

Recommended ARMER Interop Plan Change 1-4-10

Currently approved ARMER interop plan

This is directly from the conceptual plan:

A system plan will be needed to establish detail requirements for providing an interoperational system (Interop) that will facilitate communications between nonparticipating entities and those who choose to join the 800 MHz system. A couple of options are under consideration at the time of this writing. It should be noted that these are offered as topics for discussion.

- *Use the existing Minnesota State Patrol VHF radio equipment that exists today. While some of this equipment is somewhat old in terms of electronics, it may serve as a temporary link between entities of dissimilar radio systems. Since the Patrol system and most equipment used by public safety agencies in the state are already programmed with the State Mutual Aid channels (MINSEF, MIMS and the Fire Mutual Aid frequencies) it may be the least expensive route to pursue.*
- *Use the existing county sheriff's radio system and equipment. However, this option would require all counties within the district being upgraded to participate in the shared statewide trunked system. It is unlikely that all counties will convert to the new system during the initial implementation phase, which would leave major gaps in the Interop system.*
- *Use a combination of the previously described options.*

This plan has provided some cost figures to provide for interoperability between the old and the new. Best estimates indicate that the cost to implement the Interop System statewide would be approximately \$3.3 million.

Estimates and details of how the Interop issue can be satisfied will be better addressed once funding has been approved and meetings begin with local units of government to determine their interest in participating on the Trunked System as well as their requirements.

Recommended ARMER plan change

This ARMER Interop plan change is for the ARMER Phase 3,4,5 and 6 areas. The Phase 1&2 Interop plans have already been implemented.

ARMER System level Interop

Refer to Appendix A for the ARMER Interop system level block diagram.

- VHF fixed station(s)
 - Minsef (future Vcall ?)
 - Design goal is for Mobile level coverage.
 - For monitoring purposes it would be voted across region by RoIP network.
 - Voted audio monitored by (Patrol ??, Designated Regional Dispatch?) RoIP Work Station required for viewing voted site information.
 - Site station 4 wire audio bridged and tied to RoIP- voter input, RoIP standard port, site router-CCGW and to the MSO based CEB. This would make the resource available to MCC7500 and Gold Elite console in the Zone the site is connected to.
- VHF Control Station (Variable stations)
 - VHF Control station antenna will be located below the fixed station antenna on the tower.
 - All channels need to be licensed. (Control station does not meet 20 foot rule.)
 - Remotely controllable through RoIP network from RoIP Work Station.
 - Radio lineup has VCAL10 as default channel, other interop and local channels as required site by site. (Proposed channels, final detail yet to be determined.)

Channel 1		VCAL10	155.7525
Channel 2		VTAC11	151.1375
Channel 3		VTAC12	154.4525
Channel 4		VTAC13	158.7375
Channel 5		VTAC14	159.4725
Channel 6		VFIRE21	154.2800
Channel 7		VFIRE22	154.2650
Channel 8	SW Fire	VFIRE23	154.2950
Channel 9		VFIRE24	154.2725
Channel 10		VFIRE25	154.2875
Channel 11		VFIRE26	154.3025
Channel 12	SW EMS (HEARS)	VMED28	155.3400
Channel 13		VMED29	155.3475
Channel 14		VLAW32	155.4825
Channel 15	MIMS		155.3700
Channel XX	Local as needed:	?	
Channel XX		?	
Channel XX		?	

- 800 Control Station (Located at select locations for Icall and ITACs)
 - 800 Control Station located at various locations, large MN cites. Control Stations sites on IcallID with Itac1-4D, SOAs and additional channels as needed in the area would be programmed and available in radio, radio selectable through RoIP network.
 - For planning and costs purposes these are located at 12 locations, exact locations will need to be determined.

800 Control	Icall	8CALL90
(Selected Sites)	IcallID	8CALL90D
	Itac1	8TAC91
	Itac1 D	8TAC91D
	Itac2	8TAC92
	Itac2 D	8TAC92D
	Itac3	8TAC93
	Itac3 D	8TAC93D
	Itac4	8TAC94
	Itac4 D	8TAC94D
	SOA's?	

