# APX RADIO TRAINING MANUAL

The Aviation Department uses the Motorola APX 6000 XE radio for their two-way radio communications. The City of Phoenix is a member of the Regional Wireless Cooperative, RWC, along with other regional government entities. As such, the Department is able to leverage the functionality of a radio network that provides coverage to our entire airport system and maintain interoperability with first responders in the valley. For you techies, this network is a 700 megahertz, TDMA, P25 trunking system. The APX radio used by the Department is not intrinsically safe and must not be used in a potentially explosive environment. This includes within 25 feet of any fuel spill.

Your radio has many features that will help in your daily job duties and prove invaluable in an Incident Management situation. All of the channels used by the Department are encrypted, with the exception of the Sky Harbor channel. We use encryption to protect any potential Security Sensitive Information, or SSI, that might be transmitted over the radio from being monitored by folks who might use this information for undesirable actions. However, all radio transmissions are recorded and subject to public information requests. Keep this in mind as you use the radio in your daily work.

The APX radio has been programmed in a manner that will allow easy use, while including features that provide enhanced communications. You will discover that most settings on the radio have a voice announcement associated with the action to help inform you of the radios status. The following describes the functions of the various buttons and knobs on the radio:

## RADIO FEATURES

**On / Off / Volume** control knob - located on the top outside of the radio. When the radio is turned on it will announce "Aviation" and tell you which Zone or Deck and Channel is selected. Please note that for our purposes, Zone and Deck refer to the same thing.

**Zone Selector Switch** - located on the top of the radio and is labeled A / B / C. Moving this switch will allow you to select among the three Decks commonly used by the Department; A, B, and J.

**Channel Selector** knob - located in the top center of the radio. There are 16 channels to each Zone. Your supervisor will let you know which Zone and Channel you should monitor.

**Emergency Duress** button – is the large Orange button on the top of the radio is the. Holding this button down for 1 second will put the radio in Emergency mode, sending an alarm to the Sky Harbor Communications Center. Holding this button down for 2 seconds will cancel the duress call. We will talk about this in more detail in a minute.

**Keypad Lock** switch - located on the top of the radio, at the base of the Channel Selector knob. When the switch is in the O position, the keypad is NOT locked. When the switch is in the O with a slash position, the keypad is locked and pressing any button other than the Push-to-Talk and Emergency Duress button will cause a tone to be heard from the radio, indicating the keypad is locked. The displays will also flash a message that the keypad is locked.

**Top Display** - will show you signal strength, battery status, and the channel you currently

have selected.

**Push-to-Talk**, or PTT, button is the large button located on the side of the radio. Press this button when you wish to make a radio call.

**Scan Enable / Disable** button – is just above the PTT button.

**Scan Nuisance Delete** button – is just below the PTT button, with a single dot. We will talk about scanning in a minute.

**Zone Up** button – is the bottom button on this side of the radio, with two dots, is the. Pressing this button will change the current Zone that the radio is set to, independent of the Zone selector switch on the top of the radio.

**Accessory Connector** port – located on the side of the radio opposite the PTT button. When your radio is issued to you, this port should have a cover on it. **The cover should always be in place unless you have an accessory attached to your radio.**

In normal operation, your radio should be in the black plastic sleeve or holster. This holster will protect the radio and provides a belt clip for easy carrying of the radio on your belt. You will notice that when the radio is clipped to your belt, you can read the top display and reach the control knobs with ease.

When the radio is removed from the holster, you have access to the front display and additional keys.

The display is large and full color. However, most of the time, the information display here will be in gray scale. You will notice that some of the information displayed here is also duplicated on the top display, but with fewer details.

Just below the display are three buttons, with one, two, and three dots. These buttons are the menu select buttons and there function is defined by the text displayed above them. We will go into more detail about the various menu options in a minute.

Just below the Menu Select buttons is another set of buttons. The button with the house on it is the Home button. If you are in a submenu, pressing this button will return you to the main display.

