Virginia APCO/NENA/Interoperability Conference 2024

BUILD, JOIN, OR BOTH?
BEST RADIO SYSTEM FOR MY AGENCY

PRESENTED BY: BRAD BARBER,

V.P., LMR/WIRELESS PRACTICE

Federal Engineering®

INTRODUCTION

Brad Barber:

- 39 years of public safety experience, including public safety system management and support, & emergency communications consulting
- 19 years as a public safety consultant

Federal Engineering Inc:

- Four+ decades of experience with emergency communications systems
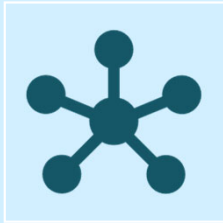- Over 2,500 successful projects

VIRGINIA APCO
Leaders in Public Safety Communications

FE Federal Engineering®

AGENDA

- Key Considerations & Process
- Build, Join, or Both Examples
- Broadband Push-To-Talk
- Recap
- Q&A
- Closing

Federal Engineering®
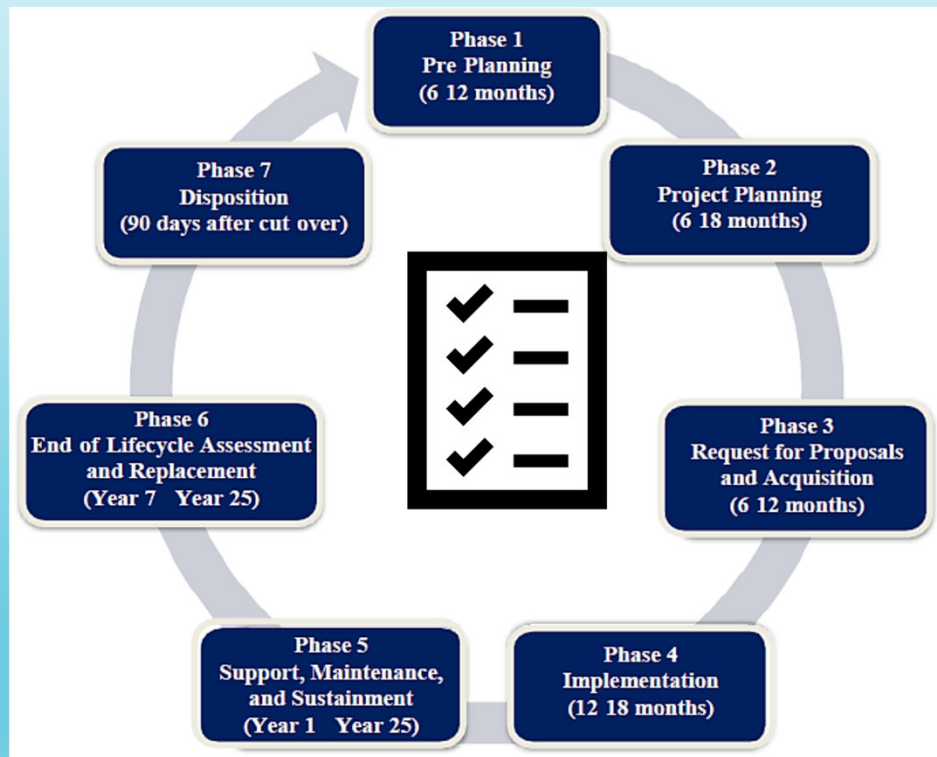
KEY CHALLENGES

Interoperability

Funding

Resources

IT'S A PROCESS!

- *Emergency Communications System Lifecycle Planning Guide Compendium: Best Practices, Considerations, and Recommended Checklists*
  DHS – 2018

- *Identify the requirements – What is needed and why?*
- *Which solutions will meet most, if not all, of these requirements?*
- *How will the solution be funded?*
- *How will the solution be supported?*
- *How will the solution evolve?*

Federal Engineering®
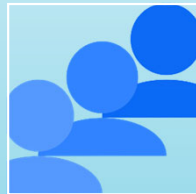
THE THREE C'S
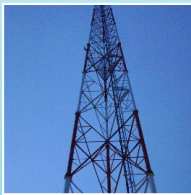
Coverage

Drives the number and location of sites

Primary system performance driver

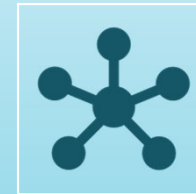Impacts scope, schedule, budget, and performance

Capacity

Determines the number of radio channels needed,

Defines Grade of Service (GoS) during routine and emergency events

Impacts budget and performance

Complexity

Resiliency, security, features, etc.

