Nevada Rural Statewide

VHF Interoperability Communications Project

NCSC Presentation
Agenda

• Project Objectives
• Project Status
• Assessment and Recommendations Overview
• Strategic Communications Plan Overview
• Opinion of Probable Cost
• Nevada Interoperability Field Operations Guide
• Next Steps
Nevada VHF Interoperability – Project Objectives

• Reach out to each of the 15 rural counties and 3 state agencies individually

• Assess current system and communications environments

• Summit Meetings

• Needs Assessment and Recommendations Report

• Strategic Communications Plan to create a fifth core system

• Create Field Operations Guide for use by field personnel
Project Status – Needs Assessment and Recommendations Report

• Tasks completed:
  – 20 Interviews
  – 16 Dispatch Center Surveys
  – Interoperability Analysis
  – Recommendations for creating the fifth core system
  – Recommendations for each VHF County and State Agency

• Draft Report reviewed by Counties & Agencies

• Final Report – Completed March 5, 2010
Project Status – Summit Meetings

• Three Summit Meetings
  – Carson City on January 19, 2010
  – Winnemucca on January 20, 2010
  – Ely on January 21, 2010

• Purpose
  – Present assessment of radio systems and interoperability
  – Discuss possible alternative solutions for interoperability and creating a fifth core system in Nevada
  – Present sample Field Operations Guide
Project Status – Strategic Communications Plan

• Tasks completed:
  – Alternatives analysis
  – Conceptual design
  – Implementation plan
  – Migration plan for narrowband
  – Opinion of probable cost
    • Interoperability Gateway System
    • Narrowband for 15 Counties and 3 State Agencies
  – Sample MOUs

• Draft Report reviewed by Counties & Agencies

• Final Report – Completed March 19, 2010
Project Status – Nevada Interoperability Field Operations Guide (FOG)

• Completed:
  – 17 Maps
  – 55 Frequency Tables
  – Dispatch Center Contact Information

• Draft FOG reviewed by Counties & Agencies

• Final FOG – Completed March 12, 2010
Assessment Overview - Radio Environment

• VHF
  – Well-suited to Nevada’s mountainous terrain

• Most - Conventional Radio Systems
  – One or more channels (frequency pairs) at several repeater sites
  – Sites accessed using different CTCSS or PL tones
  – Users must manually change channels to access proper site

• 2 Conventional Simulcast Systems

• 1 VHF Trunked Radio System
Assessment Overview - Radio System Concerns

- Coverage issues
- Lack of frequencies
- Maintenance issues due to repeater site locations
  - Mountain tops difficult to access
  - Harsh environment
- Reduced coverage footprint when transition to narrowband analog
Assessment Overview - Dispatch Centers and PSAPs

• Wide variety in manufacturer and age of console equipment

• Some console switches have limited or no capacity for expansion

• No backup dispatch facilities

• Dispatch centers cannot directly communicate with each other – must use the telephone
Current Interoperability Environment

• Strong mutual aid interoperability ethic and interoperability mindset
  – Depend upon each other
  – Interoperability occurs daily
  – Intra-jurisdictional and inter-jurisdictional
  – Willingness to do what it takes

• Interoperability between Counties and State Agencies on VHF

• Accomplished via sharing VHF radio channels
Common Simplex Channel Usage

- Fire Channels consistently used for tactical operations
  - Fire White Channels
  - NDF Red Channels

- Law Enforcement Channels inconsistently used
  - Not always programmed into radios
  - Inconsistently named

<table>
<thead>
<tr>
<th>Channel</th>
<th>Frequency</th>
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<tbody>
<tr>
<td>National Law Enforcement Mutual Aid</td>
<td>155.4750 MHz</td>
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<tr>
<td>State Law Enforcement Mutual Aid</td>
<td>155.1600 MHz</td>
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<tr>
<td>National Search and Rescue</td>
<td>155.6550 MHz</td>
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</tbody>
</table>
Interoperability Problems

• Difficulty communicating via radio with NHP
  – NHP still has VHF mobiles
  – Some NHP radio contact with VHF radio users and dispatch centers
  – NHP does not always respond to dispatch centers calling on the 800 MHz radios

• Cannot communicate via radio with NDOT

• EMS/Ambulances switching from UHF to NSRS
  – They still need 2 radios: VHF and 800 MHz
VHF Users Facing FCC Narrowband Mandate

• January 1, 2013 narrowband deadline is rapidly approaching
  – All Counties & Agencies have at least 50% subscriber radios narrowband capable
  – Many reported “most” equipment narrowband capable – conservative estimate of 75%

• Fixed equipment – base stations & repeaters
  – Newer repeaters are narrowband capable
  – Overall, approximately 55% are narrowband capable