Next to the Home button is a four way toggle pad with arrows on it. Pressing this button allows you to move through the menus in the direction indicated.

The button with the computer on it has not function.

The bottom half of this side of the radio contains a full numeric keypad. Numbers 1 to 8 can be programmed by you for easy selection of your most used / frequently access channels. We will describe this feature in more detail in a minute.

The battery attaches to the radio from the bottom. To remove the battery, simply press the serrated tabs on either side of the radio and pull down. To inset a battery, properly align the

battery and firmly press it into place. You will hear two clicks when the battery is properly seated in the radio.

Lastly, there is a microphone located on both sides of the radio. Therefore, there is no wrong side of the radio from which you can talk.

## RADIO FUNCTIONS

The two microphones provide the APX radio with superior noise cancelling technology. While this will allow clear communications in a high noise environment, it requires that you use the radio in a specific manner at all times. When making a radio call, you must hold the radio 1 to 2 inches in front of your mouth, in a vertical position. Press the Push-to- Talk button, wait for the ready tone, and then speak slow and clearly. You do not need to yell in a high noise environment for the radio to pick up your voice. However, if you fail to follow these instructions, the technology in the radio will associate you voice with the background noise and you will transmit dead air.

Now let us take a look at the Emergency Duress button. Should you find yourself in a situation where you need assistance for any reason and you are not able to actually speak into the radio, PRESS THE BUTTON. The Communications Center will attempt to contact you. When you do not respond, they will initiate a search for you. I say initiate a search for you because there is no way for them to know your exact location. This is important to remember. While the radios do have GPS units built into them, the regional radio system we use does not have the ability to receive this information. Therefore, the GPS unit in the radio is disabled. However, it is quite common for users to press this button by accident. Should you do this, do not attempt to turn off the radio. Listen to the radio for the Communications Center to call you. When they call, simply reply to this call indicating you are OK and that you accidently pressed the button. After talking with the Communications Center, clear the duress alarm by pressing the Emergency Duress button for 2 seconds. You will see the radio will return to its normal operation.

The Department has programmed 6 essential Decks into the radio. Let us take a quick look at these Decks. A Deck primarily contains channels used by Operations. B Deck has channels for Facilities and Services, Technology, and DCS. The J Deck, accessed by moving the Zone selector switch at the top of the radio to the letter C, contains channels used for incident management and off airport first responders, should their assistance be needed. Most radios used on the RWC system have the J Deck programmed in them. The K Deck, has extra channels should we have a need for them. The G Deck has a group of channels that allow our radios to join in conversations that might be part of a larger regional activity. The M Deck has channels used by other departments in the city. Many of the Channels in the M are not monitored. You should never access the K, G, or M Deck without specific instructions from your supervisor. Your supervisor will also inform you on which Deck and Channel your workgroup uses for your day to day functions.

Radios programmed during the radio upgrade project will also have two additional Zones, old A Deck and old B Deck. These will be used for only a short period of time and will eventually be removed during the radio's regular preventative maintenance cycle.

There are three ways to access the various Zones or Deck programmed in the radio.

The most convenient method to change Zones is to use the Zone Selector switch at the top of the radio.
Alternatively, you can use the two dot, Zone Up button, located below the Push-to-Talk button on the side of the radio.
Or you can use the ZnUp and ZnDn menu select buttons on the keypad.

You can only access K, G, and M Deck using the last two methods.

Regardless of the method you use, the radio will announce the name of the Zone and Channel you have selected.

Now let us take a look at scanning. The most important thing to remember about scanning is that if your radio is set to channel B2, and your scan list includes channel A11. When a radio call comes in on A11, you will miss a radio call on B2 should it come in while A11 is still in use. In short, it is very easy for you to miss a radio call when scanning. Therefore, it is recommended that you talk to your supervisor before enabling scanning on your radio.

