Mo-ARES Statewide Communications Exercise 2019

After Action Report/
Improvement Plan

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Executive Summary

The Mo-ARES Statewide Communication Exercise was conducted on June 15, 2019 as a Communications Functional Exercise (FE). The exercise started at 0830 local time and ended at approximately 1030 local time. This exercise was designed to allow the Missouri State Emergency Management Agency and other governmental and non-governmental venues throughout the state to evaluate and exercise their plans and procedures for establishing, maintaining, and sustaining communications and infrastructure systems during a large scale response with statewide impact. The exercise driver chosen was a major earthquake in the New Madrid Seismic Zone (NMSZ) which severely impacted communications along the eastern edge of Missouri at the Mississippi River.

The focus of the exercise was on statewide communications connectivity within the Missouri Section ARES community. Injects were designed to create messaging among venues and to be transmitted by both digital and analog means.

Collaboration among the ARES districts was evident by the means in which the various venues sought to overcome band conditions and mode anomalies. The cooperative spirit helped achieve the goals of the exercise and promoted innovation as the exercise progressed. These traits are consistent with the mission goals expressed within the National Response Goals.

The Amateur Radio operators who participated in this exercise proved to be very effective. Some players had little or no experience in exercises of this type. The exercise fostered a high level of cooperation and enthusiasm among the players who requested additional exercises of this type and scope.

The purpose of this report is to analyze exercise results, identify strengths to be maintained and built upon, identify potential areas for further improvement, and support development of corrective actions. This exercise was intended to provide realistic situations in which the players might become involved in a real world scenario. The procedures and capabilities of the playing venues would then be challenged in response to message activity

MAJOR STRENGTHS - The major strengths identified during this exercise are as follows:

- The level of commitment and professionalism demonstrated by the participants during the exercise exemplifies their dedication to emergency preparedness and response. The cooperation of players within and between the various ARES districts served to strengthen the communications capability statewide.
- Reconstitution of SEMA RING (or network) system to handle message traffic in and out of SEMA.
- The use of both voice and digital communications made possible an evaluation of the strengths and weaknesses of each mode and a rudimentary comparison of the two modes.
- The use of surviving infrastructure to conduct emergency communications. Specifically, the St. Charles EOC was successful in utilizing satellite internet connectivity for Winlink messaging.
- Although not part of the exercise, per se, a DMR directed net was conducted by the Missouri Section Manager on the MO ARES talk group. Check-ins were solicited from each Mo-ARES district.

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PRIMARY AREAS FOR IMPROVEMENT - During the exercise several issues were identified as needing improvement. The major areas identified for improvement are:

- Alternate means of communications
- Message processing
- Digital operations
- Voice operations
- Net operations

See Annex A for detailed information regarding these primary areas and Annex B for the detailed comments of players in response to the Exercise questionnaire.

SECTION 1: EXERCISE OVERVIEW
EXERCISE DETAILS
Mo-ARES Statewide Communication Exercise was held on June 15, 2019. The duration of the exercise was approximately 2 hours: 0830 – 1030 CDST. A Hot Wash immediately followed the exercise and concluded around 1130 CDST. The Hot Wash was conducted via conference call.

EXERCISE PLANNING TEAM LEADERSHIP

Exercise Director	J.D. Simmons WA0BER
Senior Planner	Richard Kreiser N0JBF
Technical Advisor	Mike Thayer KM0S
Winlink Coordinator	Bill McFarland N0AXZ
Federal Consultant	Jim Lundsted W0SUV

The planning team determined exercise objectives and developed documents used in exercise facilitation and evaluation. The exercise planning team leadership was assisted and guided by the multitude of players during weekly conference calls. The suggestions and advice offered by the players was invaluable in developing and executing the exercise.

