Chapter 6
Radio Communications

5 hours

Shannon McCuin, RPL

University of Arkansas Police Department

Revised: February 2018

Arkansas Basic Telecommunicator Course

References:

APCO Institute Public Safety Telecommunicator 1, Seventh Edition, 2016

National Emergency Number Association

Training Aids:

Prezi Presentation
Computer

Coordination/Personnel:

Elizabeth Jones, ALETA Instructor
Gary "Bud" Gray, North Little Rock Emergency Services
Steve Harrison, Central EMS
Carla Holcroft, Washington County Sheriff's Office
Amy Barnette, White County 911 Center
Nancy VanWinkle, White County 911 Center

Instructional Unit Summary:

Chapter 6 Radio Communications

Lesson Purpose:

The Telecommunicator should possess an understanding of the rules, regulations, abilities, and limitations of the local radio system and how this can affect response.

Instructional Objectives:

At the conclusion of this block, the student will be able to:

1. Demonstrate the four (4) Benefits of a Radio.
2. List three (3) Types of Radio Systems.
3. Demonstrate a working knowledge of How Radio Systems Work.
4. Demonstrate the knowledge of Arkansas Wireless Information Network (AWIN).
5. Demonstrate a working knowledge of FCC Rules.
6. Demonstrate the five (5) Steps to transmitting on a radio system.
7. Demonstrate the knowledge of Radio Etiquette.
8. Demonstrate the knowledge of Call Up Methods.
9. Identify the four (4) General Radio Practices.
10. List the five (5) Basic Radio Duties of a Telecommunicator.
11. Explain how to Assign Unit(s) to Calls.
12. Demonstrate General Broadcast Guidelines.
13. Demonstrate the knowledge of BOLO's, Alerts and General Information Messages.
14. Describe the six (6) Proper Unit Safety Recommendations.

I. INTRODUCTION

It is important for the student to understand the radio system and how a radio functions because this is the lifeline between the Telecommunicator and the responder. They have to use it daily, it will make their job easier and it may help them save a life. The radio system is the vital link between the Telecommunicator and the responders. Understanding the components of the radio system and how it works will assist the Telecommunicators with day to day operations.

II. BODY

A. Demonstrate the four (4) Benefits of a Radio.

1. A radio is a means of transmitting communications or information without any physical connections between the sender and the receiver.

2. Because there are no physical connections, it is a valuable and quick way to communicate.

3. Knowing how a radio works will increase job performance.

4. The radio is a responder's lifeline.

B. Demonstrate a working knowledge of Radio Technology.

1. List three (3) Types of Radio Systems

a. A Simplex System is basically a radio transmitting to another radio directly without going through a repeater.

b. A Duplex System typically uses one frequency to transmit and a different frequency to receive, but always uses the same frequency to transmit and receive.

C.   A Trunking System is similar to a duplex system, but it uses different frequencies to transmit and receive broadcasts instead of using the same frequency each time. For example, if the tower site has three transmit and receive frequencies, the controller at the tower will search for an open frequency to transmit or receive without the user having to select the frequencies.

2.   Demonstrate knowledge of how radio systems work

a.   "Radio communications work using electromagnetic waves. The difference between these types of waves is their frequency and their wavelength. The frequency of the wave is its rate of oscillation. One oscillation cycle per second is called on hertz (Hz)" (U.S. Department of Homeland Security, 2008).

b.   Radio Spectrum - Radio spectrum is the range of radio frequencies used, for example, 30MHz to 800 MHz.

c.   Bands - Portions of the spectrum are called bands.

d.   Channel Bandwidth - "Channel bandwidth is the amount of radio spectrum used by the signal transmitted by a radio" (U.S. Department of Homeland Security, 2008). Prior to narrow banding, usually channel bandwidth were 25 KHz. Now, due to the FCC mandating narrow banding, the channel bandwidths have decreased to 12.5 KHz to allow for the creation for more available channels.

e.   Radio Wave Broadcast - In past when agencies were using lower VHF frequencies, the radio

wavelength propagation would travel further because of the longer wavelength it transmitted. When agencies began to transition to UHF frequencies, the wavelength broadcasted was shorter (narrower) so repeaters had to be used to carry the wavelength signal farther.

1. When the FCC required agencies to go to narrowband (12.5 KHz), it shortened the wavelength even further, requiring even more installation of repeaters so the wavelength could reach the area needing to be covered.

f. Common Malfunctions - VHF systems, because of their longer wavelength, reach more low spots in valleys or hills. Interference can occur with lower frequencies because the wavelength is longer (wider), so it is hard to penetrate through manmade interferences such as, buildings. UHF and 800 MHz systems have a shorter (narrower) wavelength, so they are able to penetrate through some buildings because the wavelength will bounce off the walls, but the absorption rate is higher which could reduce the reliability of coverage.

