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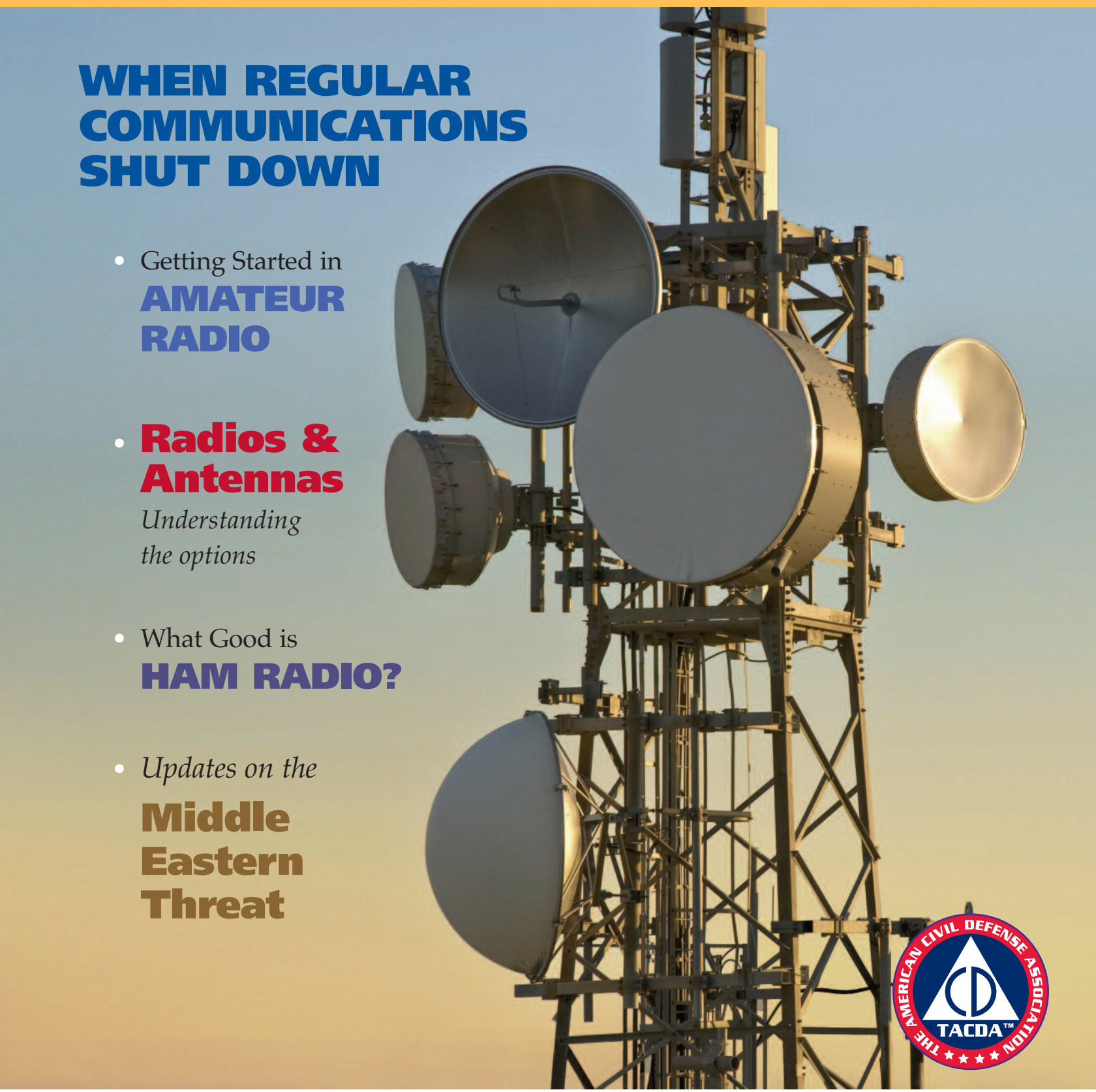

WHEN REGULAR COMMUNICATIONS SHUT DOWN

- Getting Started in **AMATEUR RADIO**
- **Radios & Antennas** *Understanding the options*
- What Good is **HAM RADIO?**
- *Updates on the* **Middle Eastern Threat**

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PRESIDENT'S MESSAGE

We would like to thank all those who attended the Annual TACDA Membership Meeting and Conference. Our members gave us great ideas for the coming journals and the TACDA Academy. We appreciated their attendance and their input.