Capabilities of the system

Impacts scope, schedule, budget, and performance

Federal Engineering®

TYPICAL BUILD SCENARIOS

Entity builds a standalone system   Less dependency on third-party timelines and requirements

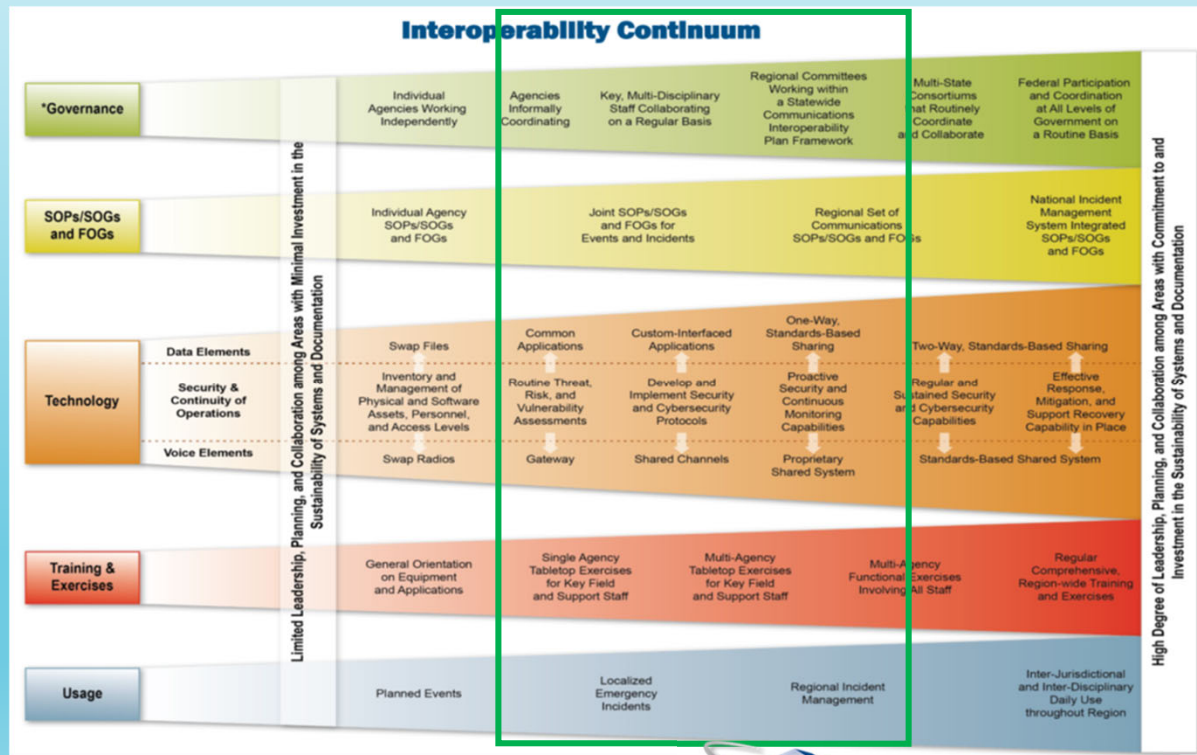Interoperability must still be considered in design

More direct control over system coverage, capacity, and capabilities

More control over the system O&M and lifecycle support, but also higher (typically) costs

Federal Engineering®

BUILD

"Gateways provide an interim interoperability solution as agencies move toward shared systems."

"A clear understanding of the nature and availability of interoperable(shared) communications channels in a given area is essential to prevent congestion, and to assure that shared channels and/or talk groups can be assigned quickly and to appropriate end users when needed."

