

**P25**

# **Digital Trunked Radio System Project Update**

**SCIENCE TECHNOLOGY AND TELECOMMUNICATIONS COMMITTEE**

**Presented by Michael Rohrbacher, Director of Public Safety Communications  
Department of Information Technology  
November 27, 2023**

# About DoIT Public Safety Communications

- Statewide radio system and data network – approximately 16,000 subscribers, 13 dispatch centers, 125 tower sites
- System is 100% self maintained by DoIT with 5 service shops, 4 business units, 40 employees
- Provides mission critical communications for all state agencies and participating local government, tribal and federal partners
- Partnerships with Federal, state and local agencies to provide service and promote interoperable communications
  - Ability for agencies to easily communicate with one another on the radio while on scene of an incident
- Transforming public safety communications in New Mexico

# How We Got Here – the ‘Old’ Radio System

- Coverage footprint was inadequate – many areas not covered
- Voice quality was very poor and sometimes unusable
- Capacity was insufficient and could not be easily expanded
- Mode of operation was antiquated – units could not talk to each other
- System lacked contemporary public safety features
- Existing VHF frequencies inadequate, too much interference, not enough available frequencies
- New Mexico’s first responders needed something better

# P25 Digital Trunked Radio System (DTRS)

- A unified public safety radio communications system for New Mexico's first responders
- State-wide coverage with high quality digital voice and contemporary features
- State owned – for all executive agencies and open to all local, federal and tribal governments
- Provides unparalleled levels of communications interoperability, capacity and capability in New Mexico
- Governed by DoIT with input from the subscriber community
- Follows the guidelines and recommendations outlined in 2014 gap analysis and needs assessment
- Based on the Project 25 technology standard

# Project 25 Overview

- Project 25 (P25) is a suite of standards for the design and manufacture of interoperable digital two-way radios and systems
  - Developed with state, local and federal representatives and Telecommunications Industry Association (TIA) governance
- Integrates into DoIT's existing network and system
- Vendor agnostic subscriber platform promotes competition in the marketplace
- Required for grant eligibility in accordance with Department of Homeland Security guidelines
  
- NM-DTRS highlighted as "P25 System of the Month"

# Current P25-DTRS Full Subscribers

Subscriber Agency (Full Subscriber)	Date Joined	Subscriber Agency (Full Subscriber)	Date Joined
United States Forest Service (pending)		New Mexico Taxation and Revenue Dept.	Jun-22
City of Las Cruces (pending)		City of Santa Fe	May-22
Sandia Pueblo Police Dept. (pending)		Dona Ana County Office of Emerg. Mgmt.	Apr-22
Santa Fe County (pending)		BNSF Railroad Police	Oct-21
Sandia National Laboratories (pending)		Eddy County	Sep-21
Albuquerque Ambulance (pending)		New Mexico District Attorney's Office (2nd DA)	Sep-21
NASA White Sands Test Facility (pending)		New Mexico State Attorney General's Office	Sep-21
City of Moriarty	Nov-23	New Mexico Corrections Department	Jul-21
Town of Mesilla	Oct-23	New Mexico Children Youth and Families Dept.	Jul-21
Socorro County	Oct-23	City of Rio Rancho	Jul-21
City of Sunland Park	Oct-23	Sandoval County	May-21
Town of Peralta	Sep-23	Village of Los Lunas	May-21
City of Belen	Sep-23	Village of Tijeras Fire Dept.	Nov-20
Valencia County Fire	Sep-23	United States Marshal Service	Sep-20
City of Santa Fe	Aug-23	Bernalillo County	Jul-20
Dona Ana County	Feb-23	Bureau of Alcohol, Tobacco and Firearms	Jun-20
New Mexico Department of Transportation	Apr-23	New Mexico State University Police & Fire	Feb-20
Los Lunas School Police	Dec-22	City of Albuquerque	Jan-20
New Mexico Office of Superintendent of Insurance	Dec-22	Spaceport America	Jul-17
New Mexico State Parks	Jun-22	New Mexico State Police	Jul-17

Full subscriber agencies pay a monthly fee for service and are permitted to use the system for daily business/agency operation

Fees for external government entities are subsidized by the state through FY 24

48 Agencies Strong in Nov 2023  
40 Full Subscriber Agencies

Updated 11/20/23

# Current P25-DTRS Limited Participants

Interoperability Partner (Limited Participant)	Date Joined
Public Service Co. of NM (PNM) EOC	Feb-22
UNMH Health (Dept. of Emergency Medicine)	Dec-21
Federal Bureau of Investigation	Jun-21
Federal Bureau of Land Management	Jun-21
Department of Homeland Security (ICE)	Apr-21
Hidalgo County	Apr-21
National Park Service	Mar-21
Cibola County	Aug-20

Limited participant entities do not pay a monthly fee for service. They are not permitted to use the system for daily business/agency operation. They can only utilize interoperability resources to talk to other agencies at the scene of an incident or event.