Our speakers gave excellent reports on various situations that could greatly impact our nation. The unrest in the Middle East and North Korea pose immediate threats to our economy, and raise the potential for terrorist attack and even nuclear exchange. The societal impact from a long-term power outage caused by a nuclear EMP or a large geomagnetic storm should raise an alarm throughout the entire nation. These issues are compounded by a total lack of public defense capabilities and a huge shortfall in our aging nuclear arsenal. The general lack of understanding of these threats has left the vast majority of the nation unprotected and totally vulnerable.

These concerns were tempered with excellent information for mediating these threats, ranging from the hardening of electronics and electrical systems against EMP, innovative sheltering concepts, alternative energy systems, and practical grass roots methods for cooking and living without power.

Our next annual conference will be held in Utah, on Sept. 10th and 11th, 2010. We hope to see you there.

William David Perkins
President, TACDA

FROM THE **EDITOR**

There have been several requests from members who would like to become part of a TACDA Chapter or meet other folks with interests in civil defense. Some have left contact information. Others prefer that you contact us at TACDA, so we can pass the information on to them.

William Stoneburner
Belton, TX
Phone: 254-933-0289
Email: wdstony@vvm.com

Kirk Shea
Oceanside, CA
Cell: 818-468-7116
Email: ftldrive@prodigy.net

Fred
New Orleans
Phone: 504-628-0075
(Fred suggests that we watch the new Discovery show, 'The Colony').

J.M.
Omaha Nebraska
Email: info@tacda.org

We enjoy hearing from our readers. Please feel free to send comments and suggestions. Our next *Journal* will have an EMP theme. If you have special interests, please let us know.

Best Regards,

Sharon Packer
Editor,
Journal of Civil Defense

TIPS *for H1N1 Flu Prevention*

The following message was given by Dr. Vinay Goyal. Dr. Goyal is an MBBS, DRM, DNB (Intensivist and Thyroid Specialist) having clinical experience of over 20 years. He has worked in institutions such as Hinduja Hospital, Bombay Hospital, Saifee Hospital, and Tata Memorial. Presently, he is heading the Nuclear Medicine Department and Thyroid Clinic at Riddhivinayak Cardiac and Critical Centre, Malad (W). His message makes a lot of sense and is critical for us to know.

The only portals of entry are the nostrils and mouth or throat. In a global epidemic of this nature, it's almost impossible not coming into contact with H1N1 in spite of all precautions. Contact with H1N1 is not so much of a problem as proliferation is. While you are still healthy and not showing any symptoms of H1N1 infection, in order to prevent proliferation, aggravation of symptoms and development of secondary infections, some very simple steps, not fully highlighted in most official communications, can be practiced (instead of focusing on how to stock N95 or Tamiflu):

1. Frequent hand-washing (well highlighted in all official communications).

2. "Hands-off-the-face" approach. Resist all temptations to touch any part of face (unless you want to eat or bathe).

3. Gargle twice a day with warm salt water (use Listerine if you don't trust salt). H1N1 takes two to three days after initial infection in the throat/nasal cavity to proliferate and show characteristic symptoms. Simple gargling prevents proliferation. In a way, gargling with salt water has the same effect on a healthy individual that Tamiflu has on an infected one. Don't underestimate this simple, inexpensive and powerful preventative method.

4. Similar to Step 3, clean your nostrils at least once every day with warm salt water. Not everyone may be good at Jala Neti or Sutra Neti (very good Yoga asanas to clean nasal cavities), but blowing the nose hard once a day and swabbing both nostrils with Q-Tips dipped in warm salt water is very effective in bringing down viral population.

5. Boost your natural immunity with citrus fruits that are rich in Vitamin C. If you have to supplement with Vitamin C tablets, make sure that they also have Zinc to boost absorption.

6. Drink as many warm liquids as you can. Drinking warm liquids has the same effect as gargling, but in the reverse direction. They wash off proliferating viruses from the throat into the stomach where they cannot survive, proliferate or do any harm.

