Nevada Rural Statewide

VHF Interoperability Communications Project

NCSC Presentation

May 18, 2010

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Agenda

- Project Objectives

- Project Status

- Assessment and Recommendations Overview

- Strategic Communications Plan Overview

- Opinion of Probable Cost

- Nevada Interoperability Field Operations Guide

- Next Steps

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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

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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

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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

Channel	Frequency
National Law Enforcement Mutual Aid	155.4750 MHz
State Law Enforcement Mutual Aid	155.1600 MHz
National Search and Rescue	155.6550 MHz

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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

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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

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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

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Typical Interoperability Gateway System
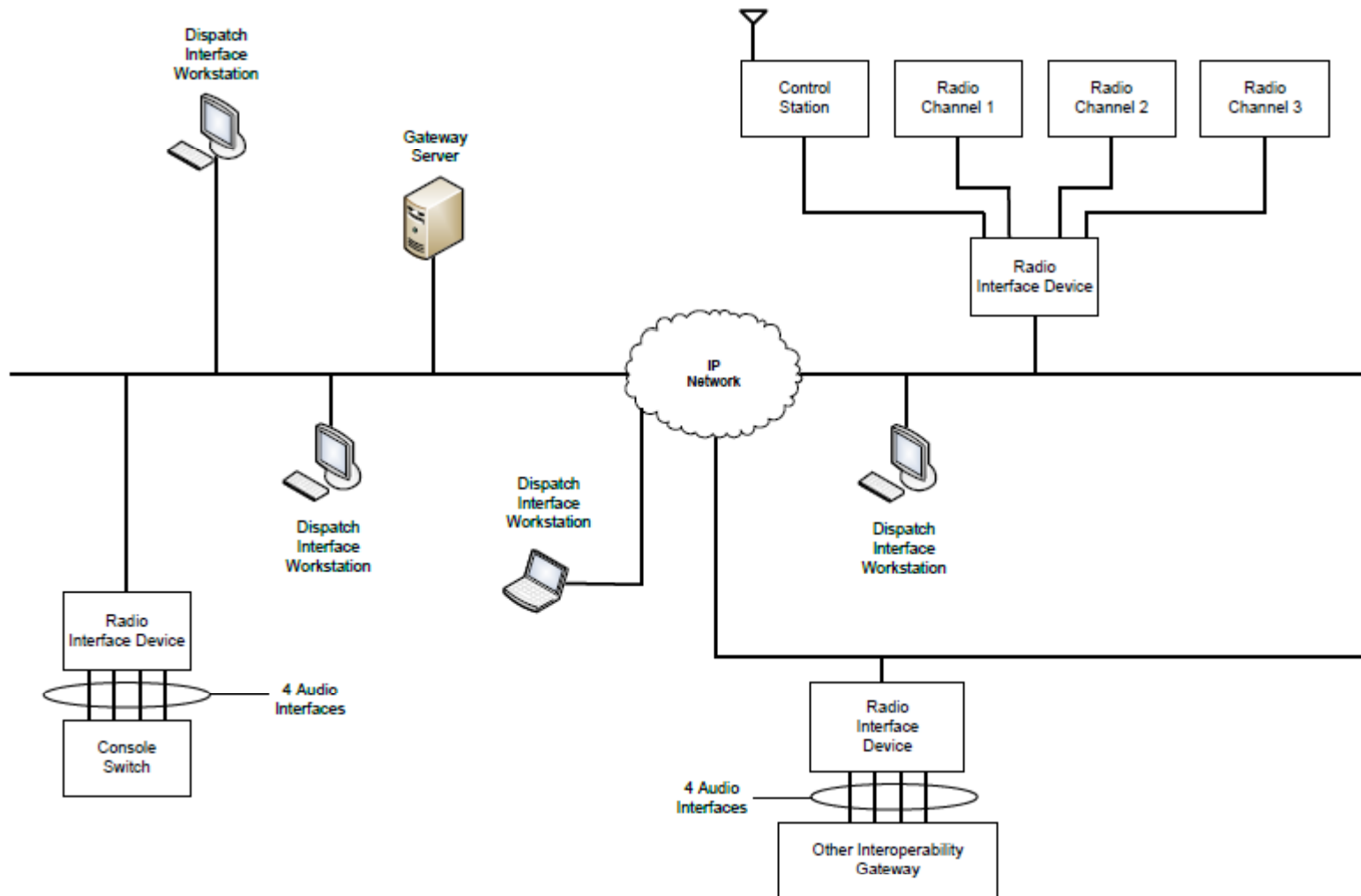
Interoperability Gateway System Implementation

