



APCO 2024

August 4-7 | Orlando, FL

Build, Join, or Both? Best Radio System for My Agency

Presented by: Brad Barber, V.P., LMR/Wireless Practice
Rajit Jhaver, A.V.P., LMR/Wireless Practice



Introduction

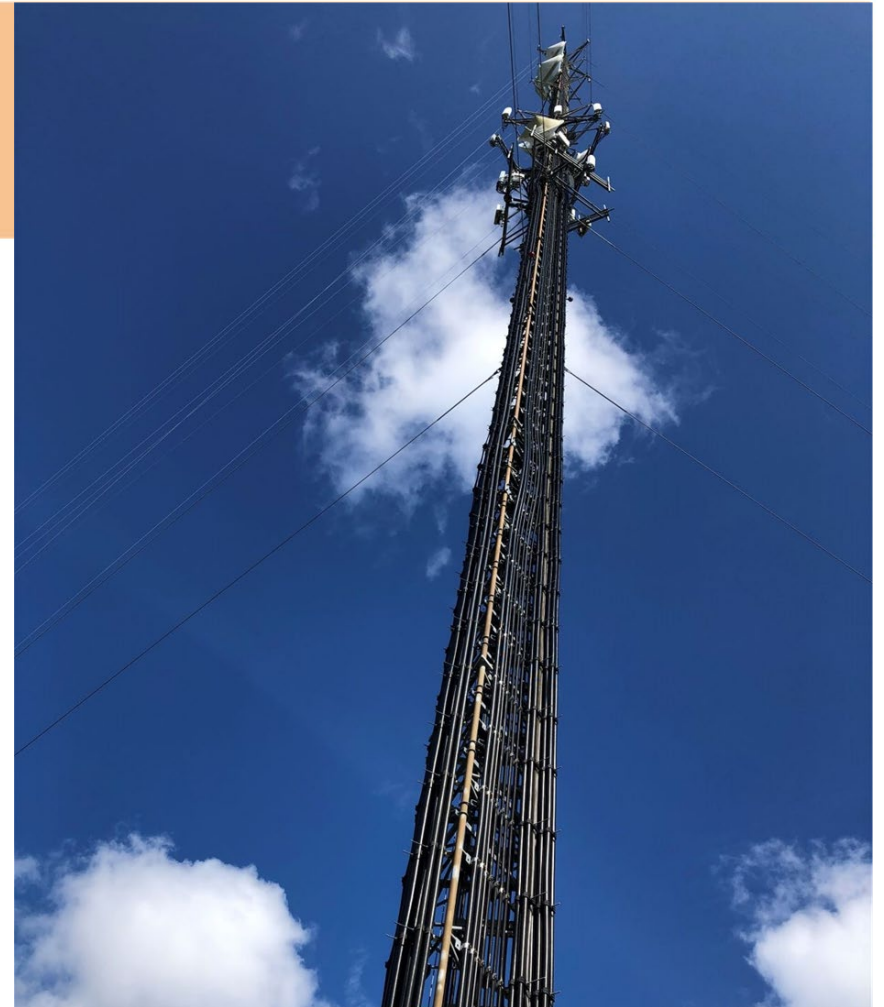
- Brad Barber:
 - 39 years of public safety experience, including public safety system management and support, & emergency communications consulting
 - 19 years as a public safety consultant
- Rajit Jhaver:
 - 24 years of public safety communications experience including with an LMR vendor
 - 16 years as a public safety consultant
- Federal Engineering Inc:
 - Four decades of experience with emergency communications systems
 - Over 2,500 successful projects



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Agenda

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



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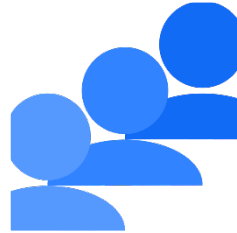
The Three C's



Coverage

Drives the number and location of sites

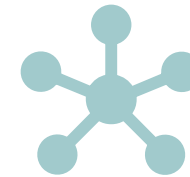
Impacts scope, schedule, budget, and performance