DHS Interoperability Continuum 2021

BUILD (CONCEPTUAL) SYSTEM
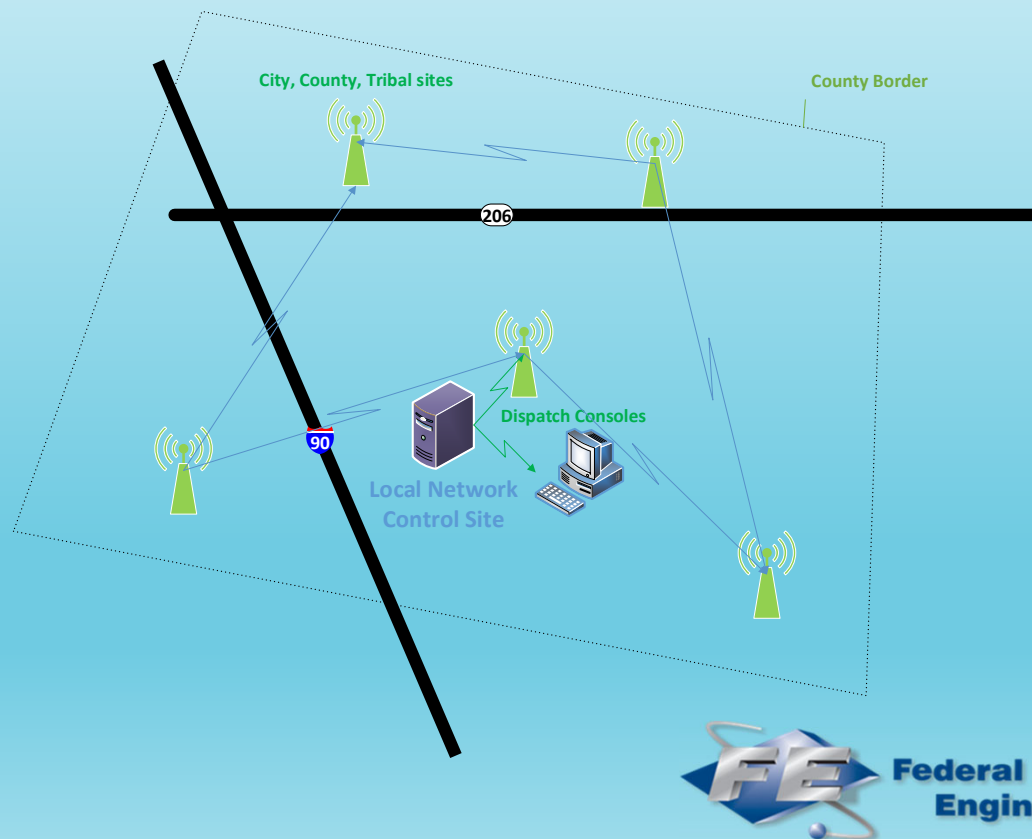
- Coverage focused on agency calls for service, portable coverage
- Network control site(s) are local
- Backup operations connectivity is local
- Interoperability and capacity during events may be an issue
- Governance process may need to be developed

CHALLENGES & BENEFITS

Build, design, and implement cycles are only subject to local coordination, consultation, and approval processes

May not include all desired features, functions, and capabilities due to funding constraints

Vendor-based support may not be familiar with needs in your area

Lifecycle support plans designed for local needs or plans.

Technology upgrades do not necessarily require coordination with others

FE Federal Engineering®

TYPICAL JOIN SCENARIOS

Local entity joining a regional or statewide system with or without coverage enhancements

Requires MOU, Interlocal agreement, MOA, or similar agreement to define the terms of engagement, each party's responsibilities, technical requirements, costs, ongoing support, governance, etc.

Less control over system O&M and lifecycle support, but also lower costs (potentially) than standalone options