Currently seeing an increase in conversion from Limited Participant to Full Subscriber

48 Agencies Strong in Nov 2023  
40 Full Subscriber Agencies

# P25 DTRS Project Statistics

- Total estimated project cost: \$170 million
  - \$91 million appropriated to date
- Funding Source: Multi-year capital appropriation and DoIT equipment replacement fund
- Timing: Currently in year 6 of 10 for deployment
- Will provide approximately 92% mobile service coverage statewide upon completion
- Deployment plan based on roadway corridors



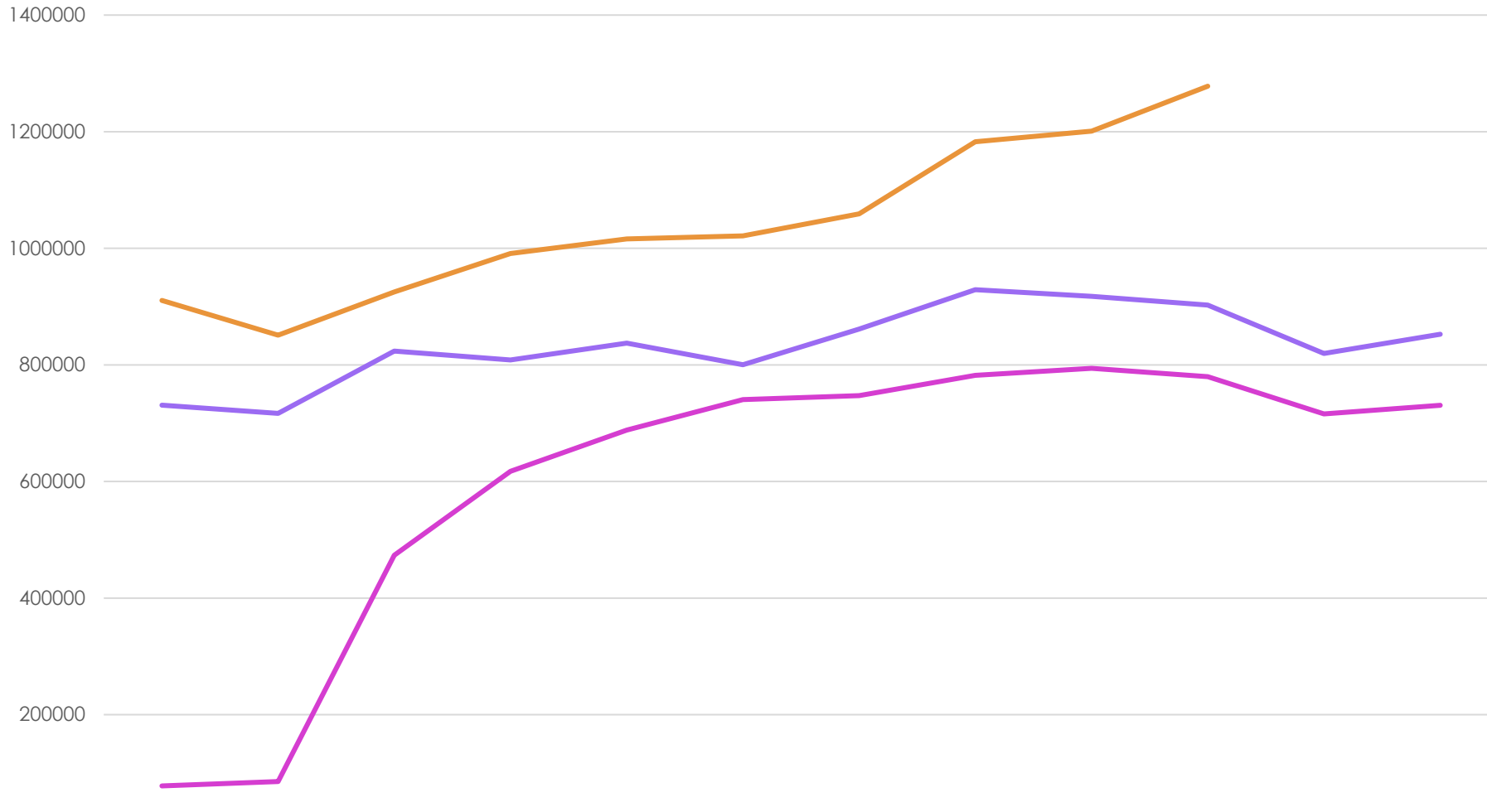
# Cybersecurity - Threat Deterrence - Fault Tolerance