- 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

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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

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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

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Opinion of Probable Cost – Interoperability Gateway System

OPINION OF PROBABLE COST
INTEROPERABILITY GATEWAY SYSTEM

| Item	Cost	
Radio Interface Gateway System	$	911,400.00
Dispatch Interface Workstations	$	84,000.00
Additional Dispatcher Software	$	62,400.00
Site Networking Equipment	$	145,500.00
Services	$	60,200.00
Contingency	$	120,300.00
Installation	$	87,200.00
Training	$	108,000.00
TOTAL	**$**	**1,579,000.00**
Spares	$	*32,600.00*
Annual Software Maintenance	$	*34,200.00*
Additional dispatcher software (per license)	$	*2,600.00*
Radio for crossband repeater access (including installation)	$	*6,700.00*

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Opinion of Probable Cost - Narrowbanding

OPINION OF PROBABLE COST

NARROWBANDING BY COUNTY OR AGENCY

Agency	First Touch	Fixed Equipment	Second Touch	Other	Total
Carson City	$635,500	$2,000	$34,500	$97,700	$769,700
Churchill County	$25,000	$82,000	$3,300	$16,200	$126,500
Douglas County	$32,100	$0	$32,100	$6,400	$70,600
Elko County	$353,200	$61,000	$20,800	$63,000	$498,000
Esmeralda County	$45,500	$207,000	$2,800	$37,800	$293,100
Eureka County	$253,500	$54,500	$12,000	$46,900	$366,900
Humboldt County	$189,700	$222,500	$16,700	$80,700	$509,600
Lander County	$129,700	$90,500	$6,700	$33,400	$260,300
Lincoln County	$16,300	$131,000	$5,500	$22,100	$174,900
Lyon County	$424,700	$0	$37,400	$65,800	$527,900
Mineral County	$40,200	$48,500	$4,100	$13,400	$106,200
Nye County	$19,500	$15,500	$19,500	$5,500	$60,000
Pershing County	$4,900	$38,000	$4,900	$6,600	$54,400
Storey County	$12,200	$22,000	$12,200	$5,500	$51,900
White Pine County	$73,600	$123,000	$8,100	$29,700	$234,400
NDOW	$13,400	$1,155,000	$13,400	$175,800	$1,357,600
NDF	$230,500	$840,500	$28,600	$160,800	$1,260,400
State Parks	$13,500	$22,000	$13,500	$4,900	$53,900

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!**
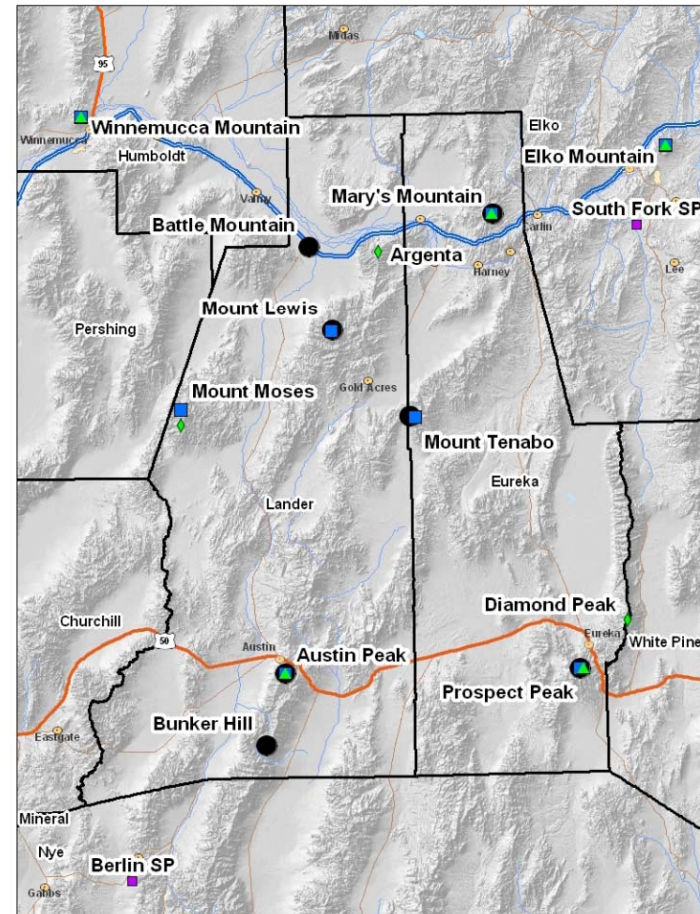
Next Steps

- 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

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Questions and Answers

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