• Some agencies are in a better position than others
P25 Conventional

• No mandate to go P25

• Advantages of P25
  – Standards-based
  – Features

• Consider P25 capable when purchasing new fixed and subscriber equipment for narrowband
  – Complies with Nevada SCIP objective of P25 capable equipment
  – Minimizes expense of purchasing new equipment at a later date

• Decision each County or Agency should carefully consider
  – Will need to maintain interoperability with analog neighbors
Fifth Core System

- Comprised of VHF radios systems
  - 15 rural counties
  - 3 state agencies

- Connectivity between radio systems
  - Users have interoperability via shared channels
  - Need dispatch interoperability
  - Interface to cross-band repeaters

- Need links to the other four core systems
  - NSRS
  - Washoe County
  - SNACC
  - Las Vegas Metro
Interoperability Alternatives

• Join 800 MHz NSRS
  – Have interoperability with NHP & NDOT
  – Coverage and capacity concerns
  – Consider on a County-by-County basis

• VHF P25 Trunked Radio Systems
  – Need at least 3 VHF channels per site
  – Need backbone connectivity of sites for system management
  – Not feasible for individual counties – perhaps on a regional basis

• Multi-Band Subscriber Equipment Radios
  – Only one radio is needed
  – High-tiered, full-featured
  – Do not support proprietary trunked protocols
Recommended Interoperability Alternative - Interoperability Gateway System

• IP connectivity and Voice over IP (VoIP) technology
  – Interfaces to radio systems regardless of frequency band
  – Leverage existing systems – conventional or trunked
  – Can support future systems
  – Can interface to cross-band repeaters

• Dispatch interface
  – Allows control & communications of the radio resources
  – Allows remote access / monitoring of radio system
  – Facilitates backup dispatch center
  – Connects dispatch centers together

• Meets objectives and requirements of Counties & Agencies
Strategic Communications Plan: Fifth Core System

• Interconnectivity of all VHF County and State Agency radio systems

• Implement Gateway Interoperability System
  – Connects to all the VHF radio systems
  – Connects all dispatch centers and PSAPs
  – Allows connectivity to the other four core systems in Nevada
  – Allows links to the cross-band repeaters

• Upgrade VHF systems to narrowband
Interoperability Gateway System Components

• Radio interface device
  – Interfaces to control stations, base stations or consoles
  – Digitizes audio into IP packets

• Dispatch interface workstation
  – Management and control
  – Can monitor local and remote voice traffic
  – Uses microphone and speakers/headset for communications

• Server
  – Establish and tear down patches and connections
  – Centralized or distributed
Typical Interoperability Gateway System
Interoperability Gateway System Implementation

• Implement as an entire system
  – Single procurement from a single vendor
  – Redundant servers
  – Links to other 4 core systems simpler

• Equipment for each agency consists of
  – Radio interface device for radio system and channels
  – Dispatch interface workstation at each dispatch center / PSAP
  – Additional dispatch interface workstations or software as needed

• IP connectivity
  – Acceptable: VPN over DSL or cable
  – Preferred: Private IP network over microwave or fiber backbone
Narrowband Migration Implementation

- Plan for replacement/upgrade of necessary fixed and subscriber equipment
- Program subscriber equipment with both wideband and narrowband channels
- Modify FCC licenses for narrowband and/or digital emission designation
- Program fixed equipment for narrowband operation
- When all neighboring counties are narrowband, remove wideband channels from subscriber equipment
Additional Recommendations – Radio Programming

• Use common naming conventions for interoperability channels - especially law enforcement

• Program radios with frequencies of cross-band repeaters

• Consider programming in the National Mutual Aid simplex frequencies – VCALL & VTACs
## Opinion of Probable Cost – Interoperability Gateway System

### OPINION OF PROBABLE COST
INTEROPERABILITY GATEWAY SYSTEM

<table>
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<tr>
<th>Item</th>
<th>Cost</th>
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<tr>
<td>Radio Interface Gateway System</td>
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<td>Dispatch Interface Workstations</td>
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<td>Additional Dispatcher Software</td>
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<td>Training</td>
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<td>Annual Software Maintenance</td>
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<td>Additional dispatcher software (per license)</td>
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<tr>
<td>Radio for crossband repeater access (including installation)</td>
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<td>Agency</td>
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<td>Carson City</td>
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<td>State Parks</td>
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</table>
Nevada Interoperability FOG

- Maps with repeater locations
- Frequency programming
  - Counties
  - State Agencies
    - NDF
    - NDOW
    - State Parks
  - VHF and 800 MHz Cross-band repeaters
- Must keep current as radio system & frequency information changes!
Next Steps

• Implement Interoperability Gateway System
  – Preferably all same vendor
  – Link all VHF radio systems together
  – Allows connectivity to the other four core systems
  – Allows link with cross-band repeaters

• Ensure that MOUs are in place for interoperability

• Proceed with narrowbanding
  – Each Agency should develop migration schedule
  – Purchase P25 capable equipment

• Implement radio programming recommendations
Questions and Answers

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