- DTRS employs several features and tactics to promote security and reliability
  - Voice encryption available for radio calls
  - Centralized Key Management Facility (KMF) for key management, over the air rekey
  - Link Layer Authentication: Radio identity protection
  - Network isolation, dual factor authentication for management accounts
  - System controlled security groups for resources
  - Remote radio monitoring and disabling
  - Redundant network paths, hardware and geo redundant system cores
  - Regular centrally managed anti-virus, operating system and software updates/patches
  - Video surveillance and access control for 53 of 115 infrastructure sites
  - Automated monitoring and alerting via Public Safety Network Operations Center (PSNOC) in Santa Fe

# NM-DTRS 2023 January – October Quick Stats

- 2023 Year to date system statistics
  - 48 Agencies participating
  - 34 Sites online, 40% Mobile Coverage (Geographical)
  - 13,351 Unit ID's, 992 Talk groups, 155 Consoles
  - Call volume previous 12 months – 10,445,439
  - CY23 Cumulative airtime 18,327 Hours
  - Current Average call volume 1.04 million / month (CY23)

### DTRS Usage - Radio Calls per Month

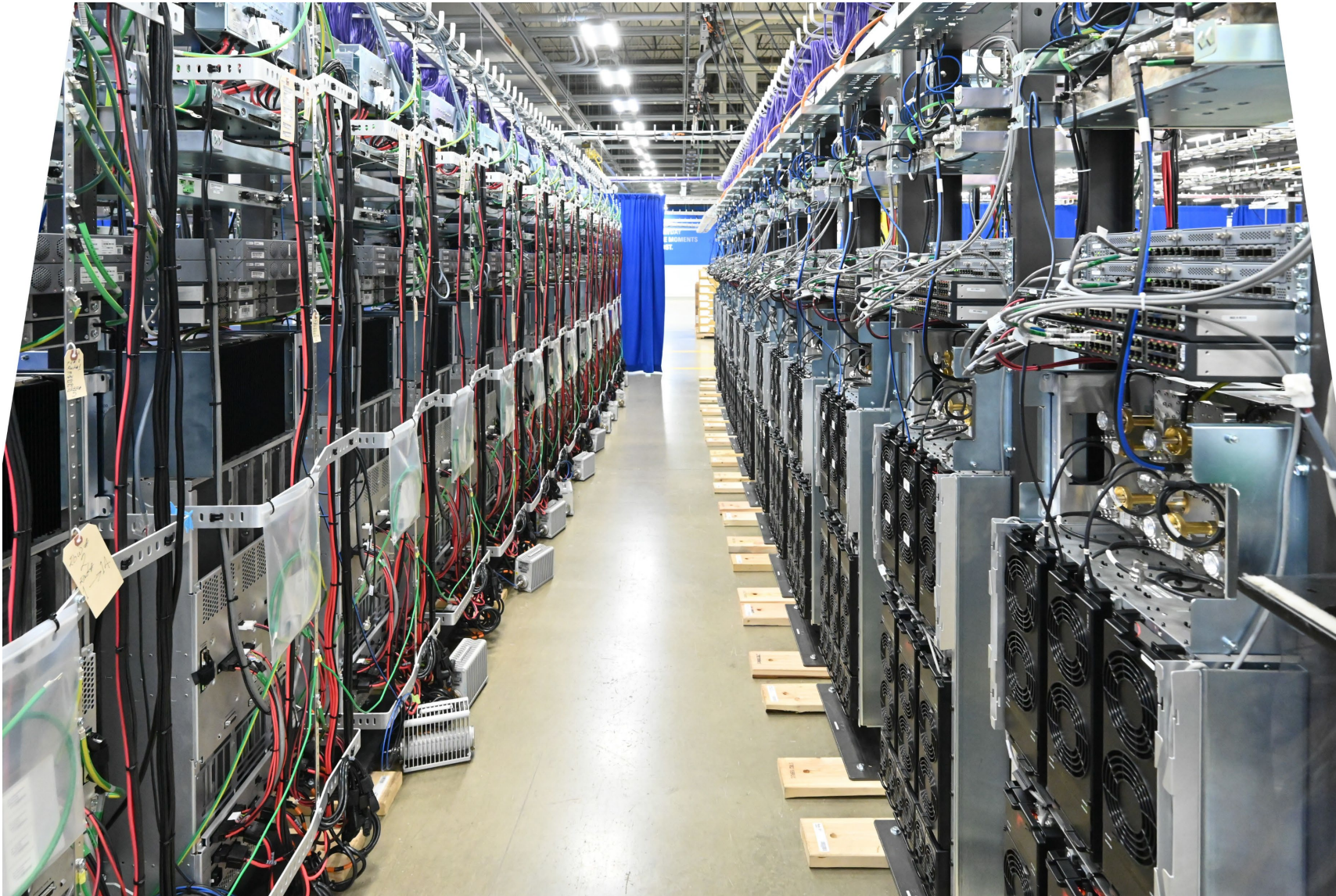


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2021	77761	85326	473405	617515	688194	740473	747350	781946	794211	779705	715762	730591
2022	730816	716721	823564	808375	837306	800165	861518	928901	917565	902656	819672	852588
2023	910573	850879	925082	991039	1015977	1021228	1059082	1182684	1200912	1277993		

— 2021 — 2022 — 2023

Illustrates system adoption and growth from 2021 to present

On track to exceed 12 million calls in 2023



Most recent order of DTRS radio sites being inspected, tested and prepared for shipment to New Mexico in November, 2023

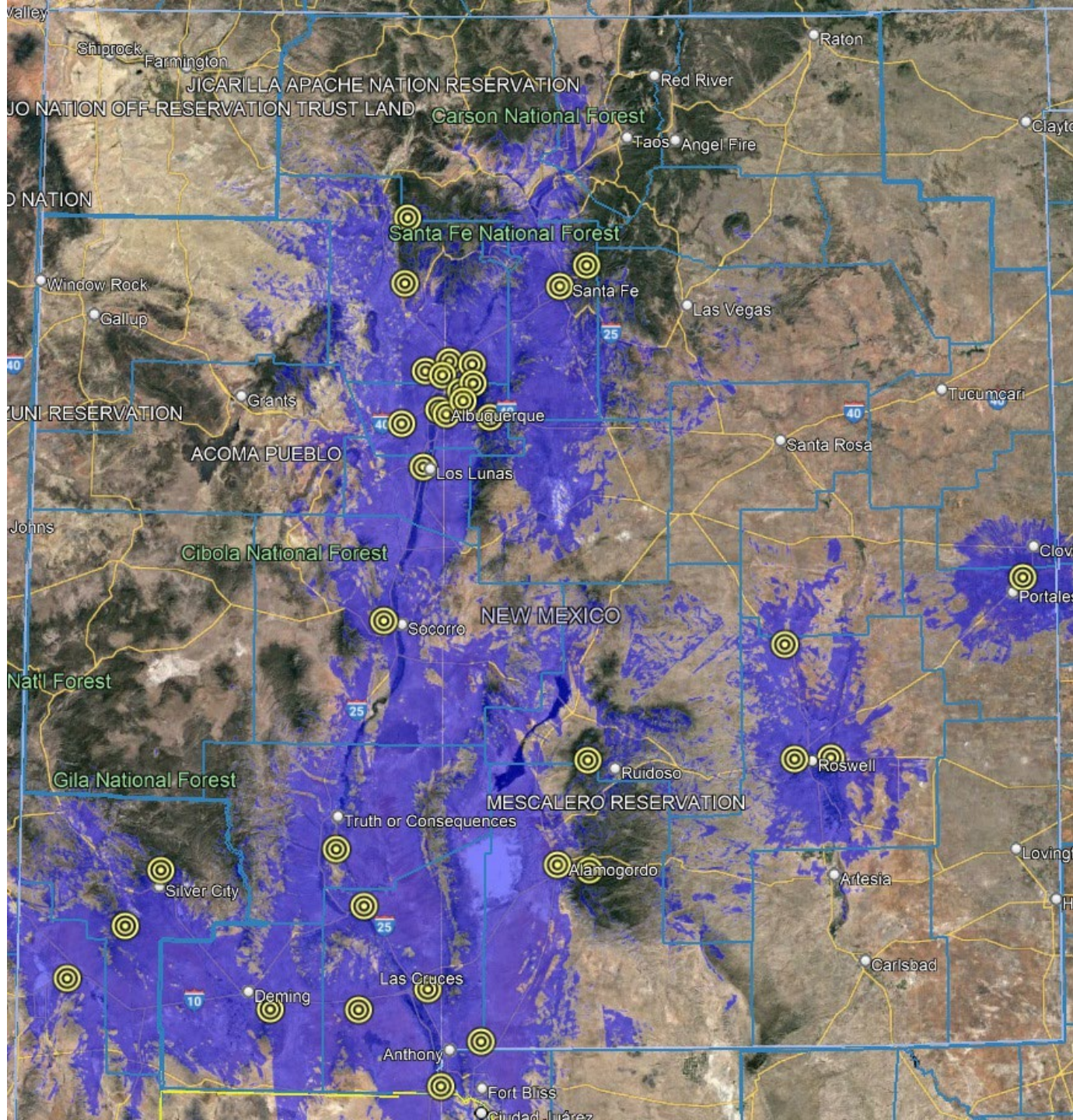
These sites will begin deployment in January, 2024