Federal Engineering®

JOIN
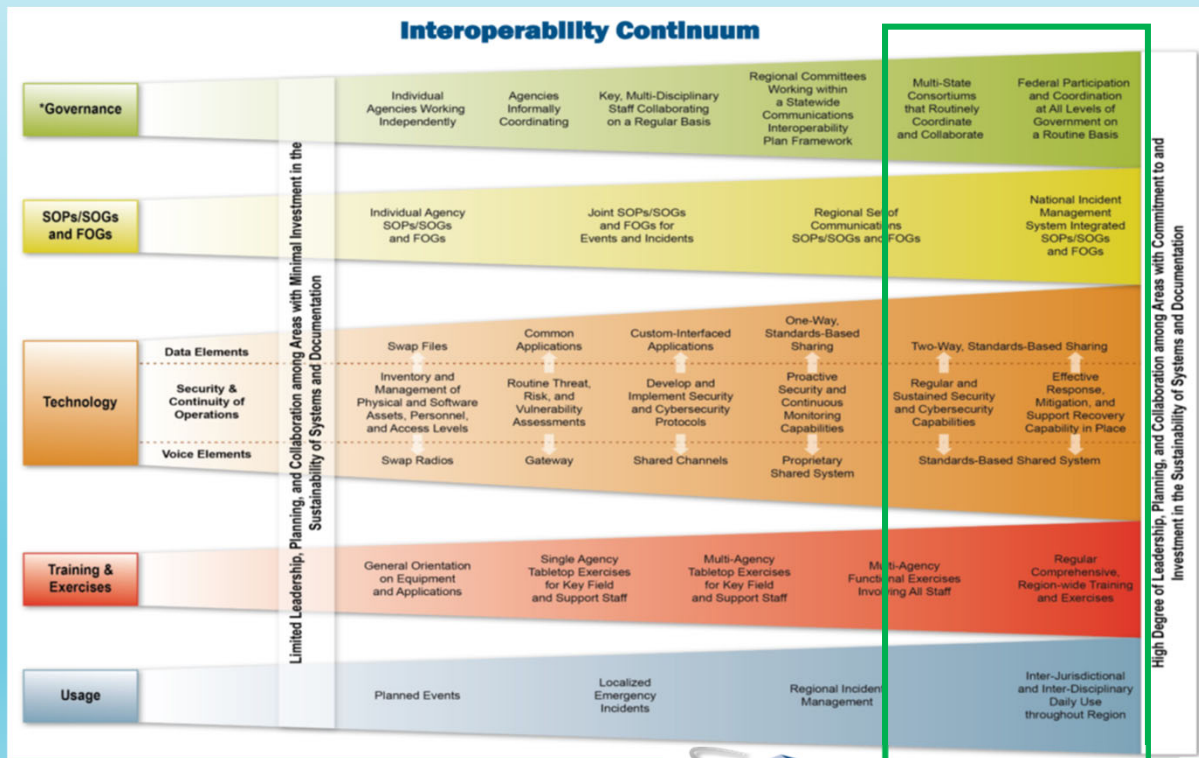
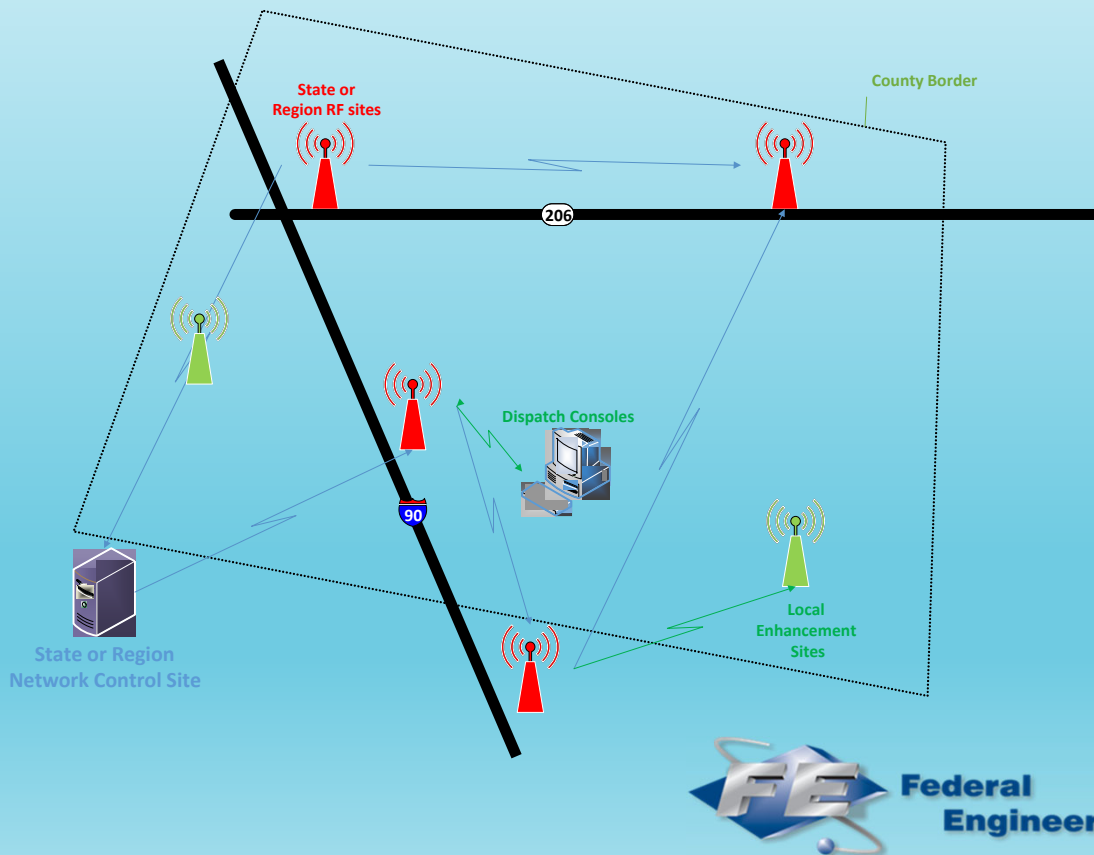Regional shared systems are the optimal solution for interoperability. "…standards-based shared systems promote competitive procurement and a wide selection of products to meet specific user needs. An optimal technology solution can be provided with proper talk group architecture and capacity planning, and both operability and interoperability addressed by system design."
DHS Interoperability Continuum Brochure 2021

