

# After-Action Report/Improvement Plan

## Simulated Emergency Test (SET) 2019

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## Introduction

The Central Ohio Traffic Net (COTN) provides a message relay service for the public and the agencies that serve the public. Using amateur radio and through affiliations to the systems of message relay, COTN's service is highly resilient, effective in the face of even large-scale outages of communications infrastructure and power.

This is the report of our 2019 Simulated Emergency Test (SET), the annual exercise to test performance under emergency operating conditions.

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Activity 1.6: Establish traffic outlet with Ohio Emergency Operations Center / Joint Dispatch Center

Observation: Strength. VHF circuit to W8SGT accomplished with ease.

Recommendation: Continue operations with W8SGT.

Activity 1.7: Establish traffic outlet with Ohio Military Reserve 4th Civil Support and Sustainment Brigade Headquarters

Observation: Strength. VHF circuit to W8OMR accomplished with ease.

Observation: Area for Improvement. Net control recognized but did not press for correct callsign.

Recommendation: Continue operations with W8OMR.

Activity 1.8: Make effective use of circuits

Observation: Area for Improvement. Net control could move traffic more efficiently by sending stations to another circuit.

Recommendation: Move Stations to Other Circuits for Relay.

Activity 1.9: Establish traffic outlet with Franklin County EMA Assessment Center

Observation: Strength. VHF circuit to W8THV accomplished with ease.

Observation: Area for Improvement. W8THV station operated very limited schedule.

Recommendation: Coordinate with FCACC to Provide Net Control operators.

Activity 1.10: Establish outlet to Ohio Single Sideband Net

Observation: Strength. OSSBN liaison present throughout operation.

Observation: Area for Improvement. OSSBN liaison stations few in number.

Recommendation: Train and Encourage Operators in HF Traffic Handling (Phone).

Activity 1.11: Establish outlet to Buckeye Net

Observation: Area for Improvement. Liaison to BN achieved with difficulty.

Recommendation: Encourage CW Operators.

Activity 1.12: Establish outlet to National Traffic System Digital (NTSD) / Digital Traffic Network (DTN)

Observation. Area for Improvement. Liaison to NTSD/DTN achieved with difficulty.

Recommendation: Encourage NTSD/DTN Stations.

Activity 1.13: Establish outlet to Ohio Digital Emergency Net (OHDEN)

Observation: Area for Improvement. Liaison to OHDEN achieved with difficulty.

Activity 1.14: Establish outlet to independent amateur traffic nets

Observation: Strength. Liaison to independent amateur traffic nets achieved with ease.

Activity 1.15: Report session statistics accurately and timely

Observation: Strength. Most reports received within hours of completed session.

Observation: Area for Improvement. Consistent handling of timezones.

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Observation: Area for Improvement. Logging.

Recommendation: Train in Logging

Capability 2: Originate third-party messages for relay on radio circuits

Activity 2.1: On behalf of served agencies

Observation: Area for improvement. Lack of standardized procedure for handling agency forms

Observation: Strength. Operators adapted to address procedure shortcomings.

Activity 2.2: On behalf of members of the public

Strength: Simulated shelter messages were effectively originated

Capability 3: Relay third-party messages on radio circuits

Recommendation: Encourage Non-Voice Modes.

Recommendation: Encourage Liaison Stations.

Activity 3.1: Using voice procedure

Observation: Strength. Voice procedure on the net was generally correct.

Activity 3.2: Using continuous wave procedure

Observation: Area for Improvement. Too few CW operators.

Activity 3.3: Using digital point-to-point narrowband emergency messaging service (NBEMS)

Observation: Area for Improvement. Too few digital operators.

Activity 3.4: Using digital automated traffic relay circuits

Observation: Area for Improvement. Too few digital operators.

Activity 3.5: Out of the served area

Observation: Area for Improvement. Too few liaison operators.

Activity 3.6: Into the served area

Observation: Area for Improvement. Too few liaison operators.

Capability 4: Deliver third-party messages received from radio circuits

Activity 4.1: By telephone

Observation: Strength. Telephone delivery was understandable and prompt.

Activity 4.2: By email

Observation: Strength. Email delivery was understandable and prompt.

Activity 4.3: By written form delivered in person by runner, courier, or postal system

Observation: Strength. Limited data show understandable and prompt delivery.

Recommendation: Ensure that message delivery is exercised at agencies such as FCEM&HS.

