Introduction and Goals

The main goal of this article is to generate awareness of the EmComm Data Messaging (EDM) training processes and to interest local amateur operators of all experience levels in joining our training activities and monthly exercises. Another broad goal is to provide information on not only EDM, but other training and exercise support groups; and how to get involved. This training and exercise support is generally done in the context of an emergency preparedness scenario in which 'normal' internet, and perhaps even first provider communications channels may be limited in operability or geographic coverage. We sometimes refer to this as 'Black Sky'.

Black Sky, in this context, is generally described as an environment where normal communications are compromised or simply unavailable. This could mean cell phones are useless either because the supporting mesh systems are inoperable; or system congestion makes individual communications difficult and untimely. The 911 events in NYC and WDC are good examples of congestion causing nearly total disruption in cell phone services. While lasting only hours, other types of events could last days or weeks. Professional radio communications systems, especially trunked systems, may also be vulnerable to loss of internet services. These are the type of situations where HF and/or VHF communications are essential over local areas, regionally and nationally. Newer space-based internet and cellular systems can be invaluable under this type of scenario, although still vulnerable if the internet loss impacts or disrupts backhaul services or downlink sites.

This is the type of environment where amateur operators are best suited to apply their skills and use tested equipment and procedures to provide time-critical public services. EmComm is, in fact, a primary reason our spectrum and communications privileges are granted through federal regulations; and a key incentive for amateur operators to maintain our skill sets.

What is EDM?

EDM is a training and exercise program, focused on HF communications. The training modules are self-contained and cover a wide range of topics in the proper setup and use of both Winlink and VarAC for EmComm. (graphic examples). The procedures and methods are intended to be selected for use by the EmComm operator's local ARES group in concert with that group's served agency requirements. EDM is managed by a steering committee of highly experienced operators and training experts. The methodology is fairly mature at this point with occasional modules added to enhance the users' understanding, training experience or operational effectiveness. New members join EDM by simply asking to join the groups.io site. One of the senior members will conduct a phone interview to make sure the candidate understands how EDM works; and has the fundamental equipment, including radios, computers and software, to participate in exercises. New members can take any or

all training modules through a self-paced process. Nothing is mandatory; but most will complete all the modules because they are geared towards the most relevant or most detailed application features and operational effectiveness.

With appropriate approvals from EDM management, and with proper citation, individual ARES or other EmComm groups may use the EDM training materials tailored to their individual requirements.

To evaluate effectiveness and enhance operator skills, EDM manages monthly exercises with the content chosen to maintain basic or advanced skills and to train on newer training modules or techniques. Seasonal exercises are conducted, as well. Exercises in September and October of each year focus on hurricane and earthquake scenarios, respectively. These types of exercises are conducted by many training and awareness organizations, in parallel. For example, the USGS's October 'Did You Feel It' earthquake exercise is run in parallel with a nation-wide effort by many agencies. In that specific exercise, EDM Field Stations provide reports to EDM 'NCS' or Target Stations in all regions of the US; and EDM then feeds the reports to the USGS central repository. USGS receives many reports via Telnet; but all EDM reports originate from Field Stations through HF communications.

Winlink and VarAC

EDM exercises are always done in a 'Black Sky' situation. There is assumed to be no internet. So, some of the common uses of Winlink with its RMS stations and CMS central server, or Telnet, are not used. Instead, EDM Winlink exercises use Peer-to-Peer modes, only on HF, and report all message types accordingly. Message types may vary but normally include one or more of the ICS message formats. During the early years of EDM exercises and training, Winlink was the primary focus, with emphasis on P2P operations. An important requirement for exercises and training is missing in this regard. That is situational awareness. In other words, Target stations are out there on HF, and the users even know the standard frequencies, but Field Stations may still experience trial and error before a P2P contact can be established, and reports are delivered into the system. It's important to think of the Target as your EOC; and the Field Stations as the ARES, or field, operators providing the link for reports to reach the EOC.

In recent years, with the new VarAC capabilities, and especially with recent enhancements to include a special 'EmComm' mode, EDM has begun to utilize it in most exercises. Now, monthly exercises may include Winlink or VarAC exclusively, or both. It's important to note that the EmComm mode in VarAC is different from the normal mode. VarAC 'normal' use means beaconing or CQ calls on a central channel; then QSOs are shifted to one of the evenly spaced channels above and below the central channel. VarAC 'normal' accommodates users negotiating a QSO channel, then moving to that channel, leaving the center channel free to continue beacon traffic and enable new QSOs.

In EmComm mode a channel is chosen by the Target Station for use by both the Target and Field Stations. In a 'broadcast' field all messages, whether directed to 'all' or to an individual station call sign, or group of stations, are visible to all users on this same 'watering hole' frequency. In this way, Target Stations broadcast their availability by NCS and time period for all the other stations' awareness. For training purposes, EDM maintains NCS-A through NCS-E designations on 20 frequencies across four HF bands. During broadcasts, NCS-x designations are defined as specific Target Station call signs; and the likely operating bands and time periods are provided. Subsequent connections between Target and Field stations are then done by call sign.