PARTICIPATING ORGANIZATIONS AND PLAYERS

Location	Exercise Facility Name	Ham assigned to Site
Carrollton	Carrollton Transfer Facility	Bill Sweeney W0WTS Jack Vantrump N0SAX
Chillicothe	Chillicothe Respite Facility	Craig Myers AD0TU
Chillicothe	EOC	Joe Dietrick KC0NOX Levi Self KE0LUB
Chillicothe	First Aid/Shelter	Paul Hurla KD0ZYA
Chillicothe	Communication Center	Mike Council WU0G
Columbia	Columbia Transfer Facility (Boone ECC)	Bill McFarland N0AXZ Tim Spurgeon W0TES
Columbia	Home Depot Transfer	Ernest Shaw KC0EZE
Kirksville	Kirksville District B Play	Dave Kruger AB0DK Patrick McGillan KA9PDK
Marion County	Marion County Debarkation Center	Don Vary KD0HHN
Platte County	Platte County Reception Center	Rick Smith K0KEX

Poplar Bluff	Poplar Bluff Debarkation Center and District E Play. N0RIC stationed at Hornersville.	Larry Ford N0RIC Robert Bledsoe KC9NNT Gary Crowley KD0FWH Mike Willis KE0PEP
Rolla	Rolla Transfer Facility	Joe Counsil K0OG
SEMA	SEMA	Mike Thayer KM0S Richard Kreiser N0JBF J.D. Simmons WA0BER
SEMA	SEMA Ring	Gary Zeilman K0WYN Hank Taylor KD0BVQ
Springfield	Springfield Reception Center	Cecil Higgins AC0HA John Wall KD0ONE
St. Charles	St. Charles Debarkation Center	Jeff Young KB3HF Bill Grimsbo N0PNP Art Goodall W0KG Steve Cave W4MWX Bill Guenther WD4EEW Vince King KD0JGB Brian Reynolds W0BDR
Exercise NCS	MESN Net Control Station	Chris Swisher K0PHP

SECTION 2: EXERCISE DESIGN SUMMARY

Exercise Purpose and Design - The functional exercise (FE) will test and assess the ability of Amateur Radio operators to provide emergency primary and supplemental communications support to governmental agencies, non-governmental organizations (NGO) and other support facilities during a simulated disaster across Mo-ARES district boundaries

The efficiency and effectiveness of both voice and digital modes using the same messages will be evaluated. Thus, a quasi-empirical comparison of the voice and digital modes under the same band conditions can be made.

EXERCISE OBJECTIVES, TARGET CAPABILITIES AND ACTIVITIES:

Objectives - Four objectives were developed for the exercise,

- Objective 1: Assess the Mo-ARES statewide response capabilities by establishing voice and data communications within and between the nine Mo- ARES districts; to include fixed, mobile, and field-deployed stations
- Objective 2: Assess the capacity of Mo-ARES emergency communications to provide for redundancy and interoperability.
- Objective 3: Incorporate elements of NIMS/ICS as deemed appropriate
- Objective 4: Identify operational, procedural, and technical gaps

Target Capabilities - The target capabilities of this exercise were voice and data terrestrial communications. Voice communications were directed to be the staple and primary medium for messages. However, digital communications were added, not only to demonstrate the robust capabilities of digital messaging, but also to provide a rudimentary quasi-empirical comparison of transport methods. An unexpected method of transport that arose for digital communications

during the exercise was the St. Charles County EOC which is equipped with satellite internet capability.

Scenario Summary – This exercise focused upon the evacuation of persons from along the eastern boundary of Missouri following a 7.7 magnitude earthquake in the New Madrid Seismic Zone (NMSZ). Exercise messaging reflected the process of tracking evacuees transiting on government-provided transportation out of the impact areas.

The exercise was executed at the Sectional level by the respective District Emergency Coordinators (DEC) and county Emergency Coordinators (EC). Exercise play within the boundaries of individual districts was executed by the respective DEC or EC as appropriate.

HF/VHF/UHF bands and FM/SSB/Data/ modes were utilized to achieve the objectives of the exercise. Satellite internet was also used in the St. Charles County impact area. An extra-exercise DMR check in by District was conducted on the MO ARES talk group by the Missouri Section Manager.

SECTION 3: CONCLUSION
Thirty four (34) amateur radio operators participated in the exercise. Participants agreed that this exercise was very much needed and that additional exercises should be conducted in the near future. Specific strengths and areas for improvement were identified during the exercise that can be addressed individually or corporately to produce better readiness and execution in future exercises and in real world environments for the State of Missouri.