# Delivered Audio Quality (DAQ)

<b>DAQ 1:</b>	Unusable. Speech present.
<b>DAQ 2:</b>	Speech is understandable with considerable effort. Requires frequent repetition due to noise or distortion.
<b>DAQ 3:</b>	Speech is understandable with slight effort. Requires occasional repetition due to noise or distortion.
<b>DAQ 3.4:</b>	Speech understandable without repetition. Some noise or distortion present.
<b>DAQ 4:</b>	Speech is easily understandable - little noise or distortion.
<b>DAQ 4.5:</b>	Speech is easily understandable - rare noise or distortion.
<b>DAQ 5:</b>	Perfect. No distortion or noise discernable.

DAQ is an industry standard method of evaluating and classifying voice quality over the radio system

DTRS coverage prediction maps are based on DAQ 4, industry standard service level is DAQ 3.4



# Current Mobile System Coverage DAQ 4.0

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Completed work as of November 17, 2023  
 34 Sites online, 40% Coverage

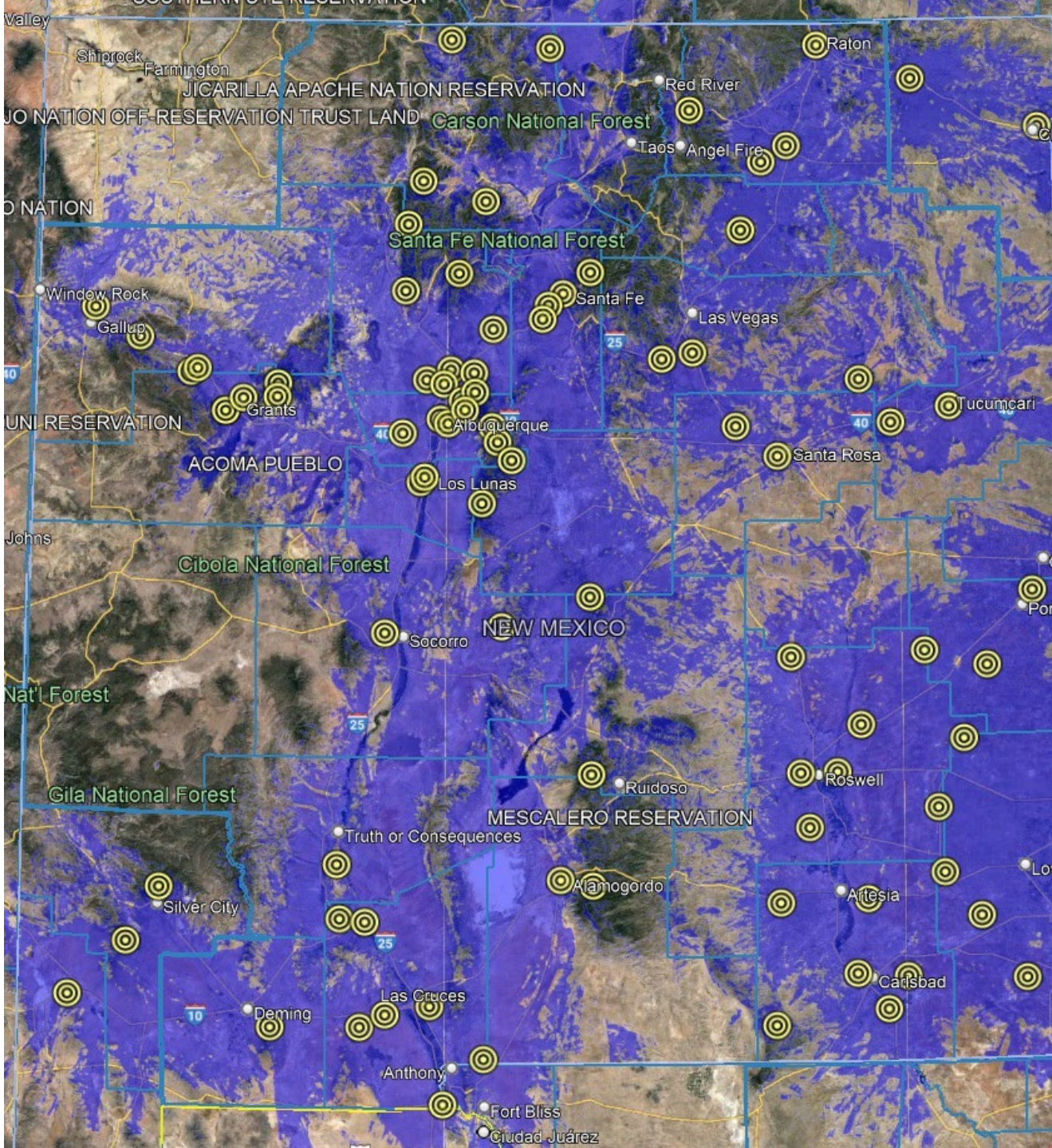
County	% Covg.	County	% Covg.
Bernalillo	92.8	McKinley	10.0
Catron	0.9	Mora	2.5
Chaves	50.9	Otero	46.0
Cibola	10.5	Quay	0.0
Colfax	0.0	Rio Arriba	12.4
Curry	32.2	Roosevelt	40.0
De Baca	22.1	San Juan	0.9
Dona Ana	92.2	San Miguel	12.2
Eddy	3.6	Sandoval	73.8
Grant	57.1	Santa Fe	85.9
Guadalupe	4.1	Sierra	72.4
Harding	0.0	Socorro	52.8
Hidalgo	42.5	Taos	13.3
Lea	0.0	Torrance	38.5
Lincoln	39.4	Union	0.0
Los Alamos	79.8	Valencia	90.7
Luna	86.2		