- Fixed patches
 - VHF County main to County Main TG, requested at sites or 800 CS at site.
 - Where the Counties give permission, patch the County Main dispatch VHF channel to a talkgroup in the system.
 - This Talkgroup would be system requested at the sites in the County.
 - This talkgroup could be programmed into 800 system user radios in the area, the users would need permission from the County to be on this talkgroup/channel.
 - This patch would be for Counties that have not migrated to the ARMER system. The patch would be removed if the County transitions to ARMER.
 - The patch would be a system level patch at the MSO through a CEB, CCGW or RoIP patch. How the patch is performed will be determined site by site based on the system resources available.
 - System patches, MN to SD
 - Specific TG created on each system, patched together using control stations on each system. Number of Talkgroups?, labeled the same on each side, (SD-MN Link1-?) CS would allow for patching within system to other resources.
 - Patch through RoIP network so resources could be pulled into other configurations if required.
 - System level Agency specific TG on either side link to system level TG, no site activity unless brought up by subscriber radio. Since built by using patch feature would not be patchable by system consoles.
 - Monitored by ?

Local Level Interop

- 800 Control Stations at PSAPs (Currently being funded through PSIC and SRB)
 - One 800 control station set to county specific talkgroup. The intent is that this is always monitored, only traffic directed to County PSAP is on this talkgroup.
 - The other control station can be programmed with the SW interop, Regional interop, adjoining county PSAP talkgroup, other ARMER talkgroups as needed and approved by talkgroup owner.

- Fixed system patches (Local addition as required, local responsibility)
 - VHF local channel patched as needed to talkgroup in the system, talkgroup not requested at any site, not interfaced to ARMER through 800 control stations, ARMER channel only comes up if selected by an ARMER radio user.
 - Interface to ARMER is a permanent patch at MSO (CEB or CCGW.) Cannot be patched to anything else in the system. Any patches to this would need to be done by use of a VHF control station.

- Local console patches (Local addition as required, local responsibility)
 - Interop at the local level for the EMS, FMA, etc. Interop channels as decided by the local agency.
 - Local patching by way of adding ARMER interop work station at local level to make use of ARMER system interop.

- 800 Control Station (Local Agency back up, local responsibility)
 - Agency provided 800 control stations selectable through RoIP. Programmed for a talkgroup and specific sites. Planned use is for system not wide area then Dispatch has a way to contact field users. Also can be used if microwave link down to reach users next site away. User would also need to have RoIP workstation to make use of this. User will need to expand the RoIP port capacity at the site and would need to provide a network extension to the RoIP workstation.

 - The number of 800 control stations at one site needs to be limited, if two or more are at one site special planning is required for the antenna system, an antenna system control station combiner should be used.

ARMER Interop Site Selection

The site selection for the VHF ARMER Interop overlay was to select sites that would provide mobile level coverage. With this we have determined that 109 sites would be need for statewide mobile level coverage. This is broken down by regions as follows:

South East	14 Sites
Central Minnesota	22 sites
South Central	8 Sites
South West	15 Sites
North West	19 Sites
North East	31 Sites
Total Interop Sites	109 Sites

See appendix B for the VHF overlay coverage prediction map.

Available Interop System funding

For Phase 3 we have \$1,000,000 set aside for system interop equipment.