Scanning does permit you to monitor activity on other channels that might impact your daily work responsibilities, allowing you to be more proactive. You can select the channels you would like to scan by editing the scan list. To do this, access the front panel of the radio. Press the button under the ScnL (scan list) menu option. Alternatively, you can enter scan programming mode with a two second press of the Scan Enable / Disable button on the side of the radio. This will bring up a list of all the channels programmed in the radio. You can now maneuver through the list of channels using several different methods.
You can use the up and down arrow buttons to move through the entire channel and zone list.
You can use the left and right arrow buttons to move through the zone list.
You can use the Zone switch and Channel knob to move through the zones and channels.
When a channel that is in the scan list is highlighted, a Z symbol appears at the top of the front display.
- To add a channel to your scan list, first highlight the channel you would like to add to your list using one of the methods just mentioned. Then press the Sel menu button. You should now see the Z at the top of the screen.
- To remove a channel from your scan list, first get to the channel using one of the methods just mentioned, it will be highlighted on the display. Then press the Del menu button. You should not see the Z at the top of the screen.
- To review the channels that are in your scan list, press the Rcl menu button.
Once you are done editing your scan list, press the Home button to return the radio to its normal operation.

To enable scanning, press the Scan Enable / Disable button located on the side of the radio, above the PTT button. You will hear an audible announces indicating that scanning has been turned off or on. When scanning is enabled, a Z will appear in the top and front displays. While you are in scan mode, if a scanned channel has excessive radio traffic that is not of interest to you, you can press the Scan Nuisance Delete button on the side of the radio, just below the PTT button, to temporarily remove that channel from your scan list. To add the channel back to your scan list, turn scan off then on or power cycle your radio.

The buttons on the numeric keypad can be programmed to jump to a Zone and Channel. To program one of these buttons, use the selector knobs on the top of the radio to find the

Channel you would like to have quick access to. Now press and hold a numeric key until you hear a beep. To access your programmed Channel, just do a quick press of the key you have programmed and the radio will switch to that Zone and Channel. Think of this feature like programming presets on your car radio. Keep in mind that this feature overrides the Zone and Channel knobs at the top of the radio. By default, the number 1 button is programmed to A1 Sky Harbor.

While we are talking about using the keypad, let us look at the other menu options. If you press either the left or right arrow buttons on the keypad, you will notice that the menu options at the bottom of the front display change.

If you press the menu select button under Batt, your battery status will display on the screen.

Pressing the page menu select button will access a feature that will allow you to send an alert to another radio. To do this, you must know the RWC Radio ID of the radio you wish to alert and you must be on the same channel as that radio. This is a nice feature if you are attempting to communicate to a coworker who is not answering your radio call or is in an environment where they may not hear the radio. Access the Page menu option brings up a screen that will list the Radio ID of the radio which last transmitted on the channel you are monitoring. Pressing the down arrow will show your Radio ID.  To send a Page alert to a radio, with the Last Number highlighted, press the PTT button. If you would like to send an alert to a radio which is not the radio listed, just use the numeric keypad to enter in the Radio ID of the radio you are attempting to alert then press the PTT. To return the radio to its normal operation, press the Home button.

The final menu option has to do with encryption. Before we talk about using this button, let us first discuss encryption. The only Channel that is not encrypted, of the main channels that we use, is Sky Harbor, located in the Channel 1 position of the A, B, J, and K Decks. Should the encryption key in your radio fail for some reason, you can always move your Channel selector knob to Channel 1 and be able to talk to the Communications Center. Of course, should your radio fail in any way, you need to notify your supervisor and bring your radio to the radio shop as soon as possible. From time to time, the RWC will need to update the encryption key; which is a software program in your radio. Before a key is updated, a notification will be sent to all Department staff with instructions on when and how to update the encryption key. However, should your radio stop working on an encrypted channel it could be due to a missed encryption key update. You can make sure your radio has the latest key by selecting the Reky menu option. After selecting this option, press the PTT button. Your radio will now enter a data update mode. Once the update is received, your radio will beep and go back to normal operation. Do not interrupt the power to the radio during this update cycle.

## RADIO ACCESSORIES

Your Motorola APX 6000 XE radio has several accessories that the department keeps in stock and you might find helpful in your job functions.