JOIN (CONCEPTUAL) SYSTEM

State or Region RF sites

County Border

206

Dispatch Consoles

90

Local Enhancement Sites

State or Region Network Control Site

Federal Engineering®

- State or Regional system coverage focused on major roadways, mobile coverage
- Network control sites in another area
- Must address backup operations if connectivity to network control site(s) is lost
- Interoperability with state or regional partners
- Governance process typically well defined

CHALLENGES & BENEFITS

May include features, functions, and capabilities that a local solution would struggle to fund and implement
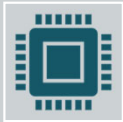
Potentially more support from "local" resources familiar with needs in your area

Lifecycle support plans may not be consistent with local needs or plans

Technology upgrades require coordination with others

Federal Engineering®

TYPICAL "BOTH" SCENARIOS

Local entity builds a standalone system but also interfaces to a regional or statewide system for interoperable communications
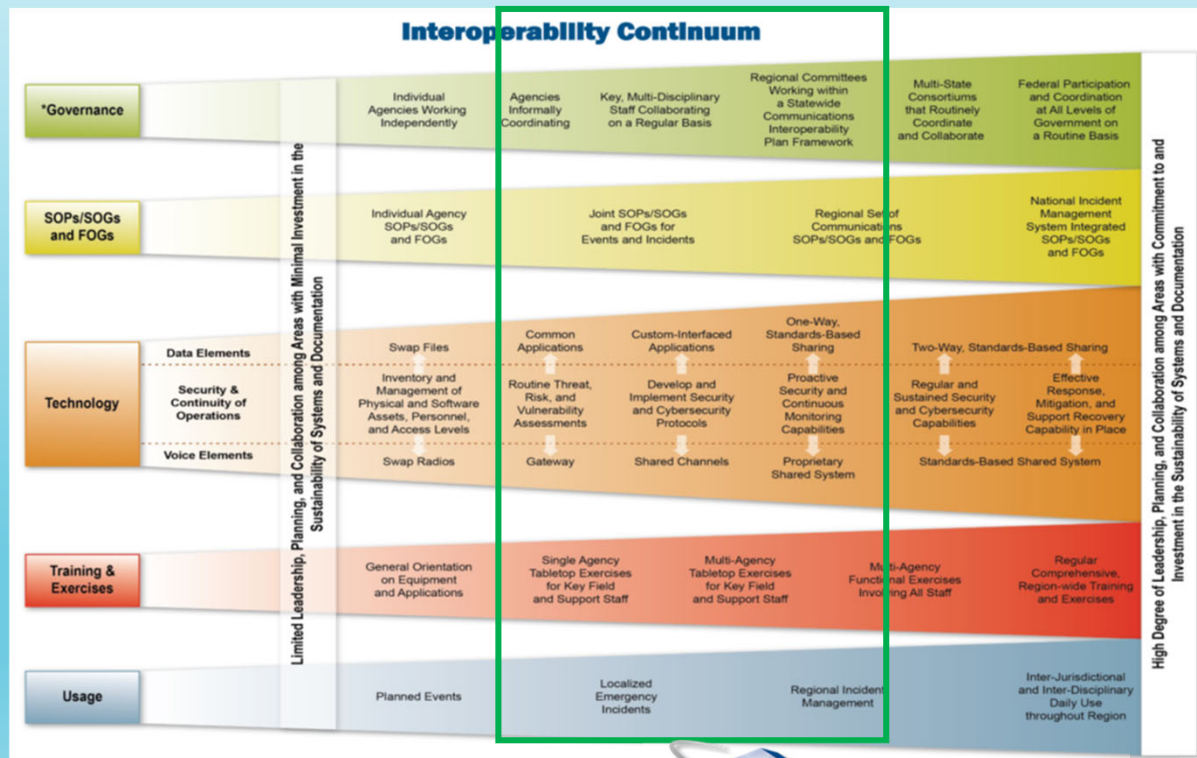
Local entity typically responsible for the cost of connecting to the host system