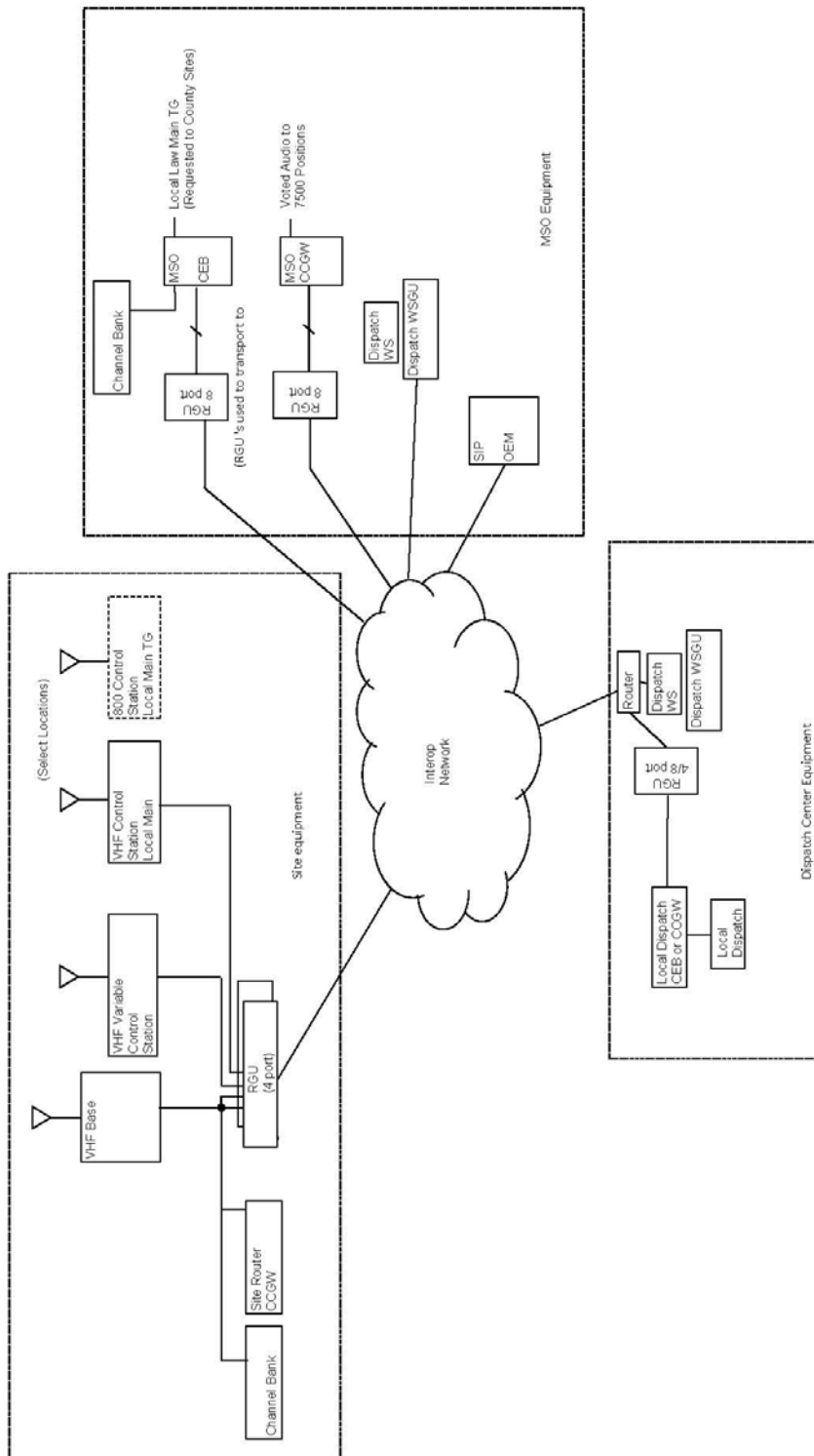
For Phase 4, 5 and 6 we have planned \$ 3,900,000.00 for system interop equipment. Basically it planned for \$14,000 per site to purchase VHF repeaters.

This was \$2,500,000 in the approved conceptual plan, but we increased it with the added sites for the SRB County by County coverage requirement. We included the amount of \$3,900,000 in the estimate submitted to Kimball and Associates for the cost/funding certifications study conducted by the ARMER office.

Estimated cost of proposed ARMER Interop System

RF Site			
RGU (4 Port)	\$7,500.00		
Router/Sw	\$3,500.00		
VHF Base	\$10,000.00		
VHF CS	\$6,000.00		
Per RF Site:	\$27,000.00		
MSO			
RGU	\$30,000.00		
Router/Sw	\$6,000.00		
WSGU	\$15,000.00		
WS	\$15,000.00		
Per MSO:	\$66,000.00		
Dispatch			
WSGU	\$15,000.00		
WS	\$15,000.00		
RGU (4 Port)	\$7,500.00		
Router	\$4,000.00		
Per Dispatch:	\$41,500.00		
System			
SIP x 2 / OEM x 2	\$280,000.00		
Phase 3	36	Sites	\$972,000.00
	2	MSO	\$132,000.00
	2	Dispatch	\$83,000.00
	1	System	\$280,000.00
	Phase 3 Total		\$1,467,000.00
Phase 456	73	Sites	\$1,971,000.00
	12	8CALL90D	\$ 72,000.00
	4	MSO	\$264,000.00
	6	Dispatch	\$249,000.00
	Phase 456 Total		\$2,556,000.00
	ARMER System Total:		\$4,023,000.00
County Patches (Counties not yet migrated to ARMER)			
VHF CS	\$3,500.00		
800 CS	\$3,500.00		
Per site:	\$7,000.00		
CM Counties	14	\$98,000.00	
SE Counties	9	\$63,000.00	
		\$161,000.00	
NW Counties	14	\$98,000.00	
NE Counties	10	\$70,000.00	
SW Counties	13	\$91,000.00	
SC Counties	10	\$70,000.00	
		\$329,000.00	
	County Patch Total:		\$490,000.00
	Total with County Patches:		\$4,513,000.00

Appendix A
ARMER System Level Interop Block Diagram



Appendix B
Estimated VHF Interop Coverage

Statewide Interop