Capacity

Determines the number of channels needed

Impacts budget and performance

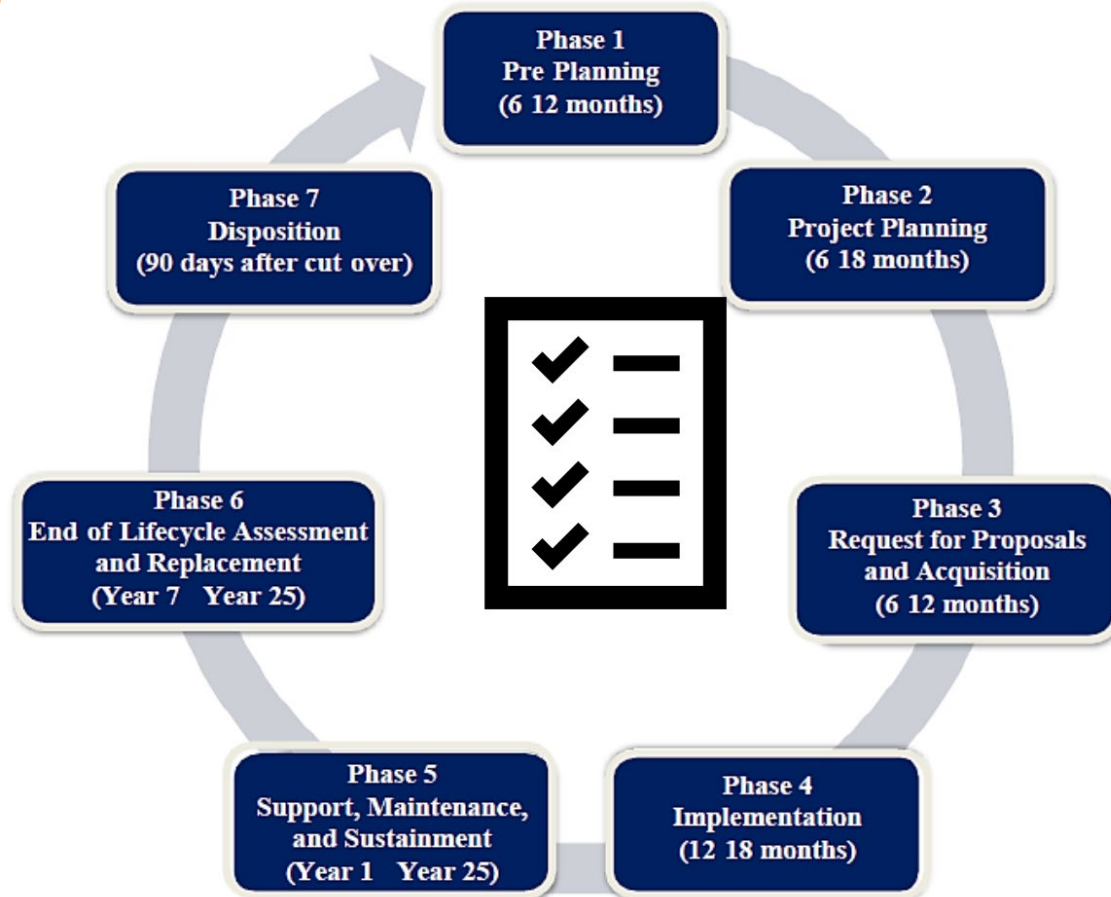


Complexity

Resiliency, security, features, etc.

Impacts scope, schedule, budget and performance

The Process



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

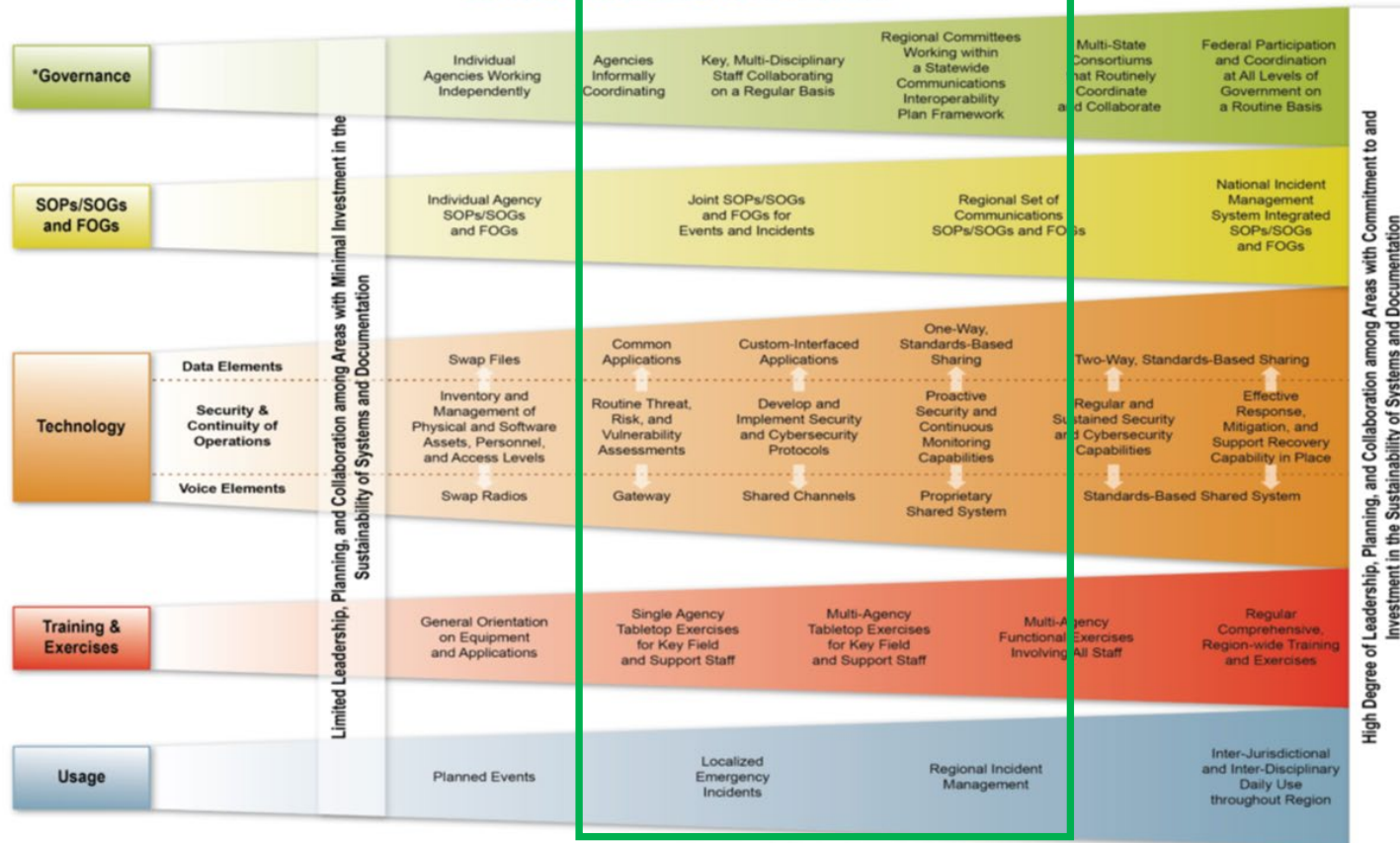
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Typical Build Scenarios