Conclusion

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## Exercise Overview

Exercise Name: Simulated Emergency Test (SET) 2019

Type of Exercise: Full Scale Exercise

Exercise Start Date: October 5, 2019

Exercise End Date: October 6, 2019

Duration: 48 hours

Location: Various locations in about ten counties containing and surrounding Columbus, Ohio.

Sponsor: American Radio Relay League, Ohio Section.

Program: Self-funded.

Mission: Response

### Capabilities

1. Operate radio communication nets
  - a. In emergency mode to meet needs
  - b. On repeater systems
  - c. On simplex circuits
  - d. Operate directed nets
  - e. Operate free nets
  - f. Make efficient use of circuits
  - g. Establish traffic outlet with Ohio Emergency Operations Center / Joint Dispatch Center
  - h. Establish traffic outlet with Ohio Military Reserve 4th Civil Support and Sustainment Brigade Headquarters
  - i. Establish traffic outlet with Franklin County EMA Assessment Center
  - j. Establish outlet to Ohio Single Sideband Net
  - k. Establish outlet to Buckeye Net

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- l. Establish outlet to National Traffic System Digital (NTSD) / Digital Traffic Network (DTN)
      - m. Establish outlet to Ohio Digital Emergency Net (OHDEN)
      - n. Report session statistics accurately and timely
  2. Originate third-party messages for relay on radio circuits
    - a. On behalf of served agencies
    - b. On behalf of members of the public
  3. Relay third-party messages on radio circuits
    - a. Using voice procedure
    - b. Using continuous wave (CW) procedure
    - c. Using digital point-to-point narrowband emergency messaging service (NBEMS)
    - d. Using digital automated traffic relay circuits
    - e. Out of the served area
    - f. Into the served area
  4. Deliver third-party messages received from radio circuits
    - a. By telephone
    - b. By email
    - c. By written form delivered in person by runner, courier, or postal system

Scenario Type: Severe weather leading to power and communications outages.

#### Exercise Planning Team Leadership

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## Participating Organizations

- Signal Section, Headquarters Company, 4th Civil Support & Sustainment Brigade, Ohio Military Reserve
- Ohio AUXCOMM Team, Ohio Emergency Management Agency
- Franklin County Auxiliary Communications Club, Franklin County Emergency Management & Homeland Security
- ARRL Ohio Section

## Number of Participants

This exercise was highly distributed; each participating net or organization has its own exercise. The scope of this AAR/IP is limited to the Central Ohio Traffic Net.

- Players: 37
- Controllers: 1
- Evaluators: 3
- Facilitators: 3
- Observers: 1
- Victim Role Players: N/A (Simulated)

## Exercise Design Summary

### Exercise Purpose and Design

Amateur radio has long played a role in communication during emergencies. Simply stated, when other means are unavailable, amateur radio operators bring their equipment, skill, and access to a wide variety of radio frequency spectrum to bear and can create the means by which communication can continue.

Success in such operation requires not only abstract knowledge, but practical knowledge of operations and experience in operations. The annual Simulated Emergency Test (SET) is the means by which the American Radio Relay League (ARRL) encourages organizations of amateur radio operators to organize tests of their capability.

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OHMR Headquarters Signal Section sponsors a larger annual exercise known as BLACK SWAN that covers multiple radio services, various government, military, and NGO responders. The exercise is designed to provide superstructure to other exercises that can be conducted at increasingly local levels. The exercise is scheduled to coincide with the operation of ARRL's SET.

This year, the Ohio Section ARES leadership opted not to expose ARES to the larger BLACK SWAN exercise and not to force interaction between ARES units and NTS services.<sup>1</sup> ARES focused instead on using the Ohio ARES HF Net and OHDEN to coordinate and receive reports created by county-level operations focused on measuring capability for simplex operations from various operating positions. ARES also opted to focus its operation on a single day, in a window fitting into a single shift of about 9 a.m. until 3 p.m. The ARES operation was focused on directing ARES traffic to the W8SGT station at the Ohio EMA's EOC. W8SGT would maintain liaison with COTN, providing an alternate traffic outlet should it become necessary.

COTN also maintained liaison with W8OMR and therefore a connection to BLACK SWAN, as well as the Ohio Section traffic nets, the Ohio Single Sideband Net (OSSBN) normally operating thrice daily and Buckeye Net—a CW mode net operating twice daily. Finally, COTN also maintained liaison to the Franklin County EMA's EOC.

