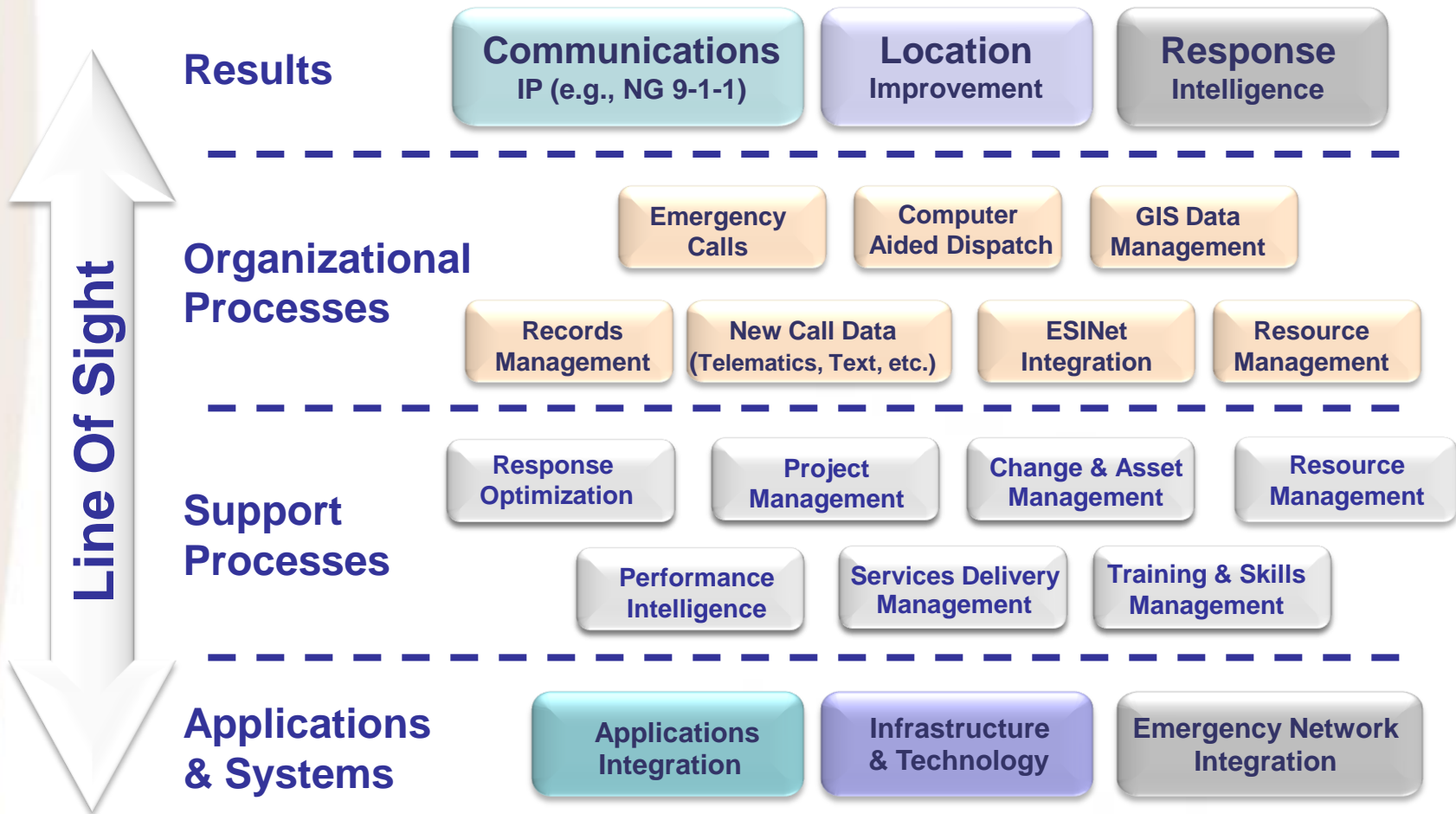
Key Issues for Next Generation Migration

- ◆ Planning and cost projections to develop funding strategies for capital expenditures and ongoing operational expenses
- ◆ Inter-local and regional integration planning to minimize ongoing operating costs
- ◆ Network security and reliability
- ◆ ESINet IP connections to PSAPs
- ◆ Integration with CAD, GIS, recording, and other dispatch systems and processes
- ◆ Integration with EC Interoperability Networks, as appropriate
- ◆ Disaster recovery transfer processes, cooperative agreements, memos of understanding, etc. with other NG9-1-1 operations
- ◆ Migration to IP only connectivity (no trunking connections)
- ◆ Early, local adoption steps (text messages to 911, cell phone photos and video to 911, etc.)
- ◆ Information and privacy protection and expanded storage requirements, perhaps significant, for multi-media messaging and associated retention requirements
- ◆ Ongoing operations updates and training – data transfer, integration, connections to police, fire and EMS data systems, etc.

Migration Deployment Life Cycle Example



Operations Model for Emergency Communications



Top Level Considerations

◆ **Funds Available:**

If one-time funds are available for upgrades and ongoing costs are not materially affected, then seriously consider the upgrade(s).

◆ **Reduced Life Cycle Costs:**

If the life cycle costs of technology changes will result in improved operations at similar costs or will result in reduced ongoing costs, consider the upgrade(s).

◆ **Mandated Upgrades:**

If State or Federal mandates require upgrades, investigate the most economical means to meet the requirements of the mandates.

Open Discussion



Thank You.

Next Generation 9-1-1 Intelligent MigrationSM

Contact: Mart D. Nelson, P.E., ENP, CISSP
214-597-2851
mnelson@avistas.com

AVISTAS
The Summit at Las Colinas
545 E John Carpenter Fwy, Suite 300
Irving, Texas 75062
Tel: 214-544-0400
Fax: 214-242-2311
www.avistas.com

