

ND SIRN Project Buildout and Transition

- Project Phases
- Status Reporting
- Transition Process



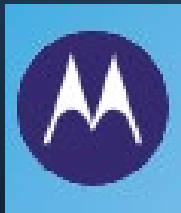
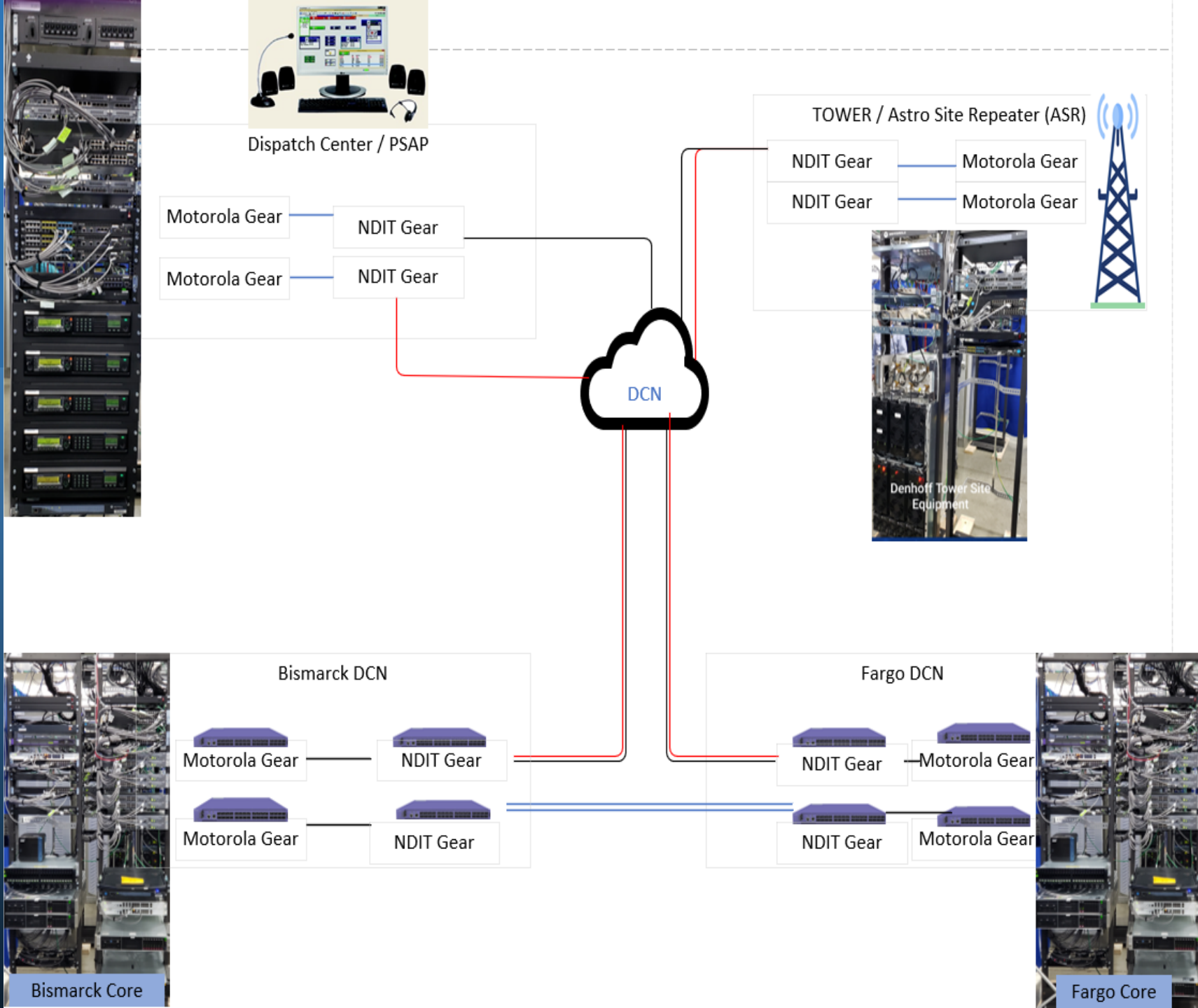
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PUBLIC SAFETY COMMUNICATIONS IN ND

➤ SORN Project Has 3 Main Phases

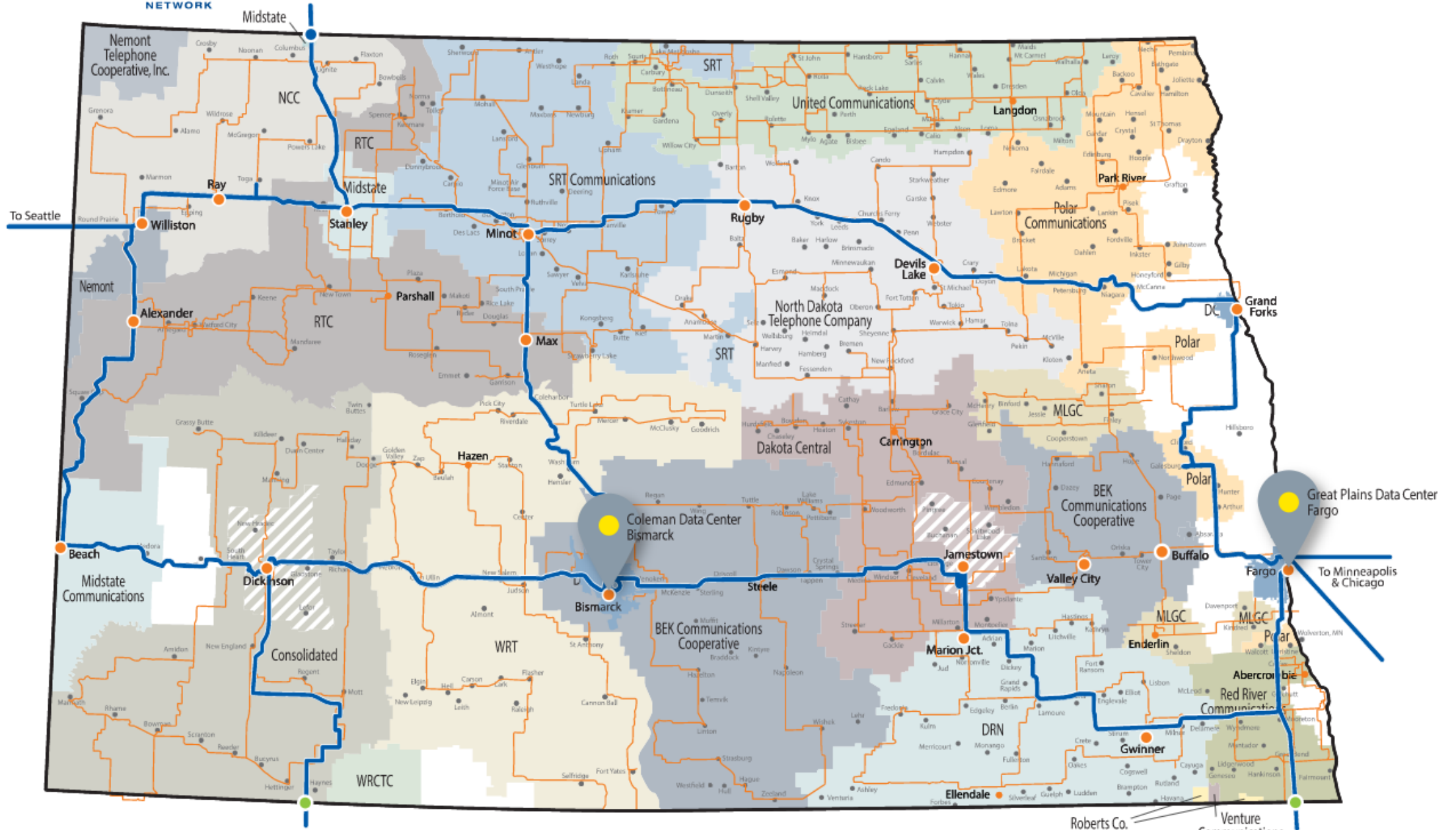
- Phase 1: Backhaul and PSAP Console Replacement
- Phase 2 – Group 1: Radio Frequency (RF) Buildout for Mobile (In-Car Radio) Coverage to include Simulcast Early Adopter Locations
- Phase 2 – Group 2: Radio Frequency (RF) Buildout for Portable (Handheld Radio)