These accessories allow for remote listening and transmitting of the radio, without you having to remove the radio from its carrying position. Your supervisor may require you use a specific accessory for your job function. All the accessories are expensive and should only be requested if they are going to be used.

The first accessory we will look at is the listen only ear piece. This ear piece attaches to the accessory port on the side of the radio and has a long cord that leads up to a small speaker you clip to your collar. Leading from this speaker is an audio tube that goes in your ear canal. Think Secret Service ear piece. This is very useful in noisy environments or locations where you do not want radio traffic to be a nuisance to the public. The ear canal part of the accessory should not be shared between employees. Therefore, this is not a good option if you share your radio with other team members or shifts.

The next accessory is the remote speaker microphone, or RSM. The RSM attaches to the accessory port of your radio and has a long heavy cord with a speaker / microphone combination attached to the other end. Think police officer with a speaker on his epaulettes. The RSM has several nice features, including placing the speaker near your ear, without having something in your ear. It also has a PTT button on the side. When using this PPT button, you can speak into the RSM. However, should you press the PTT on the radio; you will need to speak into the radio microphone. The RSM also has an emergency alert button that functions the same as the orange button on your radio. You will also notice a toggle switch that can raise or lower the volume of the RSM speaker. The last feature on the RSM is a 3.5 millimeter port that will accept a listen only ear piece. This ear piece functions the same as the previously mentioned listen only ear piece, except it has a much shorter cord.

The final accessory we stock is similar with to first listen only ear piece, but it also has a remote microphone with at PTT switch. This accessory is called a two wire covert speaker microphone. Both the ear piece and microphone are on long cords. So you can clip the microphone someplace convenient on your clothing, clip the speaker on your collar, and have to basic functionality of the RSM without the weight of the larger unit.

## RADIO ETIQUETTE

We have talked about the functions and features of the Motorola APX 6000 XE radio, as used by the Aviation Department. Now let us discuss radio etiquette, how you should use your radio, and how you should care for the radio.

Radio etiquette begins with encryption. As previously mentioned, most of the channels we use are encrypted to protect SSI. It is not encrypted so you can say whatever you wish, knowing that it can only be heard by other employees. The use of these radios is licensed and regulated by the Federal Communications Commission and is subject to federal rules and laws. While there are many things the City of Phoenix and RWC must do to remain compliant, you too have a responsibility as a person using this tool. Use of profanity, none work related conversations, and use of the radio outside of your work hours could lead to disciplinary actions. Remember; guard your words and actions.

Additionally, the encryption key contained in the radio is part of a larger radio security system. Thus, should you lose or misplace your radio, notify your supervisor immediately and contact the radio shop to have the radio disabled. Once the radio is disabled, it usually shows up at lost and found within a day or two. Should you find a radio in your daily activities, hand it to your supervisor or bring it to lost and found.

While the intent of encryption is to prevent eavesdropping, it does not prevent individuals

standing within listen distance of you from hearing radio traffic. Keep this in mind as you move around in your daily activities, keeping the volume of your radio at a level that is just enough for you to hear and not a nuisance to the public.

The Aviation Department follows the communication standards set for by the National Incident Management System (NIMS). NIMS coordinates emergency preparedness and incident management among various federal, tribal, state, and local agencies. It is partially based on the Incident Command System (ICS). ICS is a set of best practices that have been integrated into our organizational structure designed to improve emergency response operations. ICS provides standardized response and operational procedures to reduce problems and potential for miscommunication on incidents of all types and complexities. This includes the "jargon" used in two-way communications. Many law enforcement organizations and all fire agencies in the region follow these same communications standards.

What does this mean for you as a user of this radio? It means you should follow learn and remember these simple rules.

**When using the radio, always use a call sign.** It will indicate which department division you are in, which section, work group, or area of responsibility you belong to, and perhaps which shift you normally work. In the Department all call signs have a letter followed by a number. The letter is usually pronounced using the phonetic alphabet, with Oscar for O and Mike for M being the most popular. Your call sign will be assigned to you by your supervisor.