- Local 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

Build

Interoperability Continuum



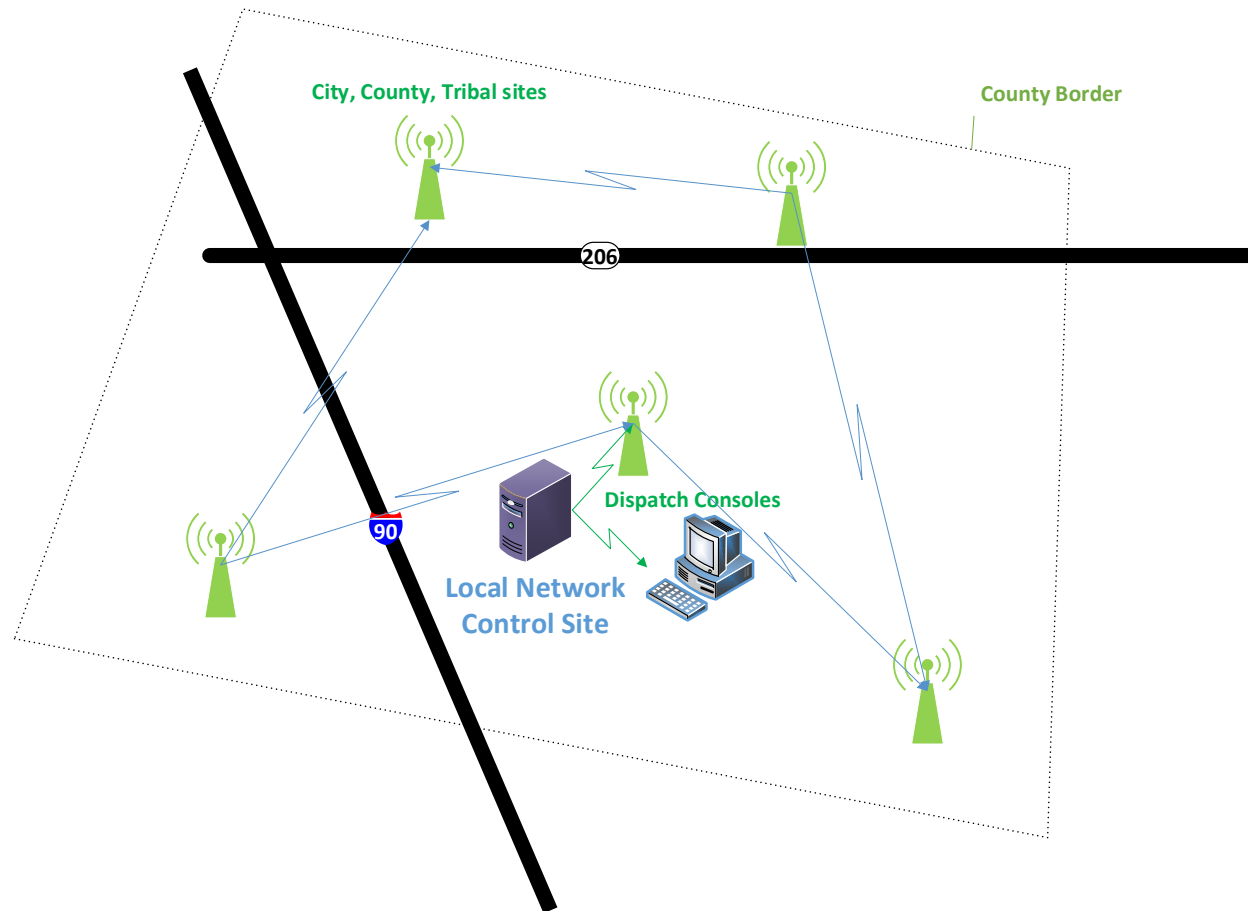
“Gateways provide an interim interoperability solution as agencies move toward shared systems.”