Phase 1 - Backhaul / Networking Design



Bismarck Core

Fargo Core



DCN Interactive Map

Roberts Co. Telephone Cooperative (SD)
Venture Communications Cooperative (SD)

Phase 1 - Console Replacement

- By December 2022, all but two (2) of the Dispatch Centers are on the new Motorola MCC 7500E Consoles compatible to transmit 800Mhz and VHF:

Grand Forks

Minot

Stutsman

Barnes

Richland

Mountrail

McKenzie

Walsh

Pembina

Rolette

Pierce

Williston

Cavalier/Towner

Bottineau/Renville

Dickinson

CenCom

MHA – Three Affiliated

Lake Region

McLean

Trail/Steele

Mercer/Oliver

- State Radio - 2025
- Red River Regional Dispatch - TBD

Phase 2 – Radio Frequency (RF) Build Out Mobile (In-Car) Radio Coverage

- **Group 1 of the Radio Frequency (RF) Buildout consists 82 Tower Sites – Currently 79% complete**
 - Group 1 Towers (RF) will provide 95% Coverage by Region with 95% reliability
 - This Phase includes the early adopter locations which provide Mobile & Portable Coverage
 - Williston Simulcast / Williams County
 - Grand Forks Simulcast
 - Minot Simulcast
 - Bismarck/Mandan Simulcast and Burleigh County
 - Approximately 50% of these sites are DOT locations
 - Approximately 30 sites are new tower builds on the same location as the old DOT towers
 - Several are also getting new shelters
 - Remainder are lease site locations
 - Site leases are either political subdivisions or private leases





Civil Work / Site Work

Whether a lease site or state-owned site, much of the work is similar.

Site Analysis

Structural Analysis

Geo Study & Analysis

Local Permitting

Federal Cultural Review

Site Drawings

Construction Drawings

Civil Work

- Tower Base
- Guy Wire Anchor Pad
- Shelter Pad
- Ground Ring
- Fiber Connectivity
- Site Electrical Work

Concrete Testing

Tower Construction

Antenna and Lines

Shelter Work

- Power Termination
- Network Connectivity
- SORN Gear Installation
- Site Monitoring

Inspection(s)

Site Optimization (tuning)

Radio Frequency Testing

More Inspections

Final Site Review / Approval

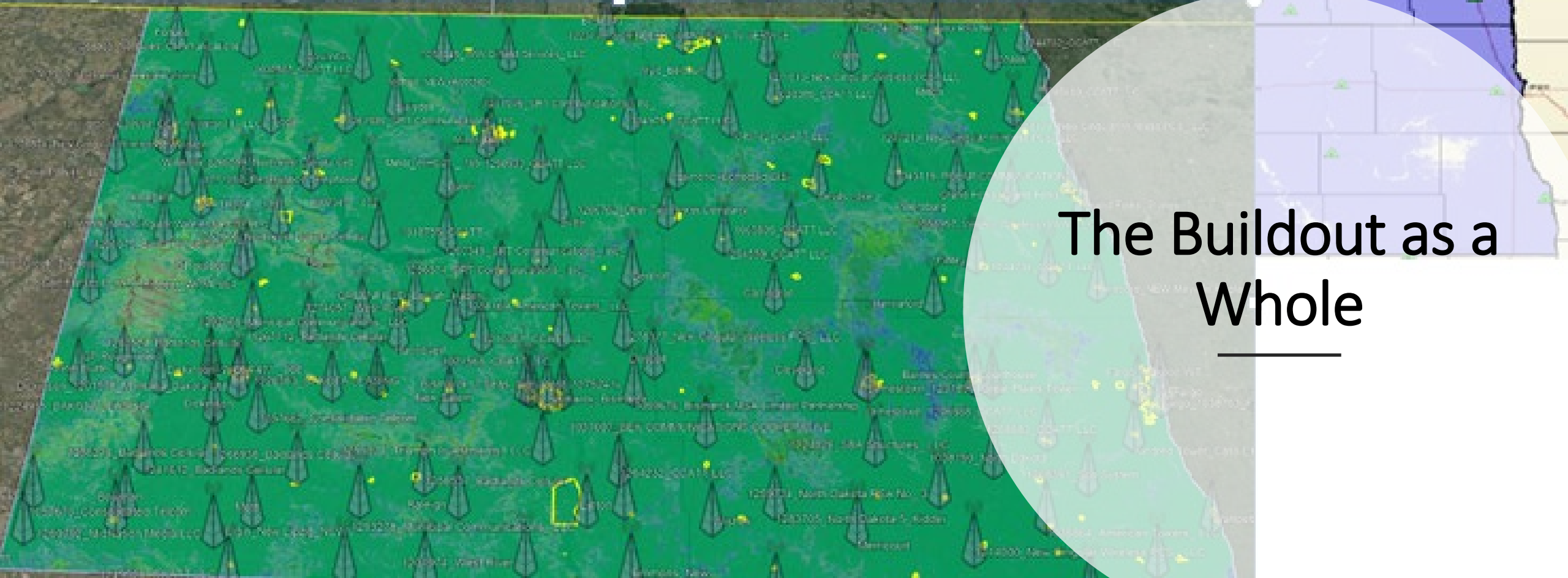
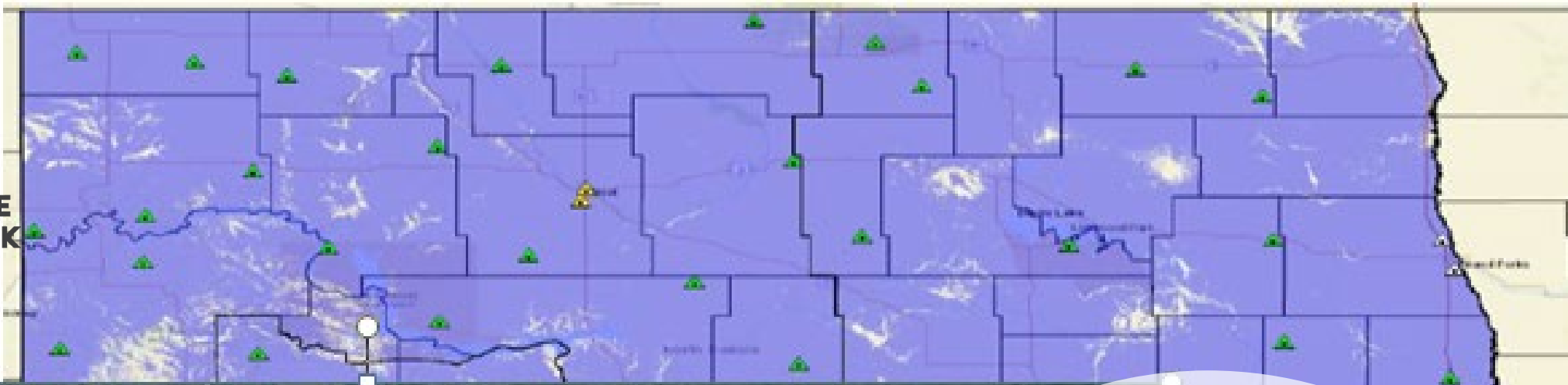
Site is Operational



Phase 2 – Group 2: Radio Frequency (RF) Build Out Portable (Handheld) Radio Coverage

- **Group 2 of the Radio Frequency (RF) Buildout consists approx. Approximately 58 additional Tower Sites**
 - This Phase will provide 85% Coverage by Region with 95% reliability
 - This phase will fill in the areas between the sites in Group 1 – Mobile (In-Car) Coverage
 - Most of these sites are lease sites
 - Sites will get a shelter
 - Antenna and Line work
 - Some sites allow for colocation within the owner's shelter





**The Buildout as a
Whole**



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**STATEWIDE
INTEROPERABLE
RADIO NETWORK**

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[Project Status Reporting](#)

SIRN 20/20

Recent news

[SIRN Buildout & Transition](#) (January 2022)

[SIRN 101 Presentation](#) (October 2020)

[Project Status as of January 2022](#)