Still requires MOU, Interlocal agreement, MOA, or similar agreement to define the terms of engagement, each party's responsibilities, technical requirements, costs, ongoing support, governance, etc.

Federal Engineering®

BOTH

"Gateways provide an interim interoperability solution as agencies move toward shared systems."

"A clear understanding of the nature and availability of interoperable(shared) communications channels in a given area is essential to prevent congestion, and to assure that shared channels and/or talk groups can be assigned quickly and to appropriate end users when needed."

DHS Interoperability Continuum 2021

BOTH (CONCEPTUAL) SYSTEM
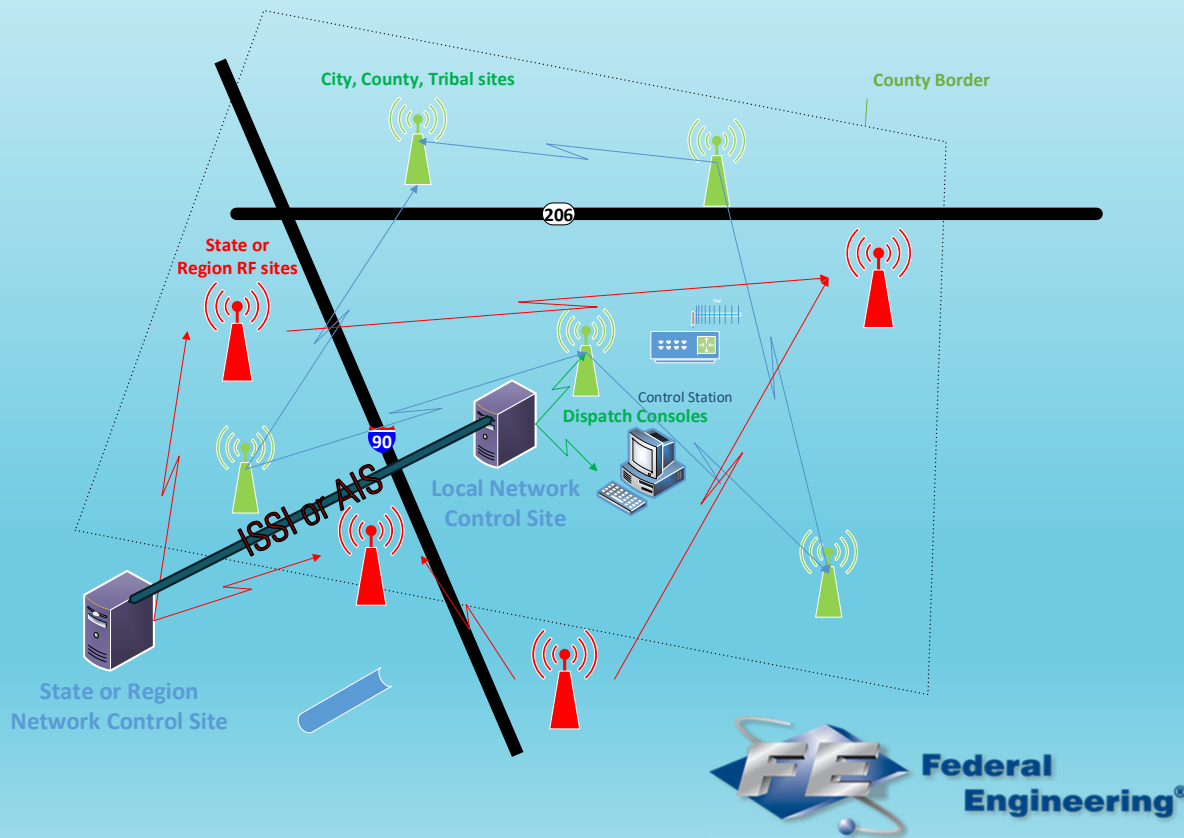
- Interoperability can be accomplished by:
  - Cross programming (same bands/technologies)
  - Direct system-to-system connections (ISSI or AIS)
  - Gateway or control station connections
- Rules of engagement must be clearly defined and documented
- Detailed planning and training are required to execute successfully