“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

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Build (Conceptual) System



- Coverage focused on City, County 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.

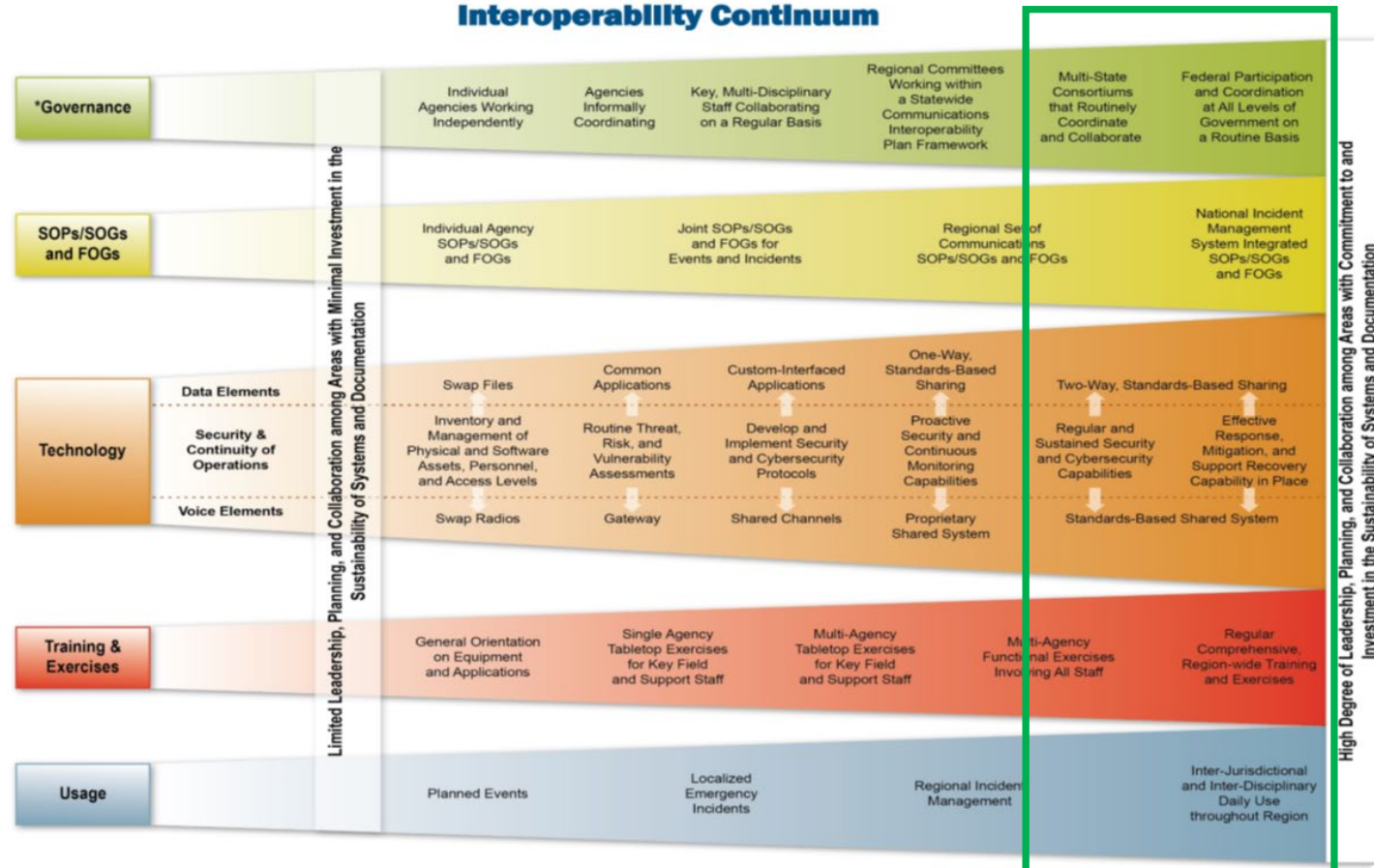
Technology upgrades do not necessarily require coordination with others