# Mobile Coverage

## Percent of Population Residing in Coverage as of November, 2023

County	Population	DAQ 4.0%	DAQ 3.4%	County	Population	DAQ 4.0%	DAQ 3.4%
Bernalillo	642074	99.6	99.8	McKinley	69450	1.6	1.9
Catron	3407	0.1	0.3	Mora	4723	0.3	0.3
Chaves	64868	98.9	99.6	Otero	62386	87.8	92.0
Cibola	26195	3.6	6.9	Quay	7670	0.0	0.0
Colfax	12571	0.0	0.0	Rio Arriba	39012	66.9	70.2
Curry	47579	90.0	95.9	Roosevelt	16544	94.8	95.9
De Baca	1963	1.8	8.2	San Juan	124423	0.1	0.2
Dona Ana	201919	99.9	100.0	San Miguel	28332	15.3	18.8
Eddy	45637	2.1	23.6	Sandoval	128593	97.8	98.6
Grant	28542	87.7	91.5	Santa Fe	139049	97.5	98.6
Guadalupe	4408	1.3	6.5	Sierra	11564	87.4	91.6
Harding	657	0.0	0.0	Socorro	17148	82.9	83.6
Hidalgo	4603	80.0	91.9	Taos	32338	5.0	6.8
Lea	60413	0.0	0.0	Torrance	15389	78.8	88.7
Lincoln	19423	58.7	72.1	Union	4097	0.0	0.0
Los Alamos	16575	85.6	89.8	Valencia	73861	99.9	100.0
Luna	22210	95.1	96.0				

- ❑ 14 Counties with 85% population residing in DAQ 4.0 coverage or better
- ❑ 15 Counties with 85% population residing in DAQ 3.4 coverage or better
- ❑ 2020 census data



**FY23/24 Expansion Phase  
Deployment In Progress  
Est. Completion October 2024**

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**Mobile Coverage DAQ 4.0**

88 Sites online, 61% Coverage

County	% Covg.	County	% Covg.
Bernalillo	97.0	McKinley	52.3
Catron	1.2	Mora	67.9
Chaves	87.3	Otero	47.9
Cibola	45.0	Quay	68.5
Colfax	65.5	Rio Arriba	38.7
Curry	57.0	Roosevelt	89.1
De Baca	52.5	San Juan	8.0
Dona Ana	92.6	San Miguel	68.3
Eddy	89.6	Sandoval	81.7
Grant	57.2	Santa Fe	91.5
Guadalupe	58.9	Sierra	73.4
Harding	56.9	Socorro	63.5
Hidalgo	42.5	Taos	58.4
Lea	94.1	Torrance	85.1
Lincoln	62.1	Union	65.3
Los Alamos	84.0	Valencia	97.2
Luna	86.2		