[Project Status as of December 2021](#)

[Project Status as of November 2021](#)

[SIRN - Infographic](#)



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MOTOROLA SOLUTIONS

State of North Dakota

SIRN 2020 Status Update

August 30, 2021

Status Report explained

Radio Frequency (RF) Phase Status

- Each Phase has groups of towers being worked on at any given time
- Each group of towers can be at various stages at any given time
 - Planning / Site Walks
 - Lease Acquisitions / Negotiations / Legal Reviews / Execution
 - Site Review/Site Walks
 - Civil Work
 - Permitting
 - Cultural Reviews (NEPA)
 - Geo Testing
 - Structural Analysis of the existing towers
 - Lease Exhibits / Site Drawings for review
 - Construction Drawings & Review & Approval
 - Notice to Proceed (NTP)
 - Order tower steel, shelter, antennas, lines, power supply, network / fiber construction (backhaul), site monitoring



- Breaking Ground
 - Site Preparation for Large Vehicles
 - Tower Base Construction / Concrete / Testing
 - Guy Wire Anchor Base Construction / Concrete / Testing
 - Shelter Pad Construction / Concrete / Testing / Ground Ring
 - Electrical Service
 - Fiber / Connectivity Service
 - Curing Period for all Concrete
- Tower Construction
 - Delivery of tower steel, anchors, guy wire, antenna, lines/coax, etc.
- Shelter Delivery
 - Crane lift shelter to the shelter pad and anchoring
 - Power termination
 - Installation of Radio Frequency (RF) gear
 - Monitoring
 - Testing (Monitor, Generator, Radio Frequency (RF), HVAC,

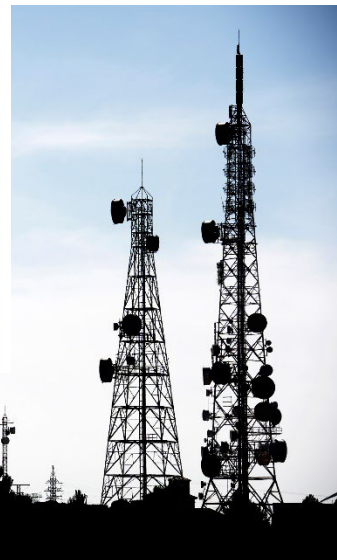
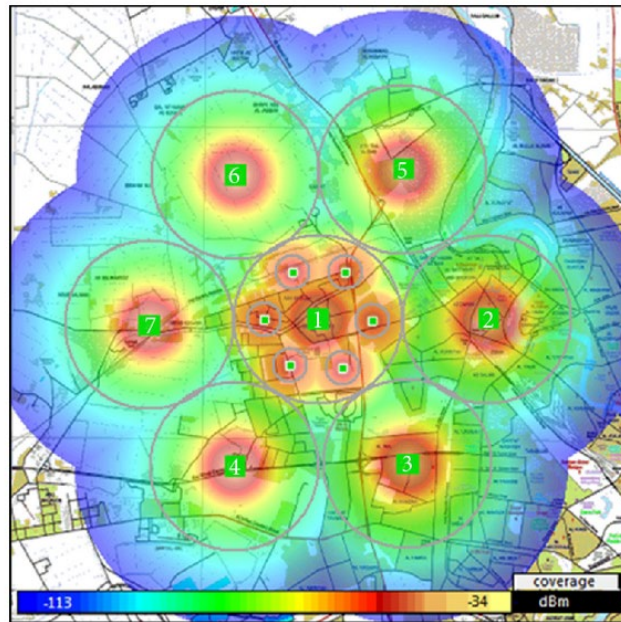
Several 1000's of tasks in the schedule

Simulcast Areas and Drive Tests



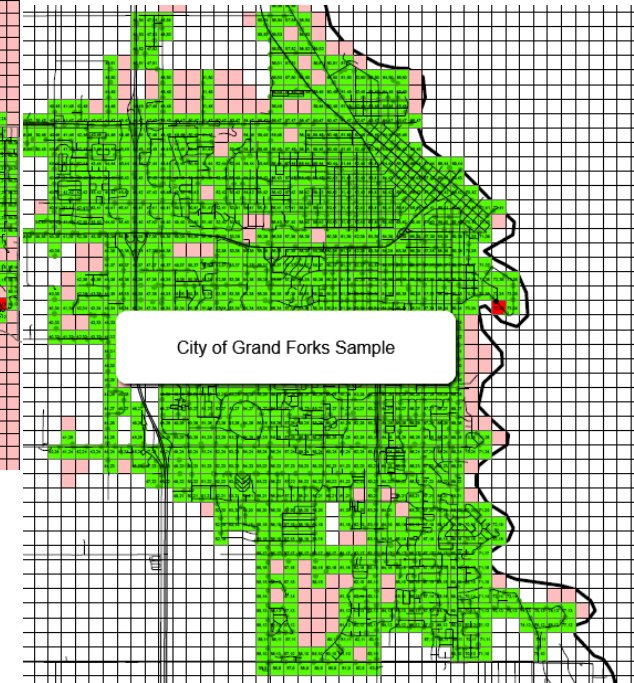
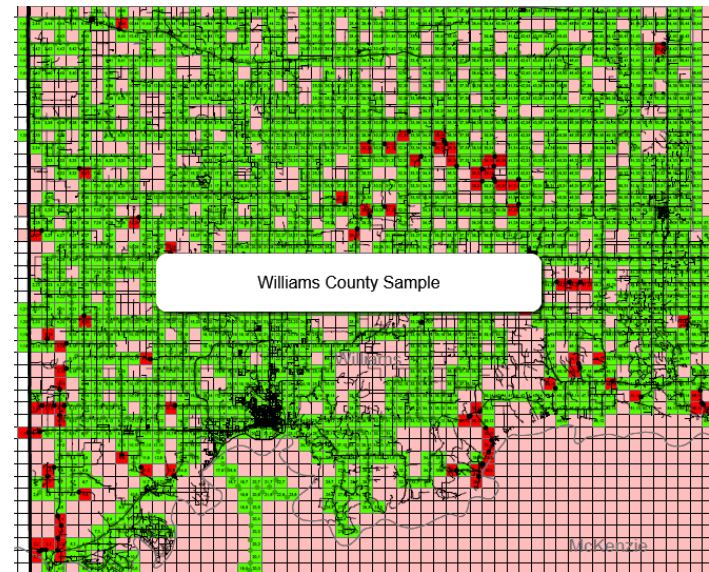
Simulcast Areas

- Saturation of Towers around Metro Areas which provide In-Building Penetration










Drive Tests

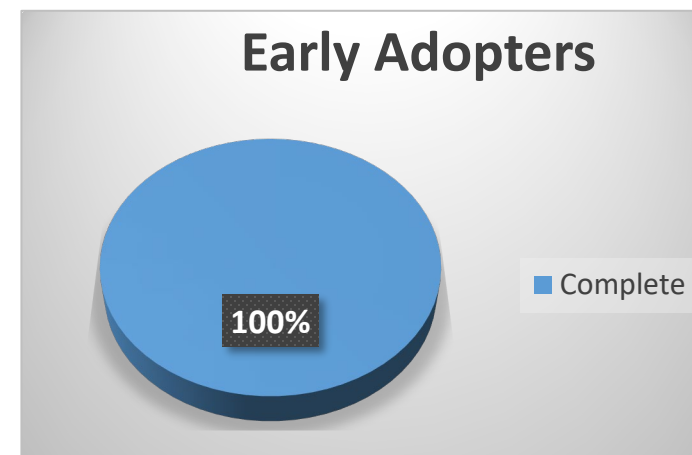
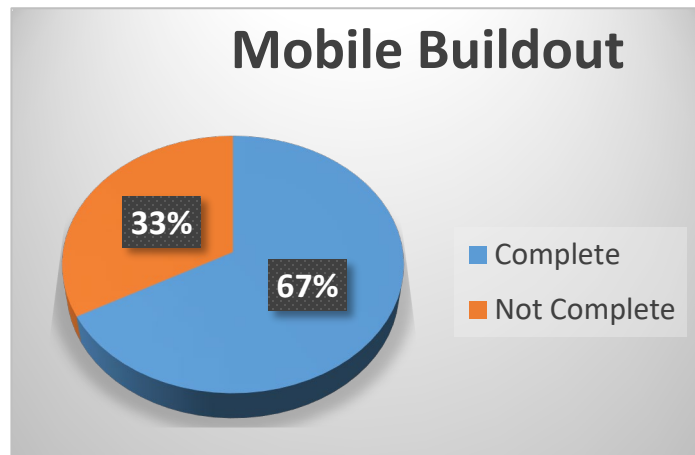
- Motorola Team(s) Drive the target area with Radio Signal Measuring Devices in grid squares on established roads
- Produces a final City or County Report