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

Join

Interoperability Continuum

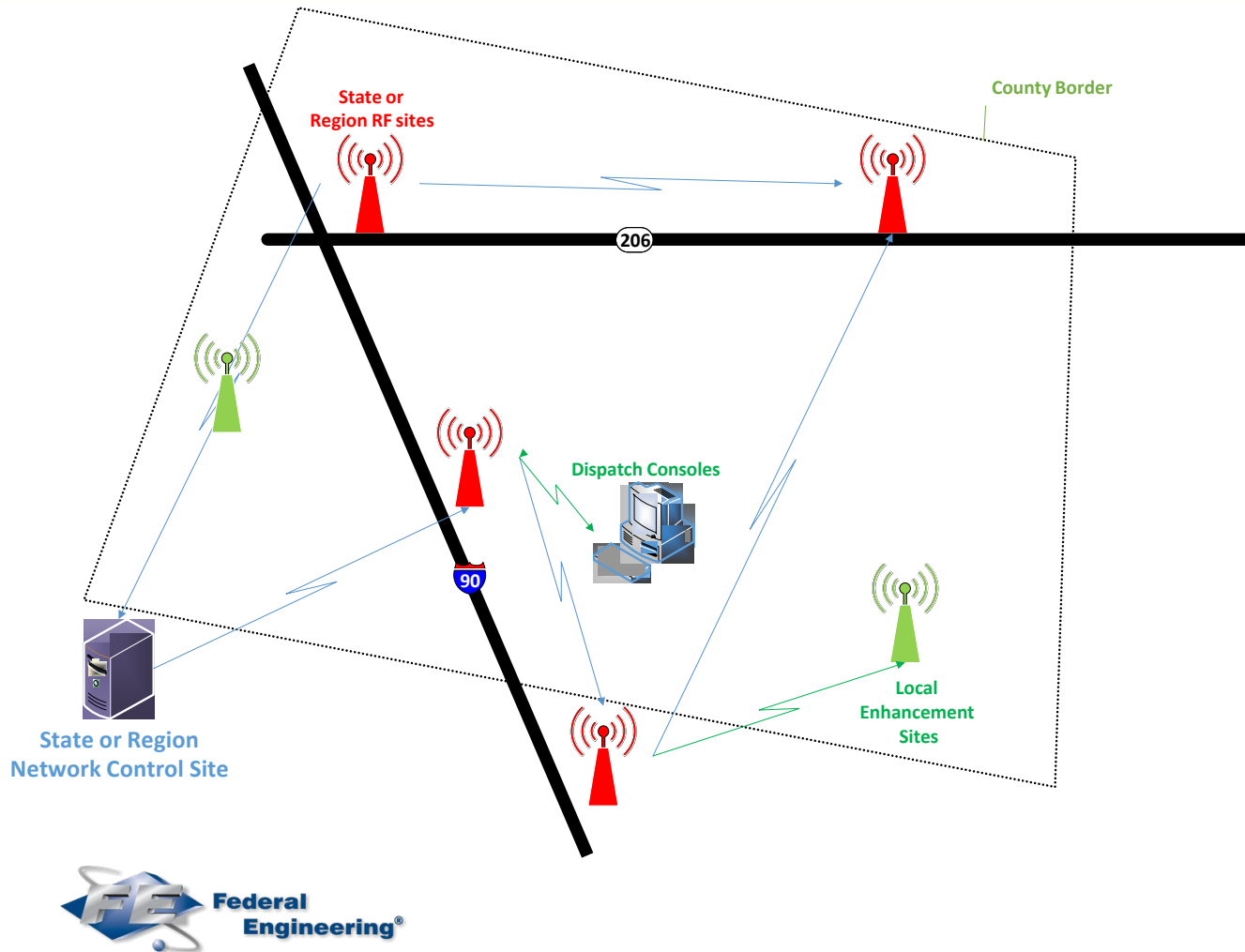


Regional shared systems are the optimal solution for interoperability. “...standards-based shared systems promote competitive procurement and a wide selection of products to meet specific user needs. An optimal technology solution can be provided with proper talk group architecture and capacity planning,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

DHS Interoperability Continuum Brochure 2021

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Join (Conceptual) System



- 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

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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