CHALLENGES & BENEFITS

Local build, design, and implement cycles may be longer due to additional coordination, consultation, and approval processes

May include features, functions, and capabilities that a local solution would struggle to fund and implement

More interoperability potential than a build-only option

Lifecycle support plans may not be consistent with local needs or plans

Technology upgrades require coordination with others

Federal Engineering®

BROADBAND PTT ENHANCEMENTS

Broadband push-to-talk (PTT) or BBPTT uses broadband, e.g., LTE and Wi-Fi, to deliver one-to-many communications

Can provide quality of service (QoS), priority, and preemption (QPP) but may not translate across carriers
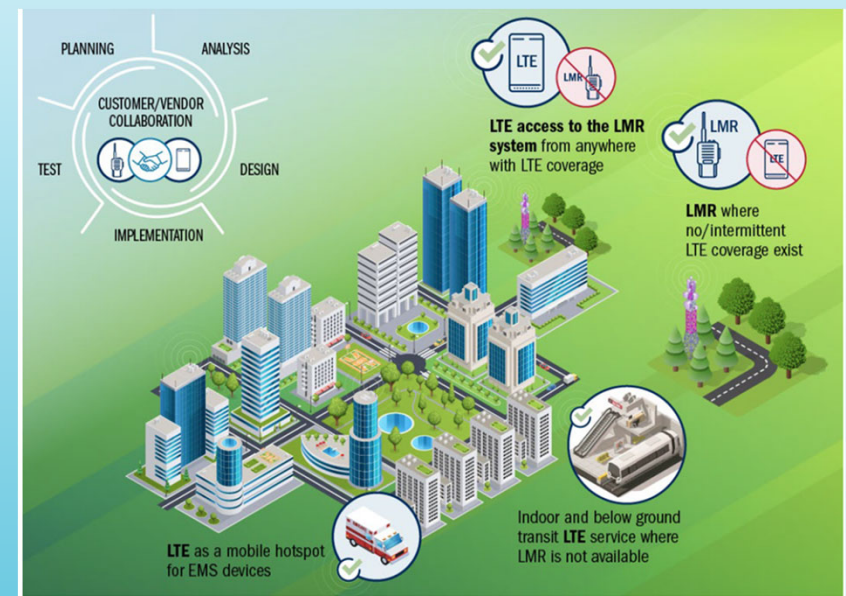
May be carrier-based (integrated) or over the top. Carrier-based systems are not directly interoperable.

BBPTT services can also connect to LMR systems, including P25 networks via an ISSI-connected gateway or DMR via AIS
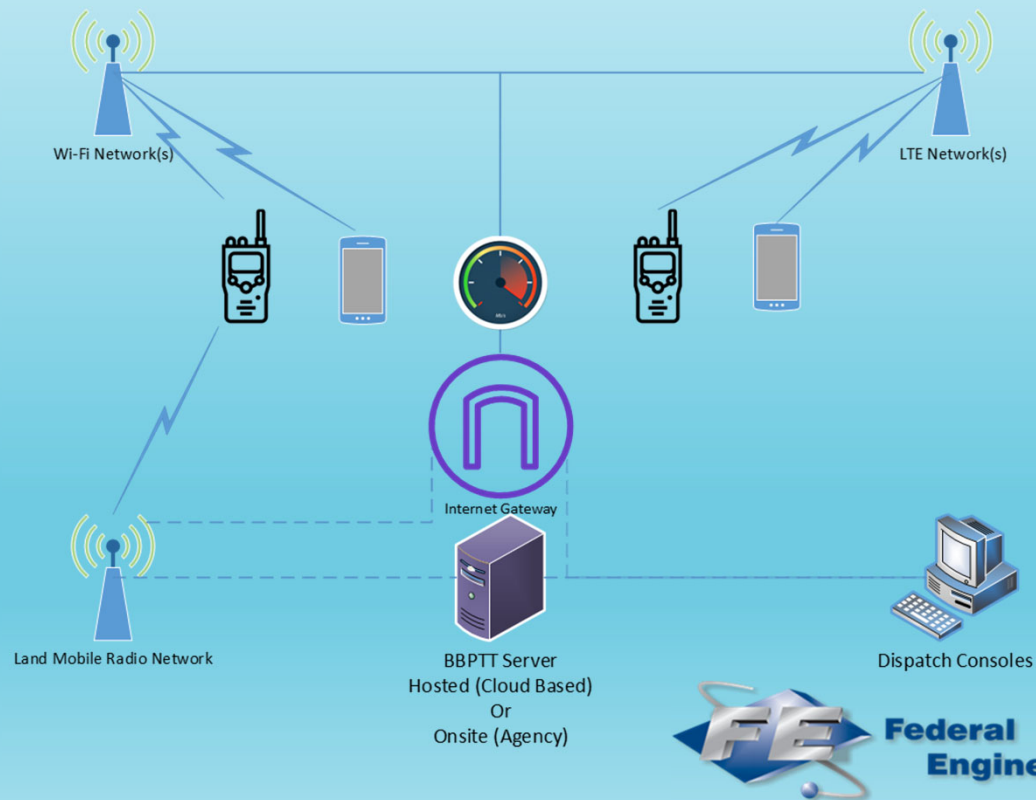
Federal Engineering®