Appendices

A. Detailed Evaluation of Major Areas of Improvement
B. General Comments from Players
C. Venues, Acronyms, Definitions
D. New Madrid Seismic Zone Impact Area

APPENDIX A: Detailed Evaluation of Major Areas of Improvement

In addition to the "Hot Wash" immediately following ENDEX an email questionnaire was sent to all exercise players soliciting additional comments regarding how well the exercise met its stated goals. Responses were received from 6 of the 8 ARES Districts participating in the exercise. Respondents ranged from individual operators to District Emergency Coordinators thus providing a cross section of evaluations at different levels within the organization. The overall consensus from all responses was that the exercise was well conceived and needed but some indicated that the exercise was too short. However, several areas were identified where improvement is needed to Missouri ARES ability to respond to an emergency.

Alternate Communications Paths
Band conditions on the exercise day were poor and further degraded by thunderstorms which created an extremely high noise level. This necessitated the use of high power by the Net Control Station (NCS) and District venues where it was available. Venues lacking linear amplifiers had difficulty communicating with the NCS. In these cases, players relied on digital modes or VHF/UHF repeaters for relays.

These problems suggest that the use of 3.963 MHz and 7.263 MHz as primary emergency communications channels be reviewed in favor of more reliable modes. The ARES State Operations Plan should include procedures and modes for establishing communications when band conditions are poor.

At the very least each District should adopt a standard operating procedure to always monitor these frequencies during an emergency and choose the one with the best conditions to contact NCS.

Message Handling
It is evident from the Hot Wash and comments on the questionnaire that District level training is needed in basic message handling. During the exercise several operators read the message they were transmitting too fast for the receiving operator to successfully copy manually. Training should include basic NTS message handling but emphasize use on of ICS Forms, particularly ICS-213.

Messages during the exercise were scripted and supplied on appropriate forms. Despite cautions to the contrary several messages were sent out of sequence. While this is a minor thing in an exercise, in a real world event if message precedence is overlooked and routine traffic is sent before a priority message it could result in tragic results. The same can be said for failure to properly acknowledge receipt of a message. Automatic digital or verbal operator acknowledgement does not insure that the message addressee has received the message. Proper message formatting and transmission protocols must be observed at all times so that they become second nature.

There was also some confusion about the objective of sending messages by voice and by a digital mode. This is not required in all exercises but was in this one to evaluate the effectiveness of digital modes versus voice modes.

Digital Mode Operations
Given the poor band conditions on exercise day most venues appear to have opted for digital operation. The primary digital modes were FSQ using Fldigi and Winlink using packet, Vera and other Winlink digital modes. While these modes worked well they were not without issues. Some Message traffic seen on the FSQ waterfall was at 1500 Hz instead of 700 Hz as specified for the exercise. There were also problems with Fldigi not always switching to incoming mode.

Likewise, Winlink functioned well but some users were unaware of features that provide for automatic message acknowledgement and logging. This again points to a need for more familiarization and training if these digital modes are to be incorporated in the ARES State Operations Plan. Winlink users were given an email address for messages inbound to SEMA rather than a Winllink address. Some operators questioned the wisdom of this decision.

DMR was utilized briefly during the exercise to allow the playing Districts to check in with the ARRL Section Manager. At present there are only 19 DMR repeaters listed in Missouri; mostly located in and near the larger cities. Thought should be given to exploring methods to promote the use of DMR as an alternative communications path for emcomm.

Voice Operations
While HF SSB use was limited due to poor propagation VHF/UHF repeaters were used to relay messages where available. In one instance NCS utilized the Rolla wide area repeater to pass traffic to the Rolla Transfer Facility.

No matter which voice method was utilized several things became evident. Each venue needed at least one operator and an assistant to help in message handling and logging. In addition there should be one individual assigned to troubleshooting and overall administrative duties.

It is possible to operate with a short staff during an exercise where things are pre-scripted but Districts should plan on developing a cadre of trained operators that would be available in the event of a sustained operation over a period of days.

The development of a network of linked wide area repeaters should be investigated to provide for value-added FM VHF/UHF voice communications throughout the State.

Net Operation
As previously indicated the net operation experience level of many operators participating in the exercise needs to be improved. While their efforts and enthusiasm are appreciated they need to have training on operating in a directed net environment and operating during an exercise. There were several instances of messages being passed without announcing that “This is an Exercise” or changing frequencies without advising net control. Another station repeatedly checked in with NCS even though he had no traffic to pass. These oversights are easily corrected with training at the local level.

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APPENDIX B: General Comments from Players

The following comments were supplied by players, leading to the detailed evaluations offered above.