**When making a radio call, always identify the person you wish to speak to followed by who you are.** For example, I want to talk to O-312 and I am M-53-14. I would say "Oscar 312 this is Mike 53-14". O-312 would respond in the same manner and let me know he is ready to receive my communications. From there we would continue our conversation in a professional manner. Once we are done, the last person to speak on the radio should clear their conversation by stating their call sign and clear.

**When talking on the radio use plain English.** The use of codes — particularly agency-specific and ten codes — is a barrier when it comes to transmitting information. While codes may ideally reduce the length of transmissions, in practice the time gained is lost in repeated messages and explanations of unfamiliar terms. Codes or terms used by one organization may be incompatible with those used by neighboring agencies. This means when someone gives you information via the radio, do not say 10-4. Say something like, "I understand" or simply repeat the message back. The only exception to this rule is to convey information that you may not want people standing near you or others standing near a co-worker with a radio to know.
The only codes you should use are the following:
901H (901 Hotel / Henry) = Dead body
906 = Police needed urgently
918 = Irrational or insane person
961 = Auto Accident without injuries
962 = Auto Accident with injuries
963 = Auto Accident with fatality

**When making a radio call, hold the radio vertically 1 to 2 inches from your mouth.** Press the PTT button, wait for an acknowledgement beep, and then speak clearly and slowly.

Release the PTT when done. You must hold the radio in this fashion or the noise cancelling technology will not be able to distinguish your voice from background noise. To insure clear voice communications, this same technique should be used with all radio accessories.

## RADIO CARE

Proper care of your radio is essential and while your radio is a very rugged tool, it is not indestructible. You need to take care not to drop the radio, get it wet, or leave it in a location where it might be damaged. If your radio gets dirty, you can use a damp cloth with mild soapy solution to wipe it clean. You are not to mark the radio in any permanent fashion, as it does not belong to you. You might be tempted to write your name on the radio or engrave the case. Do not do this. You can mark your radio in a non-permanent fashion with a piece of tape, heat shrink on the antenna, a label on the battery, or a ribbon tied to a knob. Just remember, whatever you do must be easily removed, as this radio will be issued to someone else in the future. Permanently defacing the radio could lead to disciplinary action.

Your radio was issued with one or two batteries. Your new battery should provide you with enough power to last one entire shift. As your battery gets older and its life span does not last a full shift when fully charged, seek a new battery from either the radio shop or through your Department representative. Batteries are exchanged on a one for one basis; this means you must present your old battery to get a new one. Normally, it will take less than 4 hours to fully charge a dead battery. However, the batteries we use have some intelligence built into them. This technology allows the battery to maintain peak performance throughout its entire life. To do this, the battery will periodically fully discharge when placed in the charger. This is known as conditioning and can take up to 16 hours to complete. An amber light appears on the charger indicating conditioning is in progress. It is best not to interrupt the conditioning process, as the battery may not have enough power to keep the radio functioning throughout your shift. To extend the life of your batteries and provide you with several years of good service, the following steps are recommended:

Fully charge the battery. Make sure the battery charge indicator light on the charger is solid green before using it. If this is a radio that is used by every shift, use the battery until you hear a low battery alert coming from the radio, then swap the battery for another fully charged battery. If your radio is not a shared resource, place the radio and battery in the charger at the end of each shift. At the beginning of your workweek, start using your second battery if you have one. Switching batteries every other week will keep them in great shape for years.

# Remember:

Keep all radio traffic professional – it is subject to public information requests
Radio is not intrinsically safe – stay 25 feet away from volatile hazards
When scanning other channels, you could miss a radio call on your primary channel
Hold the radio 1 to 2 inches in front of your mouth when talking
Press the Push-to-Talk button, wait for the confirmation tone before talking
Use only the six codes provided, otherwise talk in plain English
Do not deface your radio
Allow batteries to complete the conditioning cycle
Regularly swap batteries if you have more than one