Project Timeline and Estimates

1/19/2024
Contract Extension

ID	Task Name	2020				2021				2022				2023				2024				2025	
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
1	Group 1 PSAPs - COMPLETE																	COMPLETE					
2	Group 1 Towers (Mobile Coverage)																	67% COMPLETE					
3	Group 2 Towers (Early Adopters)																	COMPLETE					
4	Group 2 PSAPs - COMPLETE													COMPLETE									
5	Lease Tower Sites (estimate) Portable Coverage																						
6	Group 3 PSAPs													COMPLETE									
7	Group 4 PSAPs																	COMPLETE					




Transition to the SIRN 800Mhz System



Channels versus Talkgroups

A Talkgroup is a defined group of subscribers that have the necessary permissions to communicate together on a trunked radio system. To access a talkgroup a subscriber must have permission to access that talkgroup as well as a valid encryption key (if the talk group is encrypted)



Fleetmaps which contain the talkgroups can be structured along geographic, discipline, functional, agency, and other criteria. Each talkgroup has geographic boundaries that define which towers it can be utilized on.

HOW TG's SORN WORKS



LTE Main



Trauma 1

LE Main - Encrypted



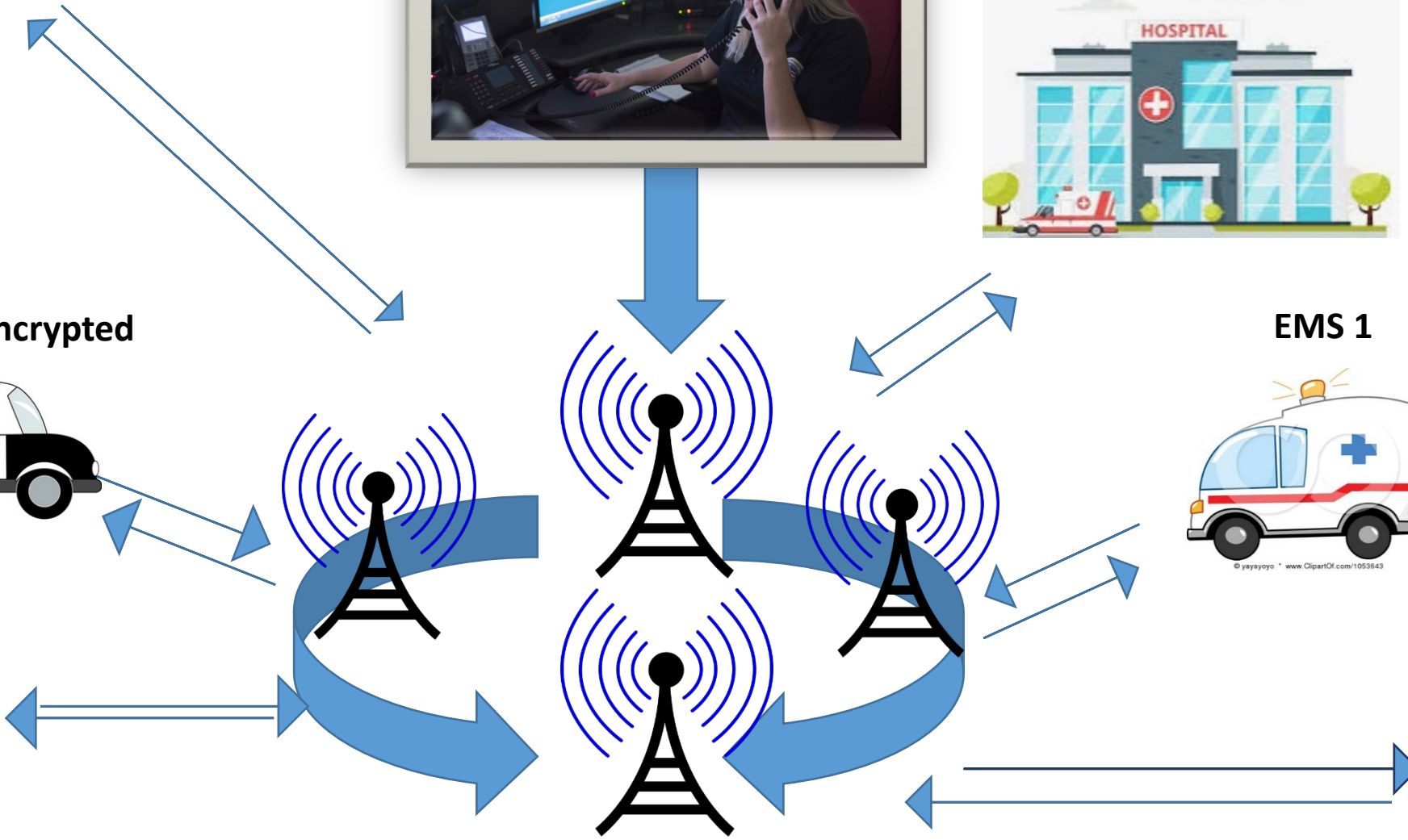
FIRE 1



EMS 1



HP



City	Agency Name	Prefix #	Sort	START TG ID	TG ID	DUP	TG Full Name	TG Name (14-CHAR)
	Sheriffs Office	51	1	51000	51101	1	SHERIFF MAIN	SO MAIN E
	Sheriffs Office	51	3	51000	51103	1	SHERIFF OPS 1	SO OPS 1E
	Sheriffs Office	51	4	51000	51104	1	SHERIFF OPS 2	SO OPS 2E
	Sheriffs Office	51	5	51000	51105	1	SHERIFF OPS 3	SO OPS 3E
	Sheriffs Office	51	6	51000	51106	1	LE PURSUIT	LE PURSUIT
	Sheriffs Office	51	7	51000	51107	1	SHERIFF OPS FAIR	SO OP FAIRE
	Sheriffs Office	51	8	51000	51108	1	SHERIFF SP OPS	SO SP OPSE
	Multi	51	10	51000	51110	1	WCNTF (BCI)	WCNTF_BCI E

Fleetmap Sessions with PSAPs

- Naming Sessions with PSAPs
- Naming Sessions with responding agencies within the PSAP area
- Radio Layout Sessions

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Transitioning to the future



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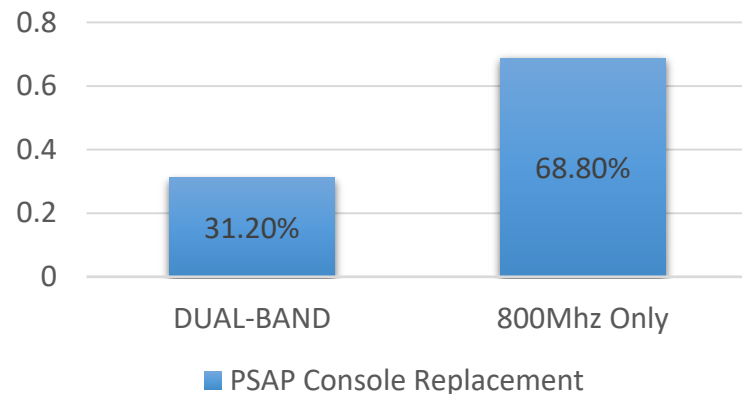
PSAPs Preparing to Transition to 800Mhz

- Fleetmaps and Meetings
 - A fleetmap is a list of talkgroups each PSAP and jurisdiction will have in the radios (think of them as channels).
 - Final Naming, how do we communicate, breaking old thought processes
 - Working with all agencies within your PSAP jurisdiction
 - Approval by every entity/department is needed
 - Then work begins on the Agency Radio Layout

Multi-band / Dual Band or 800 MHz only.....