Need to have a way to keep monitoring stations off the air unless needed once they check in. Had a station in Van Buren checking in every couple of minutes. NCS would acknowledge him and he would do it again. Could cause interference in a critical situation. Also I would suggest training opportunities for those who might not be familiar with Winlink and the use of the ICS forms with it. Other than that, I thought it went pretty well.

Provide classes and nets to bring all ARES operators up to speed on Winlink Express, FSQ and the Missouri Operation Plan. Document those that have acquired the necessary skills to operate an emergency station. Solicit donations, plan car washes, twist political arms and otherwise beg to get funds/determination necessary to bring SEMA into a fully operational State emergency communication center and out of the step child status it is burdened with currently, again IMHO! Having to rely on relaying every message coming in is time consuming, error prone and inefficient.

This exercise with messages from debarkation to destinations centers was and is ideal for NBEMS digital communications. In a real event, information needed but not limited to could include: bus driver ID, personal cell phone number, bus number, bus company, bus license number, (to positively identify a bus) district designator, FIPS, occupant ID's, cross check of male, female, children count numbers, time of debarkation, and preplanned route number. This is to ensure all buses are accounted for in the ensuing chaos.

In a real world situation, a concern is how digital traffic directed to SEMA will arrive. The JC Ring will be overwhelmed with voice traffic. A possible solution for consideration is to have several combined FSQ/Fldigi and Winlink internet capable stations around the state. Will entertain other possible solutions as well.

I would say we should endeavor to find frequency plans that would allow a more reliable voice path, or not plan on doing voice at all. FM repeaters on 2M or UHF might be organized to provide the state ARES a path for reliable voice communications. Relaying from one district to another via the appropriate repeaters should be tested. (DMR is going to come up, sooner or later).

Practice in delivering ICS-213s by voice should be required so we can easily perform an exercise like this. Reading the message must be slow enough for the receiver to write it down even when we have 5x9 signals. Acknowledging the message when delivered by Winlink should be by the "Reply" process, since this facilitates efficient messaging handling. I had trouble keeping an accurate 309 log and was very glad to use the 309 generated log in Winlink. We were insisting on message numbers for our messages, in large part because NTS and MESN would like that. Since, essentially they didn't participate in this exercise, maybe we could do without the message numbering process. Was it of any value to our exercise?

In general, I would say the exercise was very worthwhile for the fact that it demonstrated that we need more practice at providing a state-wide net. More exercises like this one should be planned. I know you all had a very hard job getting it started, but the next ones, might be easier.

MESN should just be renamed, MO-ARES and we need a plan to make state-wide networks operable in all conditions. We know there are some 2M and UHF repeaters that have a very wide coverage, probably spanning adjacent districts. We should test our coverage of the state using some planned exercises that tests how many repeaters it would take to move traffic reliably across the state, and compare that network with 3.963/7.263 MHz nets.

Winlink used successfully to relay messages. Used VERA for fast message transmission. K0SI-10 worked well. Was able to use Winlink to send messages at 100 watts and 5 watts. FSQ net couldn't pass traffic since the idea was to use ARQ. Should have had Winlink address for SEMA.

APPENDIX C: Venues, Acronyms, Definitions

MESN – Missouri Emergency Services Net

Mo-ARES - Missouri Amateur Radio Emergency Service

NCS – Net Control Station

SEMA – State Emergency Management Agency

SEOC – State Emergency Operations Center (at SEMA)

SEMA Ring – Formerly known as the JC Ring this “ring” of amateur radio operators intercepts and passes messages to and from SEMA and outside venues in order to provide for a more robust capture/transmission capability on behalf of SEMA and to provide for a more orderly flow to and from the SEOC.

The following definitions were adapted from *Local Evacuation and Mass Care Planning Handbook*, Emergency Management Division, Michigan State Police, 2013

Debarkation Center: designated to receive transportation-assisted evacuees. Means of transportation may be by air, rail, bus, or maritime, as needed.

Reception Center: Intake, processing, and departure site designated for the movement of government transportation-assisted evacuees, their household pets, their luggage, and/or their durable medical equipment (DME). Embarkation transportation modes may include bus, rail, maritime, or air.

Transfer Point: Location where transportation-assisted evacuees are moved from one mode or direction of transportation to another.

APPENDIX D: New Madrid Seismic Zone Impact Area