**Green = Significant Gain**



# Mobile Coverage

## Percent of Population Residing in Coverage as of FY24 Phase Completion

County	Population	DAQ 4.0%	DAQ 3.4%		County	Population	DAQ 4.0%	DAQ 3.4%
Bernalillo	642074	99.7	99.9		McKinley	69450	66.3	73.0
Catron	3407	0.2	0.7		Mora	4723	28.7	35.7
Chaves	64868	99.8	99.9		Otero	62386	87.8	92.3
Cibola	26195	86.5	90.7		Quay	7670	93.2	98.1
Colfax	12571	92.2	94.0		Rio Arriba	39012	80.3	85.1
Curry	47579	97.6	99.1		Roosevelt	16544	99.5	99.9
De Baca	1963	19.4	97.1		San Juan	124423	0.5	1.6
Dona Ana	201919	99.9	100.0		San Miguel	28332	77.2	90.6
Eddy	45637	99.8	99.9		Sandoval	128593	98.5	99.1
Grant	28542	87.7	91.5		Santa Fe	139049	98.4	99.1
Guadalupe	4408	85.8	94.6		Sierra	11564	87.7	91.8
Harding	657	71.6	90.7		Socorro	17148	84.5	89.1
Hidalgo	4603	80.0	91.9		Taos	32338	69.5	80.4
Lea	60413	98.5	98.8		Torrance	15389	95.3	98.8
Lincoln	19423	65.1	75.8		Union	4097	87.9	97.2
Los Alamos	16575	88.1	93.5		Valencia	73861	100.0	100.0
Luna	22210	92.7	93.4					

- ❑ 20 Counties with 85% population residing in DAQ 4.0 coverage or better
- ❑ 27 Counties with 85% population residing in DAQ 3.4 coverage or better
- ❑ 2020 census data

# Locus DiagnostX Tool

Radio Id	Alias	Dept Name	RF Carrier Frequency Error (Hz) before AFC	RF Carrier Frequency Error (Hz)	Symbol Frequency Error 600	Symbol Frequency
937	FirstNet-GW2			-360	-8	-14
2176	465-SP			-496	-10	-19
2355	829-SP			-561	-10	-25
2370	553-SP			-375	-10	-24
11658	ABQ-AFR-E-20		-585	-571	-45	-62
11660	ABQ-AFR-L4P1		-521	-320	-9	-23
11721	ABQ-AFR-E-14		-508	-387	-9	-20
11734	ABQ-AFR-RE0503		-553	-420	-5	-17
13594	ABQ-APD-44V			-393	-14	-40
13617	ABQ-APD-Z13			-355	-13	-37

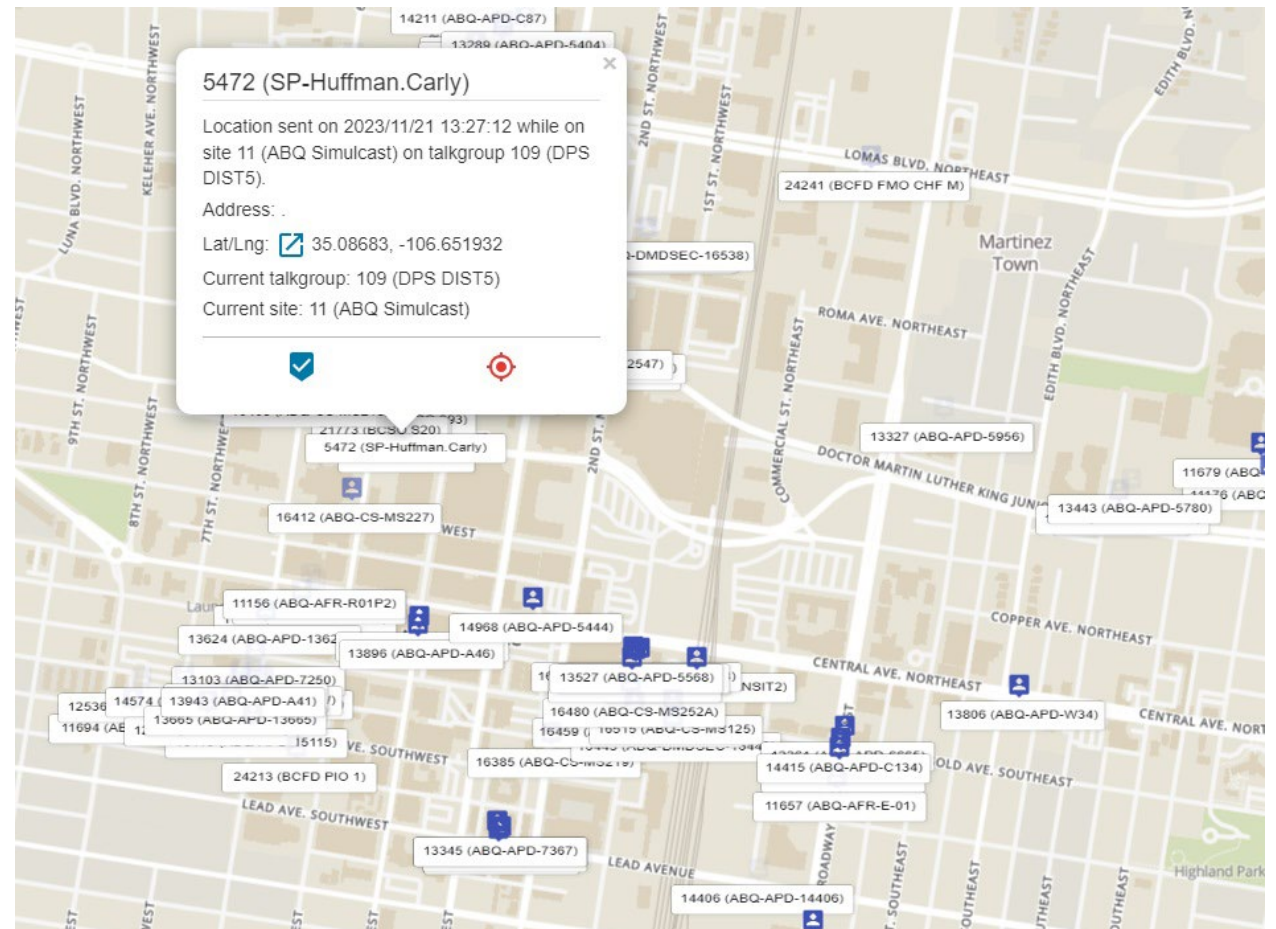
- Tracks radio health over the air to provide monthly reports and notification on radios that need attention, are about to fail, or are failed