UPDATES

on the Middle Eastern Threat

By William David Perkins
Presented at the TACDA
Annual Conference

***Note from the editor:** *Bill Perkins is the current president of The American Civil Defense Association. He also serves on the board of directors of the "Covenant Alliances", where he facilitates meetings directly between the Israeli Knesset and members of the U.S. Congress.*

The following comments are excerpts from Mr. Perkin's presentation at the August 2009 Annual TACDA Conference, held in Salt Lake City, Utah. We were thrilled to receive this current update on national security issues involving the Middle Eastern and North Korean threat.

The world conditions continue to deteriorate at an alarming rate. Today, we will discuss a few of the areas of concern with emphasis on the Middle East.

Pakistan has had three terrorist attacks on its nuclear weapons storage facilities. There are serious questions about Pakistan's army being infiltrated by Al Qaida - especially their Intelligence Service. Recently, Al Qaida captured a city only 50 miles from the nation's capital of Islamabad.

The possibility of war between India and Pakistan always exists. They have fought several wars over Kashmir. The problems are still current, and a solution will not be found in the near future.

The relevance to us is that both these countries are nuclear powers. (India has 60 + weapons, Pakistan has 50 + weapons) If the Pakistan Intel Service were to be infiltrated, it is possible they could intentionally give bad Intel to the government that would initiate a nuclear war.

North Korea
Kim Jong Il has repeatedly threatened South Korea, Japan, and the United States with nuclear war. He continues to instigate trouble, increasing tensions in the area, as he demands more and more concessions. His bad behavior continues to increase the risk of an accidental or intentional nuclear strike.

S. Korea and Japan are well within range of his nuclear weapons. The Continental United States is not currently within range, but our military installations in Japan and South Korea are at risk.

The U.S. is threatening to cut military spending in order to reduce our budget deficit. The nuclear umbrella previously afforded to Japan may no longer be available and the Japanese are becoming more and more concerned. There are reports that they may start a nuclear program of their own. If so, it is believed that they could start stockpiling a nuclear arsenal in less than one year.

Middle East
Both Egypt and Turkey have announced plans to build nuclear power plants. Syria's clandestine attempt at building a nuclear plant was stopped when it was destroyed by Israel a couple of years ago.

War in Yemen
This war has been ignored and under reported. It has finally started to make the news. In the last 30 days, over 2,000 people have been killed and 150,000 left homeless. The Shia Rebels (Shiites) are well armed by the Iranians.

Yemen is being supported by Saudi Arabia, Egypt and the U.S. The Saudis have been bombing the rebel positions. Both Egypt and the United States are supplying this war effort. This war is another example of Sunni vs. Shia. Saudi Arabia and Egypt are mostly Sunni, and Iran and the Rebels are Shia.

Iran
In my estimation, Iran remains the single most serious threat to peace in the Middle East. Many experts believe they will have a nuclear weapon in less than 12 months. Ahmadinejad has openly threatened to destroy Israel and "push all Israelis' into the sea".

These threats, though common, are not entirely empty. Ahmadinejad is what they call a Twelver. The Twelvers are followers of the 12th Imam. They believe this Imam disappeared at the age of five, a little over 1,100 years ago (approximately 874 AD), and claim he has been in what they call "occultation" ever since. Some call him the "Mahdi," which is Arabic for guided one or messiah. They believe that if they can create complete chaos, with major war and massive bloodshed, it will hasten the return of Mahdi, and that when he returns he will lead them to victory and help them convert the entire world to Islam.

In September of 2007, Ahmadinejad gave a speech to the U.N. This was his chance to convince the world that he was not looking for war, but rather for peace. Instead, he spoke of the wonders of the 12th Imam. It has been reported that Ahmadinejad has required his cabinet to sign a contract that they will work for the return of the 12th Imam.

Israel will not allow Iran to destroy them. It is well known that Israel has several hundred nuclear weapons along with multiple delivery systems. For a number of years, it has been reported that they have had a plan in place called "The Samson Option." If it appears that they will be attacked, they will preempt and hit every major Muslim city and military installation in the Middle East with nuclear weapons.

President Obama has given Iran until the end of August to stop their nuclear fuel enrichment processes, and has given them until the end of the year to verify that they have complied. Many strategists believe, however, that Israel plans to attack the Iranian nuclear facilities in the very near future, as they did in Iraq in 1981 and to Syria in 2007.

A close friend of mine recently spoke personally with Bibi Netanyahu. He reported that Netanyahu said they could not wait for verification, and that Israel would attack before the end of the year. My best guess is nothing will happen