Radio waves can travel through some substances but the strength will decrease as the signal travels through the substance. Since agencies had to meet FCC regulations for narrow banding, this shortened the radio wavelength, so the propagation of the radio signal will have a harder time reaching the bottom of valleys, traveling over hills, or penetrating buildings.

C. Demonstrate the Knowledge of Arkansas Wireless Information Network (AWIN).

1. The Arkansas Wireless Information Network (AWIN) is the statewide 800 MHz radio system that is available to all government and emergency services in the state.

2. The primary intended use is statewide communication interoperability between all agencies that may respond to natural disasters, mass causality incidents, and mutual-aid requests from other jurisdiction.

3. Some counties or departments use the system for daily operations and others use it for events (large or small, planned or unplanned).

4. Some counties have placed AWIN radios in the PSAPs while others place them with key administrative personnel for "command and control".

5. The system is monitored 24/7 at the Arkansas Department of Emergency Management.

6. The system is also used by the Arkansas Trauma System.

    i. An AWIN radio has been placed in every licensed ambulance in the state.

    ii. The primary use for this system is to give ambulances transporting patients with traumatic injuries a central contact point that monitors the availability of appropriate hospitals and trauma centers.

    iii. This system is monitored by the Trauma Communications Center (Trauma Com) which is in radios may be used on the local AWIN talk-path if needed in an emergency, providing

additional communications resources in the community.

D. FCC Rules

1. Rules for Operation

    a. It is unlawful to transmit superfluous signals, messages or communications of any kind.

    b. It is unlawful to broadcast false calls or fraudulent distress signals.

    c. It is unlawful to broadcast obscene, indecent or profane language.

    d. It is unlawful to cause malicious interference with any other radio communications.

    e. It is unlawful to broadcast unnecessary or unidentified transmissions.

    f. It is unlawful to willfully damage or permit damage to radio apparatus.

    g. It is unlawful to intercept and use or publish the content of any radio message without the express permission of the proper authorities.

    h. The FCC specifically prohibits transmission of unauthorized call letters.

    i. Telecommunicators are required to monitor a frequency on which they intend to transmit prior to transmission, to ensure their transmission will not cause harmful

interference to others who may be using the frequency.

E.   Radio Communication Techniques

1.   Demonstrate the five (5) Steps to transmitting on a radio system.

      a.   A message begins by depressing the talk button.

      b.   To transmit a message, the Telecommunicator will depress the push to talk button (PTT) for 1-2 seconds before beginning their broadcast.

      c.   The broadcast is sent to an amplifier, which increases the signal strength to the transmitter.

      d.   The transmitter sends it to the antenna using the correct frequency.

      e.   The antenna is used to send out the broadcast.

      f.   Some radio transmissions are then sent to a repeater, which boosts the signal and rebroadcasts the original transmission to the receiving radios or stations.

F.   Describe the knowledge of Radio Etiquette

1.   Telecommunicators are required to monitor a frequency on which they intend to transmit prior to transmission, to ensure their transmission will not cause any interference to others who may be using the frequency.

2.   It should be remembered other departments, news media, and the general public are monitoring broadcasts. If the operation of the radio system sounds efficient, it is likely the listeners' impression

will be that the Communications Center operates efficiently.

3.   Emotion tends to distort the voice and render it difficult to copy.   Do not use words or voice inflections that reflect or indicate irritation, disgust or sarcasm. Keep relations cordial at all times.

   a.   To keep maximum possible airtime available, think before transmitting your message. Know what you want to say. Speak distinctly. Be brief.

4.   Disseminate Accurate Information

   a.   The Telecommunicator will broadcast concise and accurate information to the field units during every radio transmission.

      i.   Broadcast the facts. Do not form conclusions or offer personal opinions with any information being broadcast.

      ii.   Read the information in the call for service before dispatching.

5.   It is extremely important to be able to understand and answer a unit(s) the first time he or she calls in on the radio. That may be the only opportunity they have to talk, depending on the situation. Do not advise a unit(s) to "go ahead" if you are not prepared to copy.

6.   It is a Telecommunicator's duty to actively listen and respond to the frequency they are responsible for operating in a timely manner.

7.   If the broadcast information is sensitive in nature and the agency has a secure or coded channel, the Telecommunicator should use that channel to broadcast the information to the unit.