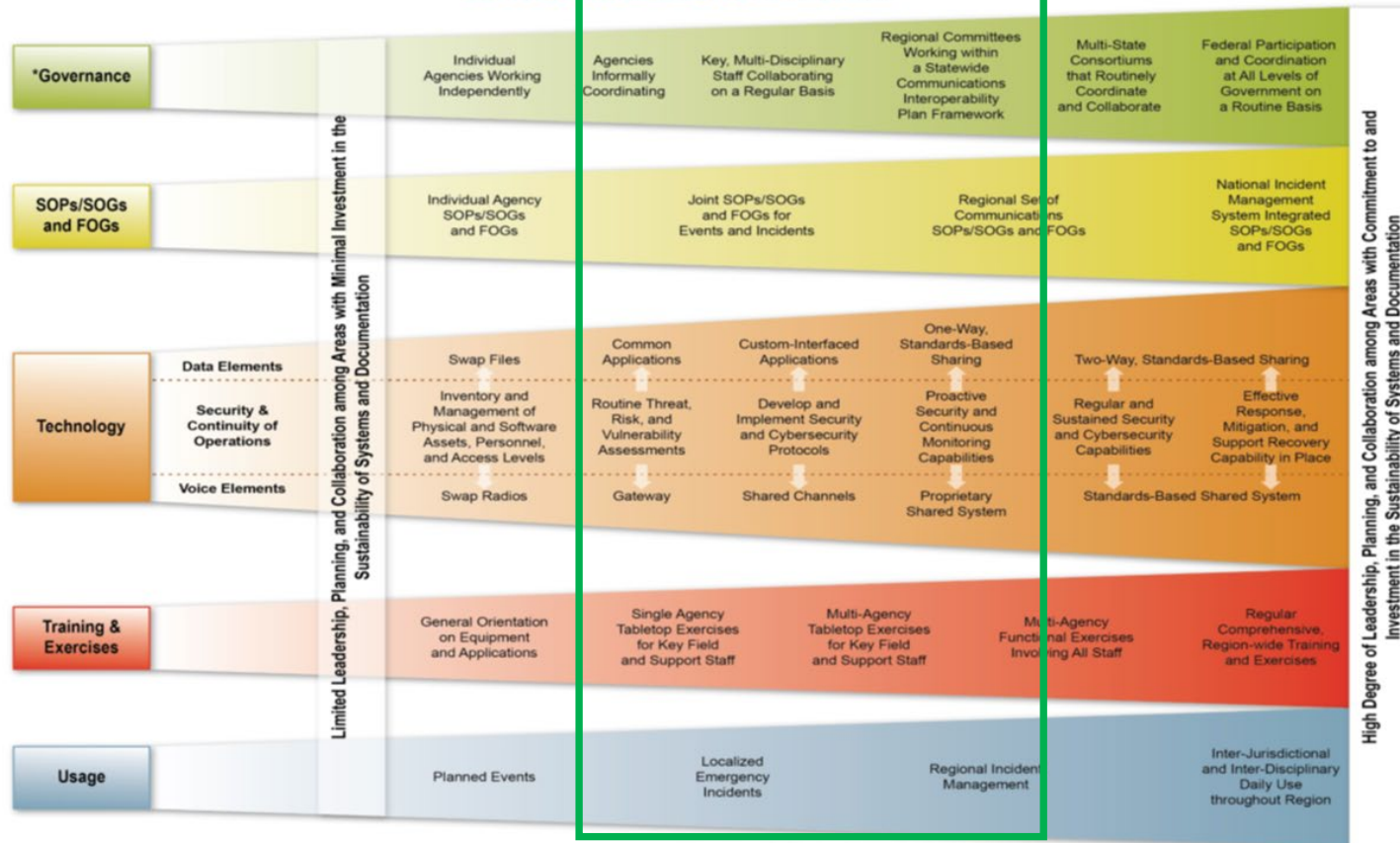
Typical “Both” Scenarios

- 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.

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Both

Interoperability Continuum



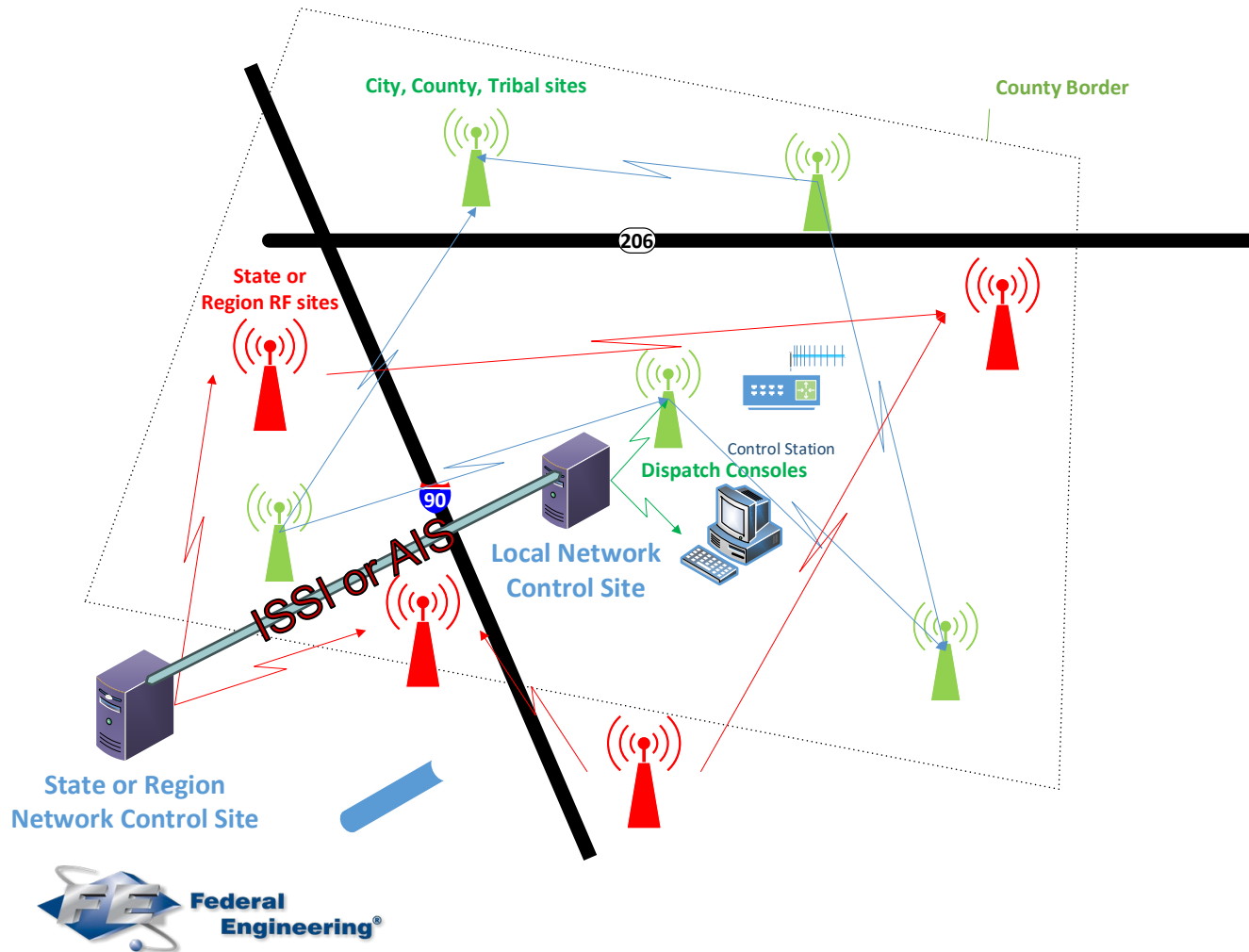
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DHS Interoperability Continuum 2021

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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

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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

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) and priority of service, including preemption but may not translate across carriers



May be carrier-based (integrated) or over the top. Carrier-based systems are not directly interoperable.

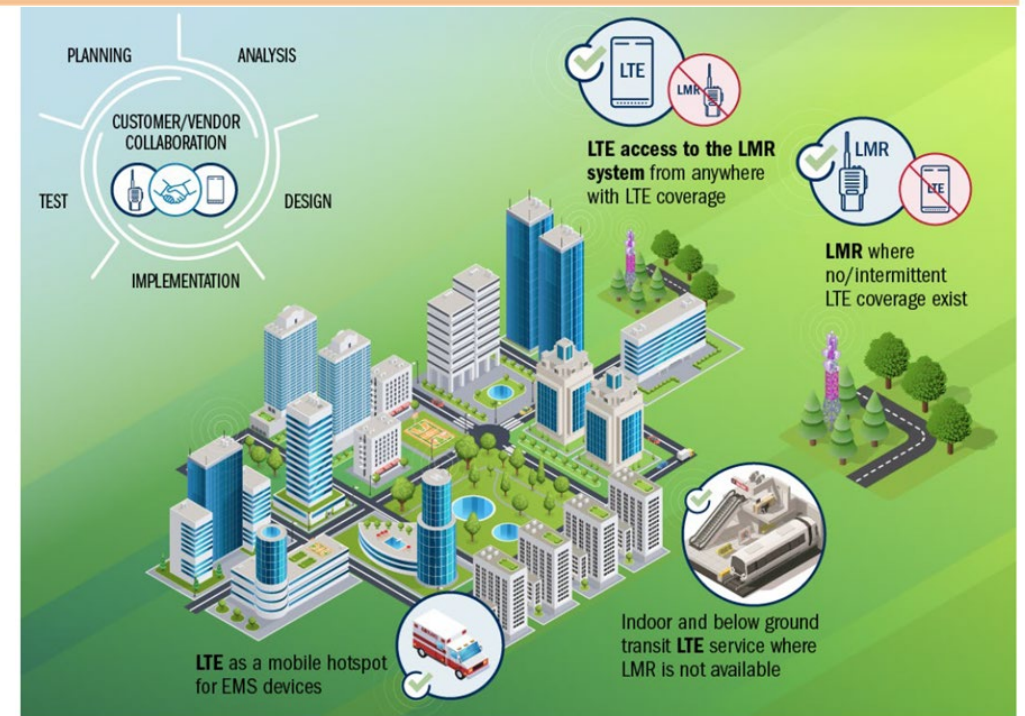


BBPTT services can also connect to LMR systems, including P25 networks via an ISSI-connected gateway or DMR via AIS

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Why use a BBPTT Network?

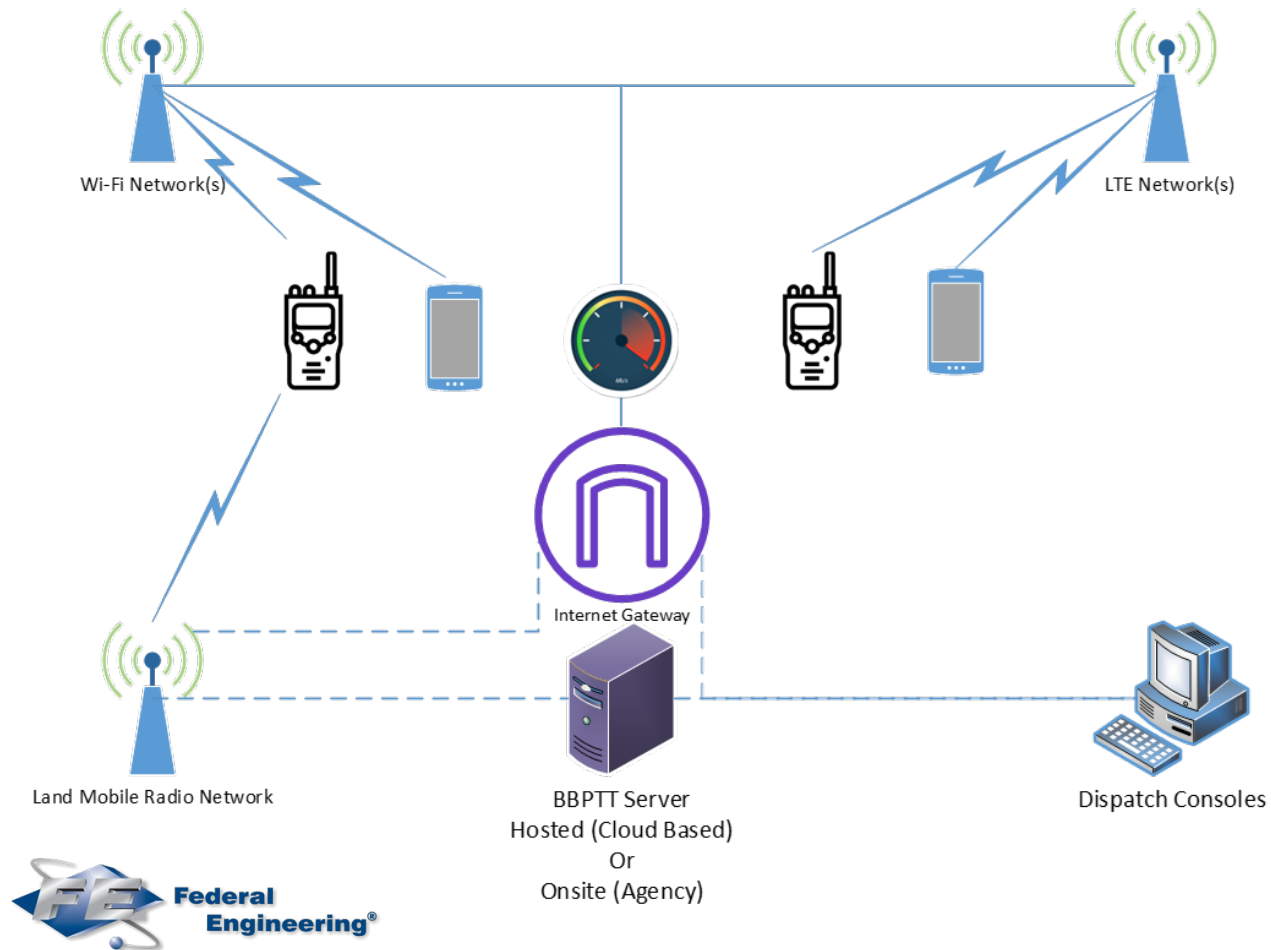
- Coverage enhancement or fill-in
- Roaming outside the LMR coverage area
- Back up to the LMR system
- Additional capabilities
 - Messaging
 - Location information



https://www.cisa.gov/sites/default/files/video/safecom_ncswic_lmr_lte_best_practices_22_0502_final_508c.pdf

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BB PTT Enhancement (Conceptual)



https://www.cisa.gov/sites/default/files/video/safecom_ncswic_lm_r_lte_best_practices_22_0502_final_508c.pdf

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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

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****APCO 2024**
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Decision Points



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 both capital and operational costs!

A robust lifecycle support plan is a key requirement as technology and user needs are not static.

Contact Info



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Q & A



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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 \(fedeng.com\)](#)

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