- Large majority of agencies are installing Dual Band Mobiles and then 800MHz Portables
- Questions to ask:
 - When are your neighbors transitioning?
 - Do your neighbors use State Radio Counties or Lake Region?
 - Options to overcome challenges
 - Side mount mobile, VHF portables, etc.
- **82 Site Mobile Coverage first, then fill in portable**

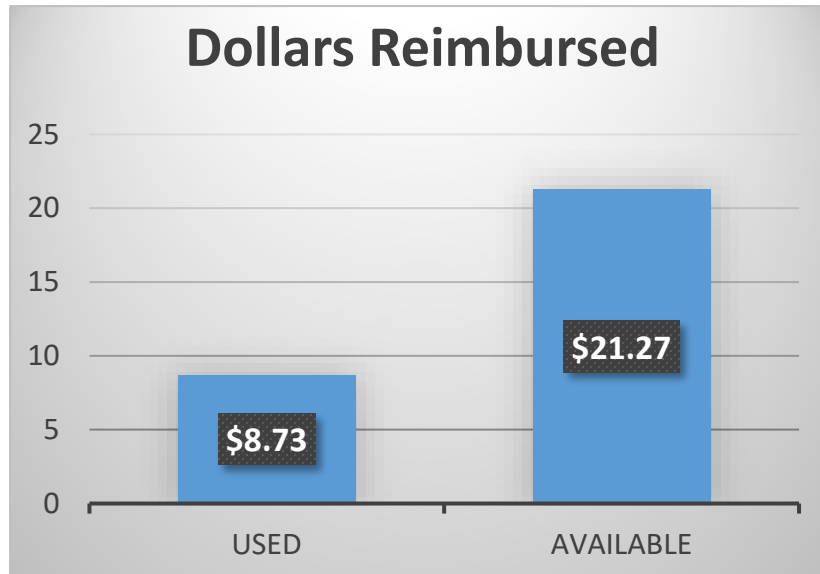
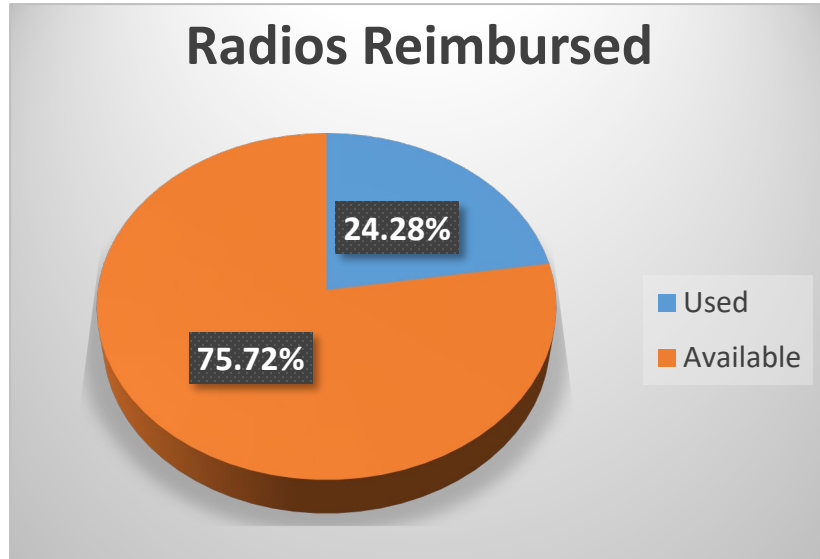
Percentage of Dual-Band Radios



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Radio reimbursement



➤ 2019 & 2021 Legislative Sessions provided funding for radios in HB 1435 & 1146

➤ Anticipate most agencies will purchase radios in 2023-2024

➤ \$1,500 cost share per radio

➤ [Organized by Tiers](#)

➤ Must complete survey

➤ Radios must be purchased between 4/2019-1/2024

➤ Agencies purchase approved radio

➤ Submit receipts and proof of payment reimbursement

➤ As of November 2022

➤ 5,849 Radios Submitted out of the 20,000 estimated (29.25%)

➤ \$8.73M reimbursed out of \$30M available (29.1%)

SIRN Today Continued

Transitioning to the future



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PSAPs Preparing to Transition to 800Mhz Continued

- Radio Talkgroup Layouts
 - State minimums on all radios
 - How, what types of events, patching to make interoperability happen

OH1	OH2	OH3	01 LAW 1	01 LAW 2	01 FIRE/EMS	01 LOCAL GOV	01 LOCAL MA	02 LAW 1	2LAW2	02 FIRE/EMS 1	02 FIRE/EMS 2	03 STATE LAW1	03 STATE LAW2	03 STATE FIRE/EMS	04 Other	05 REGIONAL	05 REGIONAL	05 STATE MA1	05 STATE MA2	5 STATE 700 MA	5 NAT'L 700 MA1	5 NAT'L 700 MA2	5 NAT'L 800 MA	5 NAT'L VHF MA		
			HOME LE	HOME LE	Home Fire_EMS	HOME Local Govt	Local MA	Adjacent LE		Adjacent Fire		State LE	State LE	State Fire_EMS	Other/Misc.	Regional Interop	Regional Interop	Statewide MA	Statewide MA	Local Simplex	National MA (700)	National MA (700)	National MA	National MA		
							## CW LE MA 1					00HP FG OPS1	SR 01 LE BD	00_FS REG A		ND NW MA HAIL	ND NE MA HAIL	ND MA HAIL	ND MA HAIL	7DIR1E	7CALL50	7CALL50_D	8CALL90	VCALL10		
PURSUIT	PURSUIT	PURSUIT					## CW LE MA 2					00HP JN OPS1	SR 01 LE MW	00_FS REG B		ND NW PRSUIT	ND NE PRSUIT	ND PURSUIT 1	ND MA 16	7DIR2E	7TAC51	7TAC51_D	8TAC91	VTAC11		
	Reg. PURSUIT						## CW MA 3					00HP BK OPS1	SR 01 LE M	00_FS REG C		ND NW MA 01E	ND NE MA 01E	ND PURSUIT 2	ND MA 17	7FIRE DIR1	7TAC52	7TAC52_D	8TAC92	VTAC12		
	STATE PURSUIT						## CW MA 4					00HP DK OPS1	SR 02 LE ANN	00_FS REG D		ND NW MA 02	ND NE MA 02	ND MA 03 E	ND MA 18	7FIRE DIR2	7TAC53	7TAC53_D	8TAC93	VTAC13		
							## CW MA 5					00HP WN OPS1	SR 02 LE BRR	00_FS REG E	Examples:	ND NW MA 03	ND NE MA 03	ND MA 04 E	ND MA 19	7DIR5	7TAC54	7TAC54_D	8TAC94	VTAC14		
							## CW MA 6					00HP MT OPS1	SR 02 LE MPSW	00_FS REG F	<i>Hospitals</i>	ND NW MA 04	ND NE MA 04	ND MA 05 E	ND MA 20	7DIR6	7TAC55	7TAC55_D	8CALL90_C	VFIRE21		
												00HP DL OPS1		00_FS REG G	<i>MEDIC</i>	ND NW MA 05	ND NE MA 05	ND MA 6	ND MA 21	7DIR7	7TAC56	7TAC56_D	8TAC91_D	VFIRE22		
												00HP GF OPS1		00_FS REG H	<i>P&P</i>	ND NW MA 06	ND NE MA 06	ND MA 7	ND MA 22	7DIR8	7GTAC57	7GTAC57_D	8TAC92_D	VFIRE23		
												00BCI BK OPS1			<i>Game/Fish</i>	ND SW MA HAIL	ND SE MA HAIL	ND MA 8	ND MA 23	7DIR9	7MOB59	7MOB59_D	8TAC93_D	VFIRE24		
												00BCI DK OPS1		00_DOH OPS 1	DOH	ND SW PRSUIT	ND SE PRSUIT	ND MA 9	ND MA 24	7DIR10	7LAW61	7LAW61_D	8TAC94_D	VFIRE25		
												00BCI WN OPS1		00_DOH OPS 2	BCI	ND SW MA 01E	ND SE MA 01E	ND MA 10	ND MA 25		7LAW62	7LAW62_D		VFIRE26		
														00_DOH OPS 3	Federal Agencies	ND SW MA 02	ND SE MA 02	ND MA 11	ND MA 26		7FIRE63	7FIRE63_D		VMED28		
														00_DOH OPS 4		ND SW MA 03	ND SE MA 03	ND MA 12	ND MA 27		7FIRE64	7FIRE64_D		VMED29		
														00_DOH OPS 5		ND SW MA 04	ND SE MA 04	ND MA 13	ND MA 28		7MED65	7MED65_D		VLAW31		
														00_DOH OPS 6		ND SW MA 05	ND SE MA 05	ND MA 14	ND MA 29		7MED66	7MED66_D		VLAW32		
																ND SW MA 06	ND SE MA 06	ND MA 15	ND MA 30		7DATA69	7DATA69_D		SARNFM		
RG varies by REGION (NW, SE, SW, NW)	Typically one home zone is adequate		Can consolidate into single bank						Add banks as necessary; alternatively, can have banks larger than 16 TGs				Varies BY REGION, STAFF TYPE, Agency MOUS; SAMPLE PROVIDED ABOVE				Uniform on all State and Local SIRN Devices									