H.   Call Up Methods.

   1.   Initiating radio traffic begins with a call up method. A call up method is the procedure for informing someone that radio traffic is about to be broadcast. Call up methods may differ from agency to agency but your agency's Telecommunicators should be consistent and use one method.

      a.   Call-up Method 1 calls for stating the call sign of the station or unit being followed by the call sign of the station calling.

         ✓ Example: "Adam 12 from Communications or Adam 12 this is Communications."
         ✓
      b.   Call-up Method 2 calls for stating the call sign of the station calling followed by the call sign of the station or unit being called.

         ✓ Example: "Communications, Adam 12 or Communications to Adam 12."

      c.   If the call requires a multi-unit response contact the units together.

         ✓ Example: "Communications (to) Adam 12 and Adam 16."

         ✓ Make sure both units being assigned to the call acknowledge the assignment and broadcast.

   2.   Before proceeding with the assignment, wait for acknowledgment from the unit.

a. Never assume that field personnel have heard the transmission. As a rule, if the unit does not acknowledge, the radio traffic was not heard.

b. "Clicking" of the microphone should never be considered an acknowledgment.

I. Identify the four (4) General Radio Practices.

1. The radio shall have first priority over all other duties. Telecommunicator involved in a telephone conversation shall request the calling party to hold on or standby while the radio call is answered, unless the telephone conversation is in regard to emergency traffic.

2. No monitor or receiver is to be turned off, or turned down so low as not to be audible.

3. Each Telecommunicator is responsible for checking volume levels when taking over a station.

4. Telecommunicator should not leave the dispatch center at the end of the shift until properly relieved by the on-coming Telecommunicator. The on-coming Telecommunicatorshould be briefed on events that could be of importance to their shift.

J. List the five (5) Basic Radio Duties of a Telecommunicator.

1. Maintain Field Unit Status

a. The Telecommunicator will accurately control availability of field units by maintaining an accurate record of status of individual field units at all times.

b. Status checks should be performed on a regular basis to ensure the location and condition of each unit.

2. Assign Priority

   a. The Telecommunicator has the responsibility for determining the priority assigned to each call for service and for dispatching the appropriate number of field units needed.

      i. Some dispatch centers have CAD systems that accomplish that task. You are encouraged to obtain knowledge of your department's policies and procedures.

3. Dispatch Field Units

   a. Calls should be dispatched over the radio system. Although some departments allow silent dispatching (dispatching via computer terminals), you should follow your department's policies and procedures.

4. Coordinate Response to Emergencies

   a. The Telecommunicator will assist in the coordination of multiple unit responses during emergencies such as vehicle pursuits, foot pursuits, various crimes in progress, weather events, chemical spills, and mass casualty incidents, etc.

5. Maintain Accurate Records

   a. The Telecommunicator will accurately record all pertinent and required information on the appropriate forms and/or logs. This includes accurate times on calls for service.

      b.   Telecommunicators may check other resources to gain additional information about the incident/persons involved. (ACIC criminal histories or utility information for a specific address).

K.   Explain how to Assign Unit(s) to Calls.

    1.   Calls should be dispatched in a timely fashion. High priority calls or emergency calls should be dispatched before low priority calls or non-emergency calls.

    2.   Multiple Calls For Service In Same Area

      a.   Assign the highest priority call to the unit responsible for that particular area.

      b.   Assign subsequent calls to the next nearest and available unit.

      c.   Do not assign more than one call at a time to a given unit.

        (1).   If you have assigned a unit to a non-emergency call and then receive an emergency call for service, you may advise the unit to cancel on the non-emergency call and reassign them to the emergency call.

      d.   It is suggested to advise a supervisor on calls holding and log that information or directives in that call for service.

    3.   Emergency Calls

      a.   Dispatch emergency calls for service immediately.

(1). Once a unit is on the scene of an assigned call, it is suggested not to pull the unit off the call unless it is necessary to assign them to an emergency call.

L.   Broadcasting Unit Assignments.

    1.   Broadcasting Unit Assignments

       a.   Emergency and non-emergency calls for service should be aired in the same format. When dispatching a call, first advise the:

         (1).   Address of Call (Area of call (the road name/ community it is close to, etc.)

         (2).   Type of call

         (3).   BREAK

         (4).   Pertinent information (e.g. who, what, when, where, why, how, weapons involved, if code-2, vehicle description, direction of travel, house description)

         (5).   Complete directions only when requested by unit(s)

    2.   Broadcasting Drivers License Returns

       a.   Drivers License Returns should be broadcast in the following manner:

         (1).   Name
         (2).   Street name (if in Washington County)
         (3).   City
         (4).   Class
         (5).   Status, Endorsements, Restrictions

(6). Traffic (this will be Yes or No unless history is specifically requested by the unit(s))

(7). FBI or SID numbers

(8). No NCIC wants/warrants or there are wants/warrants.