Radioid	Alias	Last Update	0 Hz	750 Hz	1500 Hz
16102	ABQ-UNMP...	08/15/2022 19:45:27			
24090	BCFD-24090	08/16/2022 22:38:53			
13810	ABQ-APD-C1	08/16/2022 19:18:40			
14011	ABQ-APD-14...	08/14/2022 02:17:39			
14150	ABQ-APD-B13	08/16/2022 17:43:42			
14246	ABQ-APD-C17	08/16/2022 15:06:59			
13832	ABQ-APD-C26	08/13/2022 19:32:41			
14486	ABQ-APD-C1...	08/16/2022 22:24:01			
14224	ABQ-APD-C...	08/16/2022 18:07:44			
13731	ABQ-APD-B50	08/13/2022 20:58:09			
14499	ABQ-APD-T77	08/15/2022 14:34:54			

- Simplifies the preventative maintenance lifecycle
- Service offering now available to subscriber agencies

# Radio Based Geolocation

- Capable radios send location data to system
- Location appears on map and is searchable
- Interfaces available for computer aided dispatch and 3<sup>rd</sup> party applications
- Brings attention to units in distress
- Used at events for resource planning and strategic decision making



# Enhanced Features and Technologies

- To remain relevant and contemporary, public safety communications systems must now incorporate nontraditional technologies into services
  - Wi-Fi
  - Cellular / LTE / FirstNet
  - Geolocation Services
  - Computer aided dispatch Interfaces
  - Telemetry and data services, body worn sensors
  - Integration with real time crime centers

# “SmartConnect” Radio Over Wi-Fi

- Enables compatible radios to connect to the DTRS over Wi-Fi if standard system coverage is lost
  - Great option for in-building coverage at large facilities such as hospitals, schools, event centers, etc.
  - Radio switches to and from Wi-Fi seamlessly without user interaction
  - Radio connects to secured Wi-Fi network already programmed in radio
  - Networks are controlled and cannot be added by the user
  - State of New Mexico is the largest domestic user of SmartConnect
  - Estimated \$5 million cost savings in the Albuquerque area alone over traditional in-building coverage solutions

# Cellular (LTE) Connectivity in the Future

- Will enable subscribers to access radio system over Wi-Fi and LTE phone and tablet devices
- Will be carrier agnostic- needs only internet connectivity on device. Fully compatible with FirstNet operation
- Will extend footprint of system coverage and provide additional functionality
- Centrally managed by DoIT at the system level regardless of carrier and connection method
- Utilizes fully encrypted control data and voice traffic

# Contact Information

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**THANK YOU!**

**QUESTIONS?**



NM DEPARTMENT OF  
**INFORMATION  
TECHNOLOGY**

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PROGRESS STARTS HERE