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Transitioning to the future



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OH1	OH2	OH3	01 LAW 1	01 LAW 2	01 FIRE/EMS
			HOME LE	HOME LE	Home Fire_EMS
PURSUIT	PURSUIT	PURSUIT			
	Reg. PURSUIT				
	STATE PURSUIT				
	Regional Hail				
Simplex/Dire	State Hail				

01 LOCAL GOV	01 LOCAL MA	02 LAW 1	2LAW2	02 FIRE/EMS 1	02 FIRE/EMS 2
HOME Local Govt	Local MA	Adjacent LE		Adjacent Fire	
	## CW LE MA 1				
	## CW LE MA 2				
	## CW MA 3				
	## CW MA 4				
	## CW MA 5				
	## CW MA 6				

03 STATE LAW1	03 STATE LAW2	03 STATE FIEMS	04 Other
State LE	State LE	State Fire_EMS	Other/Misc.
00HP FG OPS1	SR 01 LE BD	00_FS REG A	
00HP JN OPS1	SR 01 LE MW	00_FS REG B	
00HP BK OPS1	SR 01 LE M	00_FS REG C	
00HP DK OPS1	SR 02 LE ANN	00_FS REG D	
00HP WN OPS1	SR 02 LE BRR	00_FS REG E	Examples:
00HP MT OPS1	SR 02 LE MPSW	00_FS REG F	Hospitals
00HP DL OPS1		00_FS REG G	NREDOT
00HP GF OPS1		00_FS REG H	P&R
00BCI BK OPS1			Game&Fish
00BCI DK OPS1		00_DOH OPS 1	DOH
00BCI WN OPS1		00_DOH OPS 2	BCI
		00_DOH OPS 3	Federal Agencies
		0 DOH OPS 4	
		0 DOH OPS 5	
		0 DOH OPS 6	

05 REGIONAL	05 STATE MA1	05 STATE MA2	5 NAT'L 700MA1	5 NAT'L 700MA2	5 NAT'L 800vMA	5 NAT'L VHF MA
Regional Interop	Statewide MA	Statewide MA	National MA (700)	National MA (700)	National MA (800)	National MA (VHF)
ND NW MA HAIL	ND MA HAIL	ND MA HAIL	7CALL50	7CALL50_D	8CALL90	VCALL10
ND NW PURSUIT	ND PURSUIT 1	ND MA 16	7TAC51	7TAC51_D	8TAC91	VTAC11
ND NW MA 01	ND PURSUIT 2	ND MA 17	7TAC52	7TAC52_D	8TAC92	VTAC12
ND NW MA 02	ND MA 03 E	ND MA 18	7TAC53	7TAC53_D	8TAC93	VTAC13
ND NW MA 03	ND MA 04 E	ND MA 19	7TAC54	7TAC54_D	8TAC94	VTAC14
ND NW MA 04	ND MA 05 E	ND MA 20	7TAC55	7TAC55_D	8CALL90_D	VFIRE21
ND NW MA 05	ND MA 6	ND MA 21	7TAC56	7TAC56_D	8TAC91_D	VFIRE22
ND NW MA 06	ND MA 7	ND MA 22	7GTAC57	7GTAC57_D	8TAC92_D	VFIRE23
ND SW MA HAIL	ND MA 8	ND MA 23	7MOB59	7MOB59_D	8TAC93_D	VFIRE24
ND SW PURSUIT	ND MA 9	ND MA 24	7LAW61	7LAW61_D	8TAC94_D	VFIRE25
ND SW MA 01E	ND MA 10	ND MA 25	7LAW62	7LAW62_D		VFIRE26
ND SW MA 02	ND MA 11	ND MA 26	7FIRE63	7FIRE63_D		VMED28
ND SW MA 03	ND MA 12	ND MA 27	7FIRE64	7FIRE64_D		VMED29
ND SW MA 04	ND MA 13	ND MA 28	7MED65	7MED65_D		VLAW31
ND SW MA 05	ND MA 14	ND MA 29	7MED66	7MED66_D		VLAW32
ND SW MA 06	ND MA 15	ND MA 30	7DATA69	7DATA69_D		SAR NFM

- Radio Talkgroup Layouts
 - State minimums on all radios

SIRN HISTORY

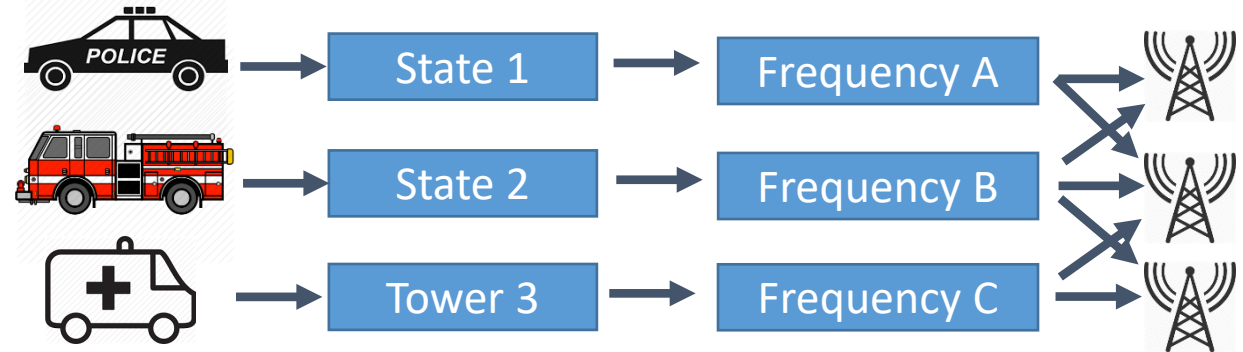
CONVENTIONAL VS TRUNKING



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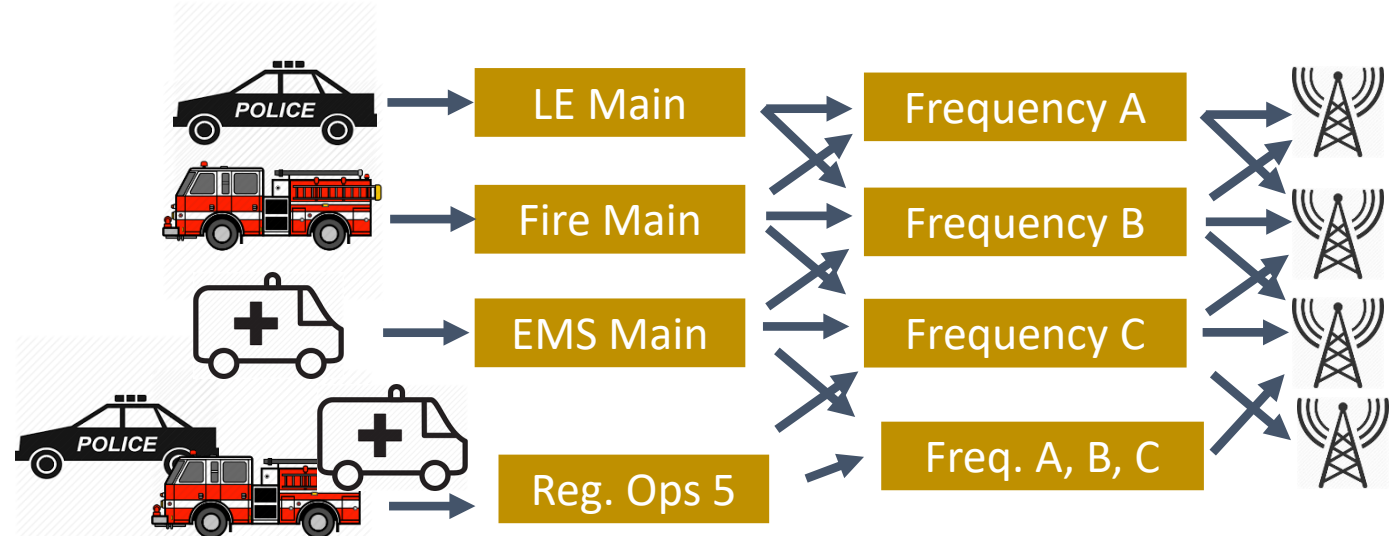
Conventional Radio System:

- User chooses a frequency
- Bound to a specific set of towers
- Assigned to a specific purpose



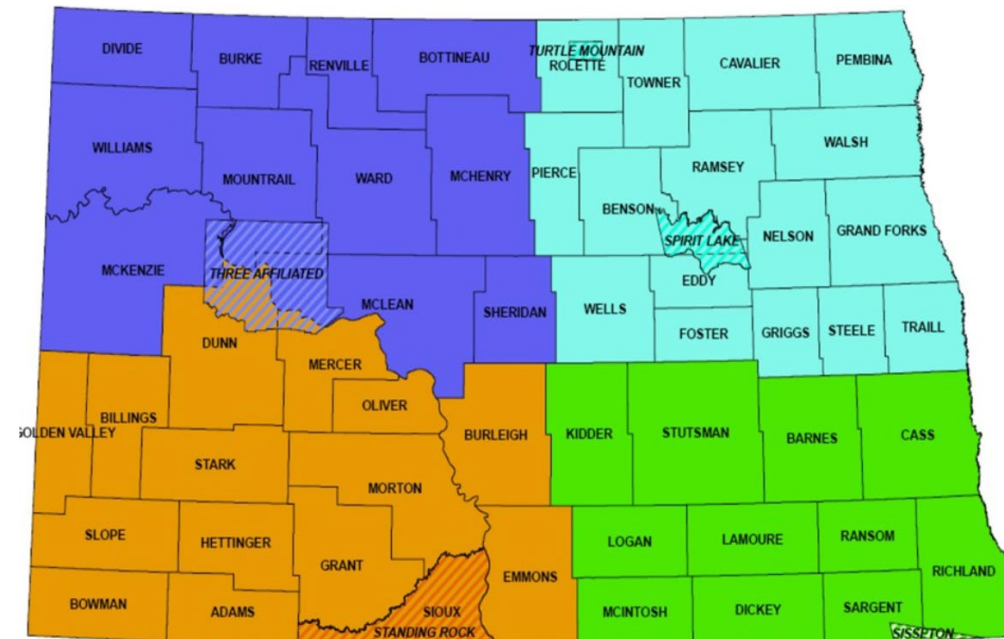
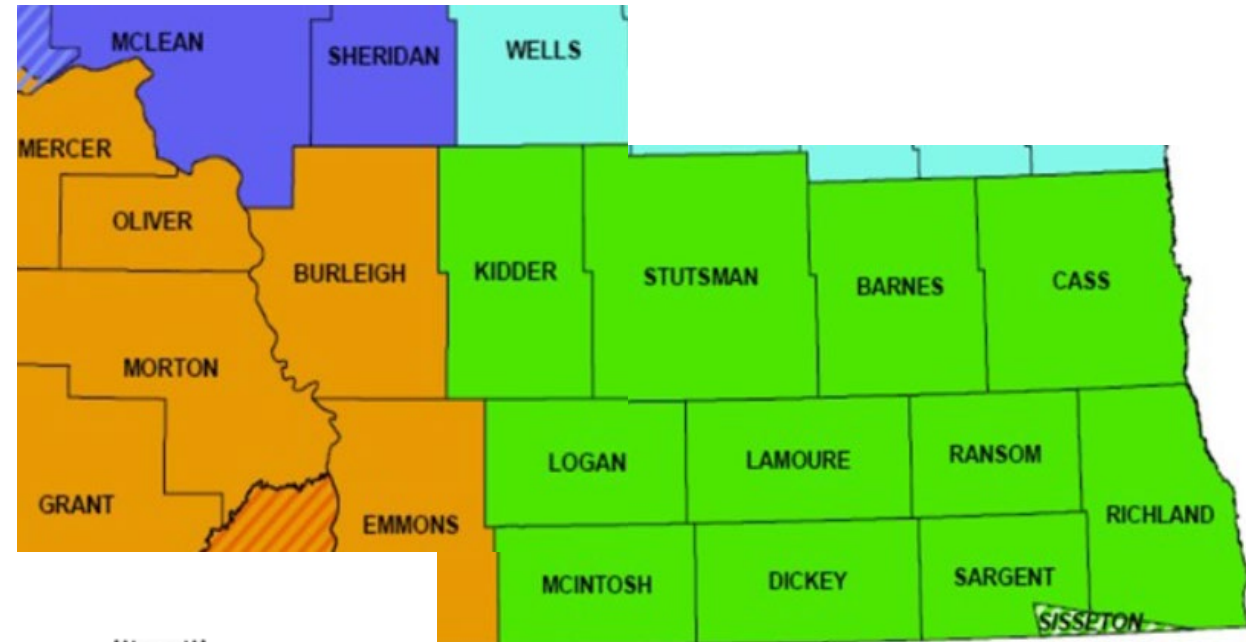
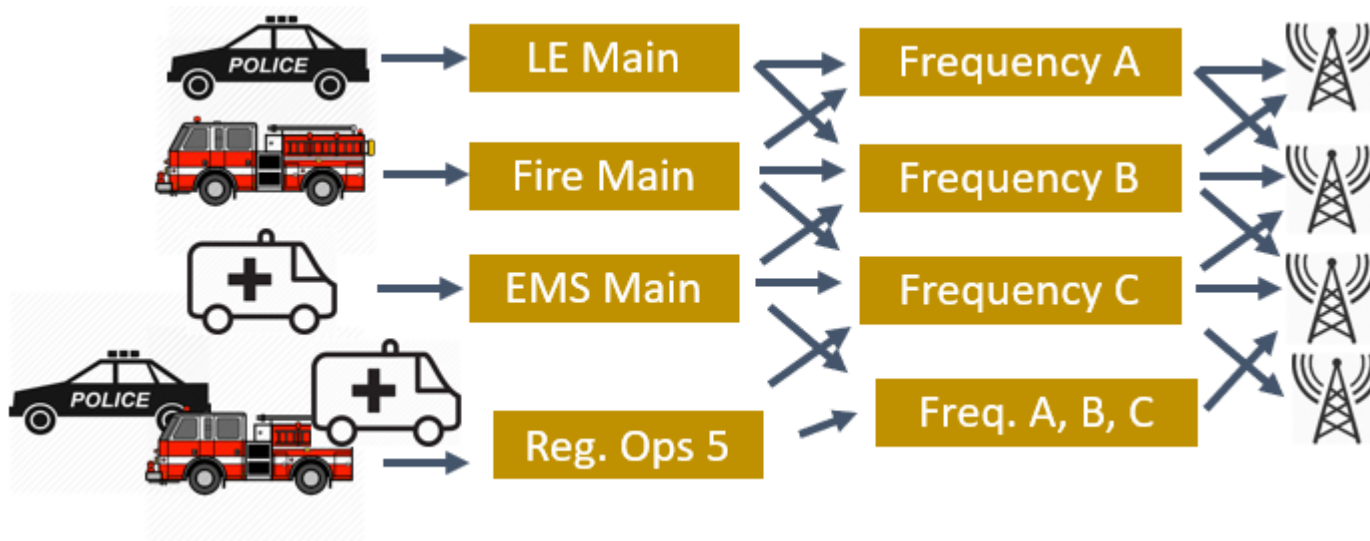
Trunked Radio System:

- User chooses a specific talk group
- Assigned to a specific purpose
- Not bound to a frequency
- Not bound to a specific set of towers
 - System programmable
- Can be local, county, regional, state, federal



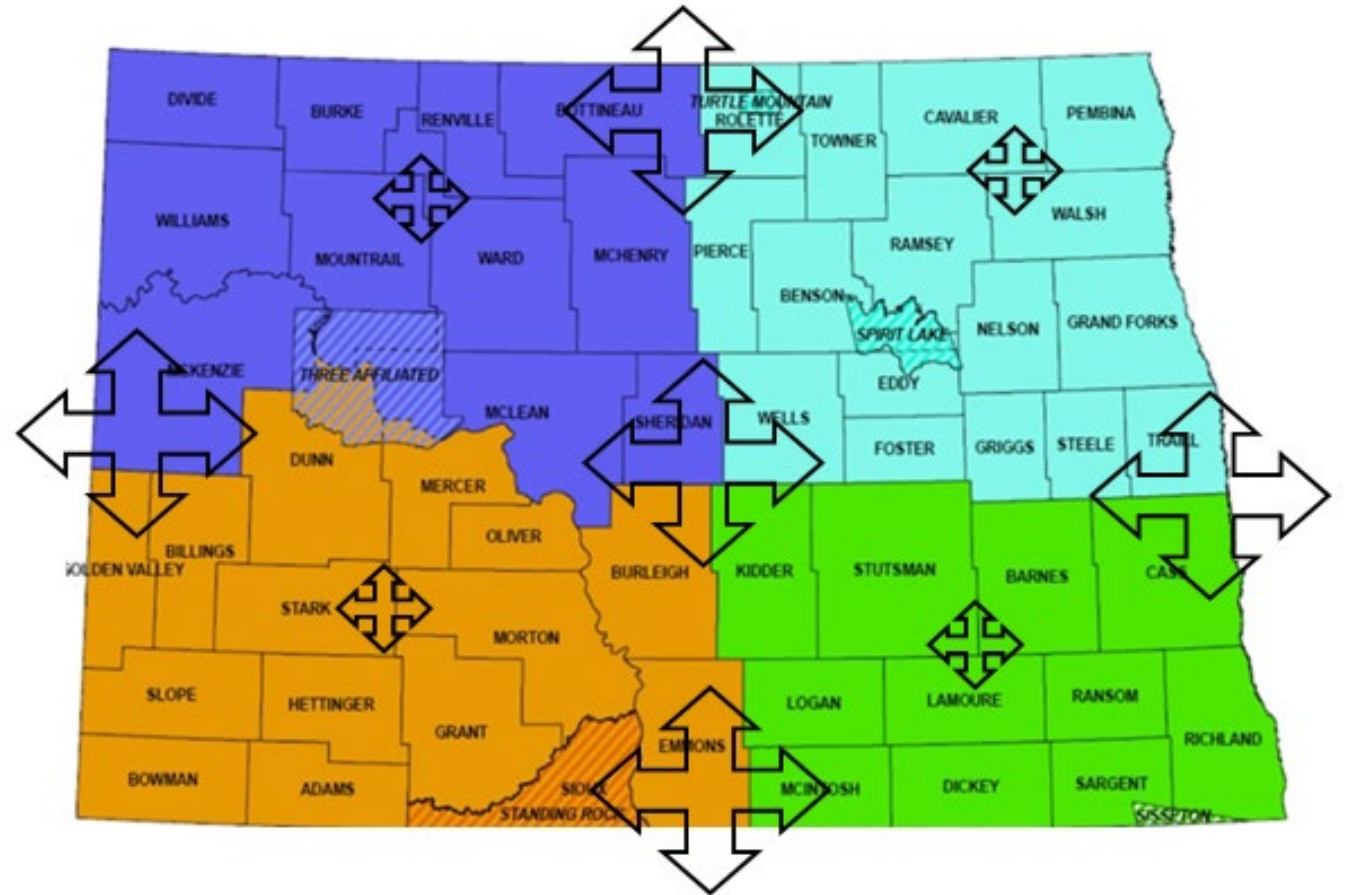
Talkgroups are organized by coverage area as follows:

- Simulcast
- County Plus+
- Regional
- Statewide



- **County to County Interoperability** – CW MA 3 & CW MA 4 will be shared with adjacent counties to provide county to county interoperability
- **Interoperability with Minnesota (MN)** – use consolettes to consume each other’s regional mutual aid talkgroups. This will be achieved by consolettes on each side of the Red River to consume each other’s Regional Hailing talkgroups. There are also PSAP to PSAP interoperability agreements in place for Grand Forks/East Grand Forks along with Fargo/Moorhead.
- **Interoperability with South Dakota (SD)** – once South Dakota’s system is upgraded we will do the same as MN. However, until then dual-band radios can be used as well as control channel gateways at strategic sites to aid in interoperability. This will be a combination of the two processes until North Dakota’s SIRN system is complete. Counties will still be able to talk to SD on dual-band radios or combination of 800MHz or side mounts as discussed in area and county responder meetings
- **Interoperability with Montana (MT)** – Since Montana is fragmented like ND is today, interoperability will be achieved via control channel gateways at strategic sites. MT is in the process of a new radio project too. However, they are years away. So currently in Williams County there is a gateway at Grenora to achieve interoperability with Richland & Roosevelt Counties and responders. We will do a similar thing with the State Radio dispatched Counties. As we prepare to transition, we will be in communications with MT SWIC, MT Highway Patrol, and local jurisdictions as we approach ND State Radio’s cutover and transition.
- **Interoperability with Canada** – Manitoba will be much like MN and SD yet to be determined. Saskatchewan will be more like MT also yet to be determined as our Western Border Conference has been postponed the past two years
- **Simplex/Car to Car** – old VHF VLAW, VMED, etc. all have federally licensed 7-800MHz versions of these channels for use which are listed in the Minimum Programming Standard

Interoperability with Neighboring Agencies



SIRN

SOLUTION



**NORTH DAKOTA
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RADIO NETWORK**

- Shared Infrastructure Utilized by All Public Safety Users
- 800 MHZ Frequency Band
- Project 25 Technology
- 99.999 Reliable is the national standard for public safety communications hardware
- Hardware Meeting Standards Usable on SIRN System
- Guaranteed Coverage
 - 95% Mobile Coverage / 95% Reliability
 - 85% Portable Coverage / 95% Reliability
- Addresses End of Life & End of support of Equipment
- Future Integration with LTE & Wi-Fi Technology
- Guaranteed System Support for 25 years

SOLUTION – 800 MHZ SYSTEM



- 140 Tower Sites
- Better In-Building Penetration
- Reduces Congestion
- Open Spectrum – No Channel Scarcity
- Lessens Interference
- Eliminates VHF Skip
- Lower Noise Floor
- Consistent Predictable Coverage

SIRN

GOVERNANCE & POLICY



**NORTH DAKOTA
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INTEROPERABLE
RADIO NETWORK**

- SIEC Governance structure allows for INVOLVEMENT at all levels
- User involvement is critical to successful implementation of SIRN
- Workgroups developing standards which are then reviewed / approved by Subcommittee / SIEC
 - [SIRN Standards Page](#)
 - [Governance Page](#)



SIRN Today, Tomorrow and beyond

- SIRN 2020 into the future...
- Interoperability with MN, SD, Manitoba, Federal Agencies
- LTE Integration via Critical Connect / Smart Connect
 - NOT meant to replace Land Mobile Radio (LMR), but to augment
 - Cost savings to agencies which can use LTE Push to Talk
 - Mission Critical Push to Talk (MCPTT) over FirstNet & Verizon
- Centralized Logging – Recording State & Regional LMR Talkgroups
- Over The Air Programming (OTAP)
- Over the Air Rekeying (OTAR)



Other SIRN Presentations

[SIRN 101 Presentation](#)

[NDFA Meeting](#) (February 2021)

[9-1-1- Association Meeting](#) (March 2021)

[Chief and Sheriff's Association Meeting](#) (May 2021)

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NORTH DAKOTA
**STATEWIDE
INTEROPERABLE
RADIO NETWORK**

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