3. Broadcasting Vehicle License Returns

a. Vehicle License Returns should be broadcast in the following manner:

(1). Vehicle year
(2). Vehicle make
(3). Vehicle model
(4). Vehicle color
(5). Expiration date
(6). Registered owner
(7). City and street name
(8). NCIC wants/warrants or there are wants/warrants.

4. Broadcasting Vehicle Descriptions

a. The same sequence should be used each and every time for the sake of uniformity. The sequence to be used is **CYMBALS,** which is an acronym for **C**olor, **Y**ear, **M**ake, **B**ody Style, **A**dditional information, **L**icense number and License **S**tate.

(1). Color

(a). Use only primary colors such as red, yellow, green, or blue. "Light" or "dark" are acceptable.

(b). If the vehicle has two colors always give colors from top to bottom, or give primary color first and then secondary color.

(2). Year

(a). Give full year. 1991 - not "91".

(3). Make

(a). Give full information such as Chevrolet - not "Chevy".

(4). Body style

(a). Two-door, four-door, convertible, pick-up truck, etc.

(5). Additional information

(a). Other identifying markings, body damage, bumper stickers, etc.

(6). License number

(a). If there are letters in the license number, always spell them phonetically.

(7). State

(a). The state the license plate is from.

5. Broadcasting Descriptions of Persons

a. When giving out the physical description of a person, it should be done in the same sequential order each and every time:

(1). Race and sex.
(2). Age (or approximate age if unknown).
(3). Height and weight.
(4). Hair color and style
(5). Facial hair
(6). Complexion.
(5). Other identifiable features.

(a). Glasses
(b). Tattoos
(c). Scars, amputations
(d). Other easily visible identifiers

b. When giving the person's clothing description, always start at the top and work down:

(1). Hat or cap
(2). Jacket or coat
(3). Shirt
(4). Pants
(5). Shoes and socks

M. Broadcasting "BOLO" or General Information Messages

1. Alert Tones are used to notify response units or stations that a message is going to be broadcast, requires their immediate attention and is of above-average importance. Alert tones can be generated in different ways and used for different types of important transmissions.

2. When broadcasting information messages, give the units an opportunity to prepare to receive data before you begin the broadcast. **Always** proofread the BOLO before broadcasting.

a.   Always preface the broadcast with "Dispatch to all units and listening stations stand by for _____out of (state the agency name)", or a similar announcement depending on the nature of the information being given.

b.   A short pause should follow the preface, and then the message may be broadcast.

  ✓ If the message is lengthy, add "breaks" in the broadcast. Do not broadcast it in one radio transmission.

c.   All pertinent bolo's are to be broadcast as soon as they are received, or as close to that time as emergency calls and radio traffic allows.

N.   Describe the six (6) Proper Unit Safety Recommendations.

1.   Telecommunicators have the responsibility of assisting the field unit(s) in completing each call as safely as possible.

2.   Field unit(s) depends on the Telecommunicator to obtain all possible information on any given situation and to broadcast that information quickly and accurately to allow them to respond as safely as circumstances allow.

3.   It is absolutely necessary that **all** pertinent information be given to the field unit(s) when calls are assigned, such as suspect and vehicle descriptions, information regarding weapons, violent persons, hazardous materials, patient information, etc.

4.   Although criminal history information is not to be broadcast under normal circumstances, it can be

broadcast if the history contains any information, which may affect the safety of the field unit(s).

- ✓ Any sex offender information may be broadcast so that the unit(s) may check the welfare of anyone with the subject(s).

5. The Telecommunicator can assist in calming an excited field unit(s) during a crisis situation by maintaining a steady, calm and confident voice.

6. There may be a time an unit(s) is on a high priority call or has an emergency and the radio channel needs to be secured.

   a. Securing or directing a channel means that all non-emergency radio traffic is held and only unit(s) dealing with the high priority call or who have an emergency continue to transmit on that channel. This allows top priority to be given and frees up air time for the unit(s).

III. CONCLUSION

During this block of instruction we have discussed the benefits, components and types of radios. We reviewed the five basic radio transmission procedures and three types of radio systems as well as AWIN. We discussed general radio practices, radio duties of a Telecommunicator and radio etiquette. We explained call up procedures, how to assign units to calls and described the proper unit safety recommendations. We also discussed BOLO's, alerts and general information message. After this block of instruction we should be able to effectively work a radio system, dispatch appropriately and maintain accurate unit status.