WHY USE A BBPTT NETWORK?

- Coverage enhancement or fill-in

- Roaming outside the LMR coverage area

- Back up to the LMR system

- Additional capabilities

  - Messaging

  - Location information

kwsv=22z z z 1f1vd1jry2vlvhv2ghidxo2ilhnv2yllghr2vdihfrp bqfvz 1fbqp uboihbehvlosudfwlfhvb55b3 835b1lgdb83;f1sgi

BB PTT ENHANCEMENT (CONCEPTUAL)

Wi-Fi Network(s)

LTE Network(s)

Internet Gateway

Land Mobile Radio Network

BBPTT Server
Hosted (Cloud Based)
Or
Onsite (Agency)

Dispatch Consoles

kwsv-2zzz1fbultjry2vlahv2ghidxo2ilbhv2ylghr2vdihfrpbqfvz1fbxpuonhbehwbsudfwlfhvb55b3835bilgddo83;flsgi

Federal Engineering®

CHALLENGES & BENEFITS

SLA(s) with the provider strongly recommended

Requires governance policies and procedures for LTE devices

Potential for enhanced coverage, interop for disparate system users

Lack of interoperability between carriers

Federal Engineering®

SUMMARY

System Characteristics	Build	Join	Join and Build
Coverage	Local area focus	Wide area focus	Expanded area focus
Interoperability	Local area focus	Wide area focus	Expanded area focus
Scalability	Local control	Regional/State control	Regional/State and Local control
Governance	Local control	Regional/State control	Regional/State control
Sustainability	Internal dependencies	External dependencies	External dependencies
Costs (capital & operations)	100% local	Shared – coverage enhancements 100% local	Some shared costs

Federal Engineering®

TAKEAWAYS

Unique to each entity

Often driven by external and non-technical factors

Requires extensive analysis, time, effort, and commitment

Needs stakeholder and sponsor buy-in and support

Must include <u>capital, operational, and lifecycle costs!</u>

A robust lifecycle support plan is a crucial requirement, as technology and user needs are not static!

Federal Engineering®

CONTACT INFO

Brad Barber

Vice President, LMR/Wireless Practice

Federal Engineering

10560 Arrowhead Drive

Fairfax, VA 22030

Mobile: 850-377-7707

Email: bbarber@fedeng.com

Z_rugz_lgh#$xedf$Vdihw|#Frp p.xqlfdwlrqv#Frqvxowlqj#|Ihghuda#Hqjlqhhulqj#|hghqj1frp_,

Federal Engineering®

RESOURCES

- DHS Guidance
  - https://www.cisa.gov/resources-tools/programs/emergency-communications-state-local-tribal-and-territorial-coordination
  - https://www.cisa.gov/news-events/news/updated-2018-emergency-communications-system-lifecycle-planning-guide-release
  - https://www.cisa.gov/resources-tools/resources/interoperability-continuum
  - https://www.cisa.gov/safecom
  - https://www.cisa.gov/safecom/encryption
  - https://www.cisa.gov/safecom/project-25

- Federal Engineering
  - Insights & Resources | Public Safety Communication | Federal Engineering (fedeng.com)