Situational Awareness

This method is a form of Situational Awareness that is otherwise not available on other amateur messaging systems or protocols. Field stations choose the NCS call sign, HF band and specific NCS frequency to send their message traffic. In VarAC, in contrast to Winlink, the message traffic is typically sent as a Vmail that may be simple text messages, or a formatted ICS form, such as the ICS213 form in common use. In both the Winlink P2P and VarAC Vmail cases, the reports are maintained in both the Field Station and Target Station computer files indefinitely. Also, in both cases, the report transaction is specific to ONLY the Target (EOC) and the Field (reporter). Whereas all 'broadcast' messages are available to all operators. So the important records function required by FEMA for EOC operations is maintained. And this is all accomplished without internet. VarAC also enables 'relay' or store and forward capabilities so a Target Station may hold a message until the intended recipient connects and receives the message.

The discussion so far has been centered on HF, because that is the focus of EDM, but both Winlink and VarAC support all the same functionality on VHF FM. In addition to increased message throughput speed and efficiency, VHF expands messaging capabilities through use of Digipeaters. Generally, that means, in a local exercise scenario as conducted by most if not all ARES groups, the use of VHF instead of HF is both completely feasible; and in fact enhanced. The Digipeater function in VarAC can greatly enhance the situational awareness among stations using the broadcast features on a common VHF frequency. A local group might choose to use one VHF frequency for broadcasting and another frequency for message traffic (Vmail). Of course this pertains to UHF, as well. The VHF traffic can also be SSB, if desired, and if user stations are suitably equipped. Digipeaters are limited to FM.

Operator Requirements

Setup in Winlink and VarAC is the same as setup in most digital modes – e.g. WSJT-X modes. If your HF/VHF/UHF equipment is compatible with FT8, it will be compatible with both applications. Winlink is Windows, only; but VarAC is compatible with certain Linux distributions, like Mint. Once you have established your CAT configuration and

input/output audio on FT-8, it is the same with Winlink and VarAC. No additional setting up should be necessary.

It is important to note that while EDM started with Winlink, with emphasis on P2P, and has evolved to include VarAC in most exercise scenarios, a case can be made that all EDM's EmComm training functions can be accomplished with VarAC, alone. That means, for those groups wanting a non-Windows, or Windows optional solution, it already exists with VarAC.

Typical Exercise and Some of the Pitfalls – Why Training is Key

To the public, at large, the EDM NCS frequencies (five for each of four HF bands; 20 altogether) are proprietary. In other words, the frequencies are solely for training and exercises. Concealing a specific association of an NCS to a call sign may be required as part of an exercise. One frequency on each band is defined as Primary. That is intentional to help train users, during exercises, to acquire the appropriate information to know when and where NCS stations will be located. During a broadcast on a primary NCS frequency, the exercise participants may learn the call signs of the NCSs for the exercise. Remember, P2P and Vmail transactions must be made by Call Sign, not NCS-x designation. Consequently, a typical exercise may unfold over several days and may include the following elements.

On one day, over several hours, all stations, Target and Field, are on the same primary frequency in the four bands – 80M, 40M, 30M, 10M. (This choice is up to the ARES group, and served agency – and could also include VHF or VHF and HF.) In other words, depending on the time of day, using VarAC/EmComm, the 'watering hole' frequency is one of the four primary frequencies on the most likely band, based on time of day and the region. Over the exercise interval, all stations may 'check' in on the primary frequency and announce their availability for a future exercise time/date. At the same time, selected stations may broadcast the NCS-x: Call Sign assignments for a given time/date. This process gives the field stations the information they need to do P2P and/or Vmail contacts with NCS/Target stations. Because this is HF, and because Target stations may be in widely separated parts of the US, the training on HF band choice and time of day to receive the NCS/Target/Schedule information is vital. This is a realistic example of VarAC broadcast mode to achieve situational awareness among the field station community.

Then on subsequent days or at specific days and times, contact windows are open for either P2P or Vmail message traffic handling among the Field Stations and Target Stations. A recent exercise did the broadcast part on a Tuesday for three hours, Vmail and additional broadcasts on a Thursday for three hours, and P2P on a Saturday for 10 hours. On Saturday, there was no information broadcast, so P2P reports were done by the Field Station operators attempting P2P contacts with Target Stations based solely on previously

published Call Sign designations and best (educated) guess on which band a particular NCS may be operating, based on time of day.

These types of training scenarios may be tailored to the specific needs and skills of any ARES group, with attention to the geographic and other operating constraints.

Training and Exercise Organizations (Partial List)

The figure lists training and exercise organizations that are active nationally or in the National Capitol Region. Check their websites for further information. Most are based on Winlink and/or VarAC; but note NBEMS (Narrow Band Emergency Messaging System) is organized around Fldigi and its associated messaging tools and modulation modes.

If you would like additional information on any of the material presented here, please contact Bruce Crandall at kn4gdx@gmail.com.

EmComm Resources

EDM

Groups.io: EmComm Direct Messaging

ETO and Winlink Thursday

Groups.io: EmComm Training

Emcomm-training.org

Winlink Wednesday (National)

winlinkwednesdays.net

NBEMS (National)

arrl.org/nbems

MDC (Maryland/District of Columbia)

www.arrl-mdc.net

Important Note Regarding Cost

Both Winlink and VarAC are Freeware

Vara and VaraFM are Commonly Used in Both

Vara/VaraFM is Licensed, for a Fee, at other than Basic Data Rates; and as Digipeater Mode in VaraFM