COTN's operation was designed to ensure that served agencies Ohio EMA, Franklin County EMA, and OHMR were able to maintain traffic connections, and that simulated shelter operations were able to move welfare traffic.

## **Exercise Objectives, Capabilities, and Activities**

Exercise objectives for COTN were enumerated to ensure testing of the various capabilities we advertise and the activities required to achieve the capability. Because of the low number of evaluators and multiple duty required, some of these were only informally defined this year.

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<sup>1</sup>ARES groups were in no way hidden or prevented from interacting with the traffic system or the BLACK SWAN exercise; the interaction simply wasn't as evident to groups not looking for interaction beyond their own county and direct connection to the Ohio EMA station.

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### **Objective 1: Schedule Emergency Mode Operations**

Operate radio communication nets: In emergency mode to meet needs

### **Objective 2: Ensure local served agencies had an outlet**

Operate radio communication nets: Establish traffic outlet with Ohio Emergency Operations Center / Joint Dispatch Center; Establish traffic outlet with Ohio Military Reserve 4th Civil Support and Sustainment Brigade Headquarters; Establish traffic outlet with Franklin County EMA Assessment Center

### **Objective 3: Conduct net operations**

Operate radio communication nets: Operate directed nets; Operate free nets; Establish outlet to Ohio Single Sideband Net; Establish outlet to Buckeye Net; Establish outlet to National Traffic System Digital (NTSD) / Digital Traffic Network (DTN); and Establish outlet to Ohio Digital Emergency Net (OHDEN).

Relay third-party messages on radio circuits: Using voice procedure; Using continuous wave (CW) procedure; Using digital point-to-point narrowband emergency messaging service (NBEMS); Using digital automated traffic relay circuits; Out of the served area; Into the served area.

### **Objective 4: Involve new stations**

Operate radio communication nets: On repeater systems; Operate directed nets; Operate free nets.

Originate third-party messages for relay on radio circuits: On behalf of members of the public

Deliver third-party messages received from radio circuits: By telephone; By email; By written form delivered in person by runner, courier, or postal system.

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## **Objective 5: Distribute net control and liaison duties**

Operate radio communication nets: Establish traffic outlet with Ohio Emergency Operations Center / Joint Dispatch Center; Establish traffic outlet with Ohio Military Reserve 4th Civil Support and Sustainment Brigade Headquarters; Establish traffic outlet with Franklin County EMA Assessment Center; Establish outlet to Ohio Single Sideband Net; Establish outlet to Buckeye Net; Establish outlet to National Traffic System Digital (NTSD) / Digital Traffic Network (DTN); and Establish outlet to Ohio Digital Emergency Net (OHDEN).

## **Scenario Summary**

COTN's operating scenario came straight from the larger exercise BLACK SWAN. Remnants of a Gulf of Mexico hurricane moved north into Ohio (along the lines of Hurricane Opal in 1995). With additional storms coming in from the west at approximately the same time, heavy rainfall led to flash flooding, putting low-lying areas completely underwater. Roads were washed out in some cases and remained underwater for days. High winds further exacerbated the situation, damaging structures. The impact was widespread loss of power and normal means of communication.

## **Analysis of Capabilities**

This section of the report reviews the performance of the exercised capabilities, activities, and tasks. In this section, observations are organized by capability and associated activities. The capabilities linked to the exercise objectives of Simulated Emergency Test (SET) 2019 are listed below, followed by corresponding activities. Each activity is followed by related observations, which include references, analysis, and recommendations.

### **Capability 1: Operate radio communication nets**

A radio net is comprised of two or more stations able to communicate with each other using compatible procedures, radio frequency emissions. COTN's normal operation is for any station wishing to join the net to tune into the amateur radio repeater system in central Ohio operating on the frequency of 146.97 MHz. That system is configured in accordance with procedures to ensure compatibility and to avoid interference, including the

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requirements for transmissions for the repeater to transmit, namely, inclusion of a subaudible tone of 123.0 Hz and transmission on the frequency 146.37 MHz. As documented in its Standard Operating Procedures, COTN has other repeater systems available as secondary and tertiary operating bases, as well as a simplex frequency to use should none of the repeater systems be available.

Operation of an effective net requires that stations on the frequency are able to list the messages that they bring for exchange and to exchange messages with other stations that can provide an outlet for them.

### **Activity 1.1: In Emergency Mode to Meet Needs**

#### Observation 1.1: Strength: Demonstrated ability to complete schedule.

Consistent with a severe weather event with days of warning, BLACK SWAN controllers issued simulated weather information reports. BLACK SWAN players provided additional detail that created realistic situational awareness.

The greatest impact, leading to widespread loss of power, communications, and the need for sheltering took place on Friday, October 4, allowing for the situation to reach a point where auxiliary communications (AUXCOMM) functions would be called up by emergency responders.

In the days leading up to the need for activation, the COTN net manager placed a call for volunteers to complete an emergency mode schedule. The results allowed for midnight sessions on Saturday and Sunday, as well as nearly continuous operation on both Saturday and Sunday from roughly 6 a.m. until 8 p.m., usually also including liaison to Ohio EMA, OHMR, Franklin County EMA, and the rest of the amateur traffic system.

Operation of the net was organized into one-hour sessions, such that the top of each hour was the start of a new session, operating as a directed net with newly-scheduled net control and liaison stations. Once traffic was passed, the net would switch to a free net, where stations that could stay, would—ensuring that any station bringing traffic to pass would be able to do so, while also allowing for stations to communicate with each other directly as needed.

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Stations were flexible in their duty with one another, so the top-of-the-hour schedule was useful guidance but where net control stations needed to complete other duties, the stations addressed the needs cooperatively. One session even had net control passed from one station to another, and back again.

#### Recommendations

Complete COTN SOP manual for alerting of net operation and scheduling operators for emergency mode operations.

### **Activity 1.2: On repeater systems**

#### Observation 1.2: Strength. Effective use of the repeater system.

COTN makes use of three repeater systems from two different organizations. Our primary operating position is the 146.97 MHz repeater, which has a very wide footprint and is able to provide reliable service throughout Franklin County and beyond; modest remote stations are generally able to use the machine in a coverage area that corresponds roughly with Ohio ARES District 7, namely Marion, Union, Delaware, Knox, Licking, Fairfield, Pickaway, Fayette, Madison, and Franklin counties.

The 146.97 repeater is owned and operated by the Central Ohio Radio Club (CORC), which grants us priority use of the machine. Should the "97" machine be unavailable, our secondary operating frequency is the 146.76 machine, also owned and operated by CORC, and we have priority there, secondary only to the Central Ohio Severe Weather Net (COSWN), which coordinates with the National Weather Service SKYWARN program.

A tertiary operating position is on the 147.24 MHz machine owned and operated by the Capital City Repeater Association (CCRA).

During the course of SET, we were able to call nets as expected on the 97 machine and at various points also sent stations to the 76 machine to exchange traffic while the rest of the net continued operation on 97.

#### Recommendations: Make Regular Use of All Identified Repeaters.

Used published backup frequencies for traffic relay to ensure regular use.

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### Activity 1.3: On simplex circuits

Observation 1.3: Area for Improvement. Few stations able to reach many other stations in simplex operation.

As people become more location-independent, we find that many of our operators are using convenient “handie-talkie” (HT) devices that come with low power, compromised antennas, and are often operated in far from ideal locations, surrounded by obstructions.

HT systems generally require that stations are nearby to hear one another, or are connected to unusually capable antenna systems to be effective.

Critical stations such as W8OMR at Ohio EOC and W8OMR at Haubrich Armory were able to hear each other, as well as to relay for other stations.

Some simplex nets were able to operate but are heavily dependent upon relay, where one station that can hear both net control and a remote station will need to repeat transmissions so the remote station and net control will get the messages for each other.

Recommendation: Conduct more simplex nets.

Station masters working entirely through repeater systems can easily not have an accurate picture of station capability. Exclusively low-power stations with weak antenna systems may find that without repeater systems they are completely isolated and unable to participate in any operation. Even minor modifications, such as the erection of external antenna systems, will typically make a significant difference.

Recommendation: Create a coverage map.

Conduct of regular simplex nets will allow stations to understand their own station “footprint,” and coordinated reporting of station footprints can help the net to understand its coverage for simplex operations.

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## Activity 1.4: Operate directed nets

Observation: Strength. Directed nets conducted clearly and consistently

COTN typically operates in the form of a directed net, as is common in amateur radio. In fact, COTN by-law 8 defines the preamble to be used when the net is called using language that requires a directed net.

*This is the Central Ohio Traffic Net, a part of the Ohio Section of the National Traffic System. We meet daily to handle traffic. This is a directed net and net control will control the net...<sup>2</sup>*

No session had any trouble with the directed net operation, either from net control operator, or any other station joining the net.

Recommendation: Continue to operate directed nets.

Directed nets should remain a mainstay of COTN operation.

## Activity 1.5: Operate free nets

Observation: Area for Improvement. Movement from directed net to free net consistently took place but with difficulty

Free nets are unusual in amateur radio and are rarely practiced. COTN has started to use free nets only recently, perhaps for the first time during SET 2018. Compounding matters, the terminology “free net” is sometimes used to indicate that the net has concluded.<sup>3</sup>

In normal operations there is no need to hold a net open once traffic has passed. Routine precedence traffic can wait for the next session on a net that meets once daily or more.

Recommendation: Eliminate Requirement for Directed Net.

At a business meeting of COTN where there is a quorum to conduct business, move to amend by-law 8 to eliminate the phrase “This is a directed net and” in the call-up script.

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<sup>2</sup> <http://www.cotn.us/by-laws>

<sup>3</sup> A “free net,” is a net that is in operation but is not controlled; any station may call any other directly or use the circuit as needed. Net control is still there and is to ensure discipline and that net operations are able to be conducted. A net that concludes is not “free” but “closed” or “secured.”

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Recommendation: Conduct Free Nets.

Practice in use of a free net could be introduced in other exercises conducted throughout the year.

Recommendation: Establish Procedure for Switching Between Directed and Free Net.

Adopt prowords specified in Allied Communications Procedures 125(G) for changing the net operation between directed and free modes, namely:

THIS IS A DIRECTED NET, meaning *From now until further notice this net is directed.*

THIS IS A FREE NET, meaning *From now until further notice this net is not directed.*

### **Activity 1.6: Establish traffic outlet with Ohio Emergency Operations Center / Joint Dispatch Center**

Observation: Strength. VHF circuit to W8SGT accomplished with ease.

No difficulty reaching W8SGT, including on simplex net sessions. The station was on frequency nearly continuously in its operating period. When traffic came for W8SGT outside of its operating schedule, relay stations were able to take the traffic and deliver through prearranged means (internet email).

Recommendation: Continue operations with W8SGT.

Seek and create opportunities to interact with W8SGT, maintaining a valuable high-quality VHF circuit for traffic in and out of the station.

### **Activity 1.7: Establish traffic outlet with Ohio Military Reserve 4th Civil Support and Sustainment Brigade Headquarters**

Observation: Strength. VHF circuit to W8OMR accomplished with ease.

No difficulty reaching W8OMR, including on simplex net sessions. The station was on frequency nearly continuously through the entire exercise.

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Observation: Area for Improvement. Net control recognized but did not press for correct callsign.

New W8OMR operator checked in as W8OHMR. Net control should have identified the improper format (no U.S. amateur callsign appears in 1x4 format) and asked for clarification. (There are special occasions when strange formats can be heard, e.g., 1x1, which is why net control should ask for clarification.) The odd format was noted by net control in session reporting but the matter should be resolved by then.

Recommendation: Continue operations with W8OMR.

Seek and create opportunities to interact with W8OMR, maintaining a valuable high-quality VHF circuit for traffic in and out of the station. Regular interaction will help to ensure that net control stations are familiar with the W8OMR station callsign and function.

### **Activity 1.8: Make effective use of circuits**

Observation: Area for Improvement. Net control could move traffic more efficiently by sending stations to another circuit.

On some nets, net control stations identified and used opportunities to move traffic in parallel circuits but not all did. If station A has traffic going to B and C has traffic going to D, net control may have A pass to B, then C to D on one frequency. The same traffic could move in roughly half the time of net control were to send A and B to another frequency to pass the traffic before returning to frequency, and after A and B were passing traffic, have C and to D on the control frequency.

Recommendation: Move Stations to Other Circuits for Relay.

Traffic is commonly passed on the same circuit as that used for calling and controlling the net. When an opportunity to move traffic presents itself while the control circuit can still be working, send the stations with traffic to move to the secondary, tertiary, or simplex frequency and let them move the traffic while business continues to conduct on the control frequency.

For example, if W1AW is listing traffic for W6RRI and W6RRI joins the net, net control can send both stations to tertiary frequency to pass traffic, then continue the net call-up.

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### **Activity 1.9: Establish traffic outlet with Franklin County EMA Assessment Center**

Observation: Strength. VHF circuit to W8THV accomplished with ease.

No difficulty reaching W8THV during its operating period. The FCACC station operators had a very short operating period. Traffic for the station was handled by liaison.

Observation: Area for Improvement. W8THV station operated very limited schedule.

FCACC volunteer leadership suffered a perfect storm of scheduling conflicts, leaving no officer available for the operating period. No arrangement was made to ensure that the station could be operated in that absence. A leader for the event should have been established. A definition of the W8THV mission should have been made, along with assessment of resources required to achieve it, and a call for volunteers from the organizations represented by FCACC.

Recommendation: Coordinate with FCACC to Provide Net Control operators.

As an umbrella for all amateur radio resources supporting Franklin County Emergency Management & Homeland Security, FCACC depends upon radio services and systems for staffing. As FCACC defines requirements for its nets and radio operators, COTN needs to support the process and ensure that COTN membership is aware of FCACC's needs and standards. COTN should also support its members' efforts to train to the necessary standards.

### **Activity 1.10: Establish outlet to Ohio Single Sideband Net**

Observation: Strength. OSSBN liaison present throughout operation.

COTN maintained connection to the rest of the National Traffic System primarily through OOSBN. Priority and Welfare traffic were able to move with minimal delay. We observed no case where traffic was listed to go from OSSBN to COTN or the reverse where a station was not performing liaison duties.

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Observation: Area for Improvement. OSSBN liaison stations few in number.

There were occasions when during simplex nets, liaison was difficult to maintain. The most active liaison station was based in Caledonia, in Marion County, the extreme north of our coverage area. Having another station able to relay between Franklin or Fairfield county and OSSBN would have improved traffic flow.

During busy sessions having more than one liaison would have allowed traffic to flow more rapidly between COTN and OSSBN.

Recommendation: Train and Encourage Operators in HF Traffic Handling (Phone).

As a net that meets every evening of the year on a high-profile repeater, many new hams come across COTN early in their listening to amateur spectrum. Without hearing about the system of interconnected nets, many do not understand how traffic moves in and out of the area, or the role that they can play in providing those connections. Encourage through regular awareness and training sessions upgrading of licenses, stations, or otherwise addressing obstacles to handling traffic on HF. As phone mode is COTN's procedure, encourage operators to begin with phone mode on HF through Ohio Single Sideband Net (OSSBN).

### **Activity 1.11: Establish outlet to Buckeye Net**

Observation: Area for Improvement. Liaison to BN achieved with difficulty.

Too few CW operators to maintain effective liaison to BN. (See Activity 3.2.) The CW operator we had was able to move traffic to and from BN during SET, and was not overwhelmed by the duty, but the dependence on a single operator leaves this as an area for improvement.

Recommendation: Encourage CW Operators.

While training CW mode operation is beyond the scope of COTN's training objective, encourage interested operators to enroll in such programs as the CWOPs CW Academy.<sup>4</sup> CW operators on COTN should actively encourage and participate in on-air QSOs, and other

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<sup>4</sup> <https://cwops.org/cw-academy/>

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elmering activity to give new CW traffic handlers comfort with operating on the Ohio Slow Net, Buckeye Net, and other CW traffic nets.

### **Activity 1.12: Establish outlet to National Traffic System Digital (NTSD) / Digital Traffic Network (DTN)**

Observation. Area for Improvement. Liaison to NTSD/DTN achieved with difficulty.

While COTN has an unusually large number of NTSD/DTN stations (two) for a VHF net, those stations are not available frequently enough to make them an effective outlet for priority or emergency traffic. Given the tremendous efficiency increase that can be realized through use, automated store and forward systems COTN would enjoy significant improvement in capability if using this outlet in favor of manual nets, where available.

Recommendation: Encourage NTSD/DTN Stations.

The system of automated traffic handling greatly improves system capacity. While NTSD/DTN today specifies the use of PACTOR mode HF modems which can become expensive, there are equipment loan programs that can help interested operators develop the capability over time and acquire the necessary equipment as it becomes available. COTN operators should ensure that operators are aware of the option and how to get themselves and their stations ready to act as digital traffic stations.

### **Activity 1.13: Establish outlet to Ohio Digital Emergency Net (OHDEN)**

Observation: Area for Improvement. Liaison to OHDEN achieved with difficulty.

COTN did not this year specify a liaison schedule with OHDEN due to the scenario used by ARES and the lack of emphasis in movement between ARES nets and the traffic system. Nevertheless we did have a station bring traffic to COTN and rather than pass by voice, wanted another station to go to HF and pick up the traffic via OHDEN.

Ultimately, the model required for getting this traffic was backward: traffic was not brought to the net, but someone joined to ask an operator to leave the net, join another, and receive the traffic. An OHDEN capable station was on air but not prepared to work OHDEN. A second OHDEN capable station was acting as COTN net control in a field-expedient location and unable to handle traffic on another circuit.

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### **Activity 1.14: Establish outlet to independent amateur traffic nets**

Observation: Strength. Liaison to independent amateur traffic nets achieved with ease.

Results here are similar to those for maintaining liaison to other nets, though the lack of specificity in the activity means that all modes count toward the same goal. COTN maintained liaisons with independent nets such as 75 Meter Interstate Sideband Net and Hit and Bounce Net, though these other nets meet only once daily.

### **Activity 1.15: Report session statistics accurately and timely**

Observation: Strength. Most reports received within hours of completed session.

The current system of online reporting was extended this year to include detailed SET reports. This has greatly increased the ease with which reports can be filed, and wildly simplified the reporting effort. The entire SET report was compiled by the net manager and submitted to the ARRL within a week after completion of the operation, by comparison to having a separate statistician spend weeks chasing down session reports and attempting to compile results for submission to ARRL.

Observation: Area for Improvement. Consistent handling of timezones.

COTN session reports are recorded with the time of the net call in cases where the net is called at any time different from the daily 19:15 session. Review of the submitted logs showed several occasions where the same session was reported twice—once with eastern time to indicate the session, and another with coordinated time to indicate the session.

Observation: Area for Improvement. Logging.

Logging of activity by newer net control stations can be difficult, as less common procedures are sometimes unfamiliar, and strange callsigns can make their way into the exercise play. Net control stations being more rigid about challenging unusual callsigns can help to identify where new operators are making errors in callsigns (e.g., too many letters) and to correct them before they make their way into the logs.

Recommendation: Train in Logging

Logging is a critical and often overlooked skill. Include sessions on logging in training.

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## Capability 2: Originate third-party messages for relay on radio circuits

To take the thought or message of one person and format the message for transmission on the traffic system is the process of *origination*. In tactical traffic, people use radios to talk directly to each other, just as with a telephone. Third-party message handling is a written medium, and the goal of a traffic circuit is to have word-for-word and letter-for-letter fidelity, as well as to have the means of accountability for movement and instructions for how to ensure delivery. To achieve this goal, messages must be formatted for transmission—exactly as messages sent by email, the web, or any other circuit must be.

### Activity 2.1: On behalf of served agencies

Observation: Area for improvement. Lack of standardized procedure for handling agency forms

Amateur traffic nets, like any message relay service, require standardized information in the form of a message preamble. As agencies increasingly adopt Incident Command System forms like the ICS-213 General Message form, amateur radio traffic handlers need to develop the skills needed to take a written message and originate the radiogram necessary to include the form.

ARRL has provided no useful direction on methods to do this, and has only since 2015 included a count of ICS-213 traffic on its traffic net statistics form for SET, the Form B. Attempts to fill the void, such as the Radio Relay International "ICS-213 compliant radiogram" have not helped, and have been ultimately unhelpful, presenting a form that looks like neither the familiar amateur radiogram nor the ICS-213. Worse, that form is actually not compliant with the ICS-213 because it loses the numbers of the fields of the form.

Observation: Strength. Operators adapted to address procedure shortcomings.

Nevertheless, several operators at served agencies including both county EMAs and the Ohio Adjutant General's Office, injected ICS-213 messages by encapsulating them in the

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text of a message, using OP NOTE instructions for delivering station to present the traffic as an ICS-213.

### **Activity 2.2: On behalf of members of the public**

Strength: Simulated shelter messages were effectively originated

Precedence correctly listed as TEST W. Good use of ARL numbered radiograms.

### **Capability 3: Relay third-party messages on radio circuits**

To be neither the originator (operator formatting a message for transmission) nor the deliverer (operator converting a message formatted for transmission into something that the recipient expects) is to *relay* the message, receiving a formatted message from a station closer to the sender and transmitting that message to a station closer to the addressee.

Recommendation: Encourage Non-Voice Modes.

Several observations related to this capability show a need to develop non-voice relay modes. Force strength and system capability rapidly degrade when voice modes are unavailable.

Starting with scheduled additional training nets specifically for that purpose will allow for interested operators to train themselves and develop stations that will meet those requirements.

Recommendation: Encourage Liaison Stations.

In addition to the need for HF operators (see Activities 1.10–1.14), liaisons are needed even within VHF, e.g., for agency stations like W8THV, W8SGT, and W8OMR. We have agency stations as part of the COTN roster, but coordination with those agencies should ensure that we have regular checkins to COTN sessions from representatives of each of those stations.

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### **Activity 3.1: Using voice procedure**

Observation: Strength. Voice procedure on the net was generally correct.

Even among new operators, voice procedure was correct, and mistakes were minor. Corrections were offered to improve operating procedure, consistent with COTN's mission to train traffic handlers, but were done when timing allowed, and with encouragement to continue to improve. All operators appeared to appreciate the corrections and incorporated the changes.

### **Activity 3.2: Using continuous wave procedure**

Observation: Area for Improvement. Too few CW operators.

During SET 2019, we had only one operator capable of CW operation. We therefore had no option for conducting operations in CW and were limited in our liaison capabilities. (See Activity 1.11.)

### **Activity 3.3: Using digital point-to-point narrowband emergency messaging service (NBEMS)**

Observation: Area for Improvement. Too few digital operators.

Unlike several previous years we did not include specific requirements for use of NBEMS. We did, however, have particular stations known to be NBEMS capable. High volume circuits could be established allowing for digital transmission of traffic.

Generally this is desirable capability and needs to be tested but isn't an area we've maintained throughout the year. (See Activity 1.13.)

### **Activity 3.4: Using digital automated traffic relay circuits**

Observation: Area for Improvement. Too few digital operators.

This is NTSD/DTN. It can also include Winklink 2000 Global Radio Email for point to point routes.

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### **Activity 3.5: Out of the served area**

Observation: Area for Improvement. Too few liaison operators.

As noted in the commentary on liaisons, we did achieve the objectives but with difficulty due to a limited number of operators.

### **Activity 3.6: Into the served area**

Observation: Area for Improvement. Too few liaison operators.

As noted in the commentary on liaisons, we did achieve the objectives but with difficulty due to a limited number of operators.

## **Capability 4: Deliver third-party messages received from radio circuits**

Taking a formatted message from a transmission circuit and presenting it to the addressee is the process of *delivery*. That can mean a phone call where the message is orally reported, delivery by email, delivery in written form by presentation at a message board, or presentation of a written message delivered in person or by a courier or on-site runner. Delivery may also include taking the message and putting it into a standardized form, such as the ICS-213 General Message form, such that it will match the written message at the point of origination.

### **Activity 4.1: By telephone**

Observation: Strength. Telephone delivery was understandable and prompt.

Much of the exercise traffic was injected such that it would come back to exercise controllers and evaluators. Even in cases where voicemail messages were left, the messages were clear about who was calling for whom and why, making it easy to respond and to collect traffic by phone or to get responses back through the traffic system as need.

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### **Activity 4.2: By email**

Observation: Strength. Email delivery was understandable and prompt.

As was the case for delivery by phone, email delivery was clear and prompt.

### **Activity 4.3: By written form delivered in person by runner, courier, or postal system**

Observation: Strength. Limited data show understandable and prompt delivery.

At OHMR station W8OMR, evaluators observed radiogram forms used for origination and delivery of traffic. Sections of the form used for accountability, as well as the usual preamble, text, and signature were used. Our only caution from drawing too much from this observation is that limited delivery with this mode does not accurately measure the ability to perform this task at scale.

Recommendation: Ensure that message delivery is exercised at agencies such as FCEM&HS.

CERT and other exercises will present opportunities to deliver messages by runner, and allow for evaluation of performance.

## **Conclusion**

SET 2019 was a success for COTN. Over the course of the SET weekend, COTN held 28 sessions for a total of 25 hours and 55 minutes of runtime, with 186 check-in, and 122 messages relayed. This represents a level of activity rarely seen since radiograms were used as an inexpensive alternative to long-distance (toll) telephone calls, putting the October 2019 activity at a level seen only twice in the previous ten years.

The exercise nevertheless indicated several areas of weakness and help to establish priorities for the Calendar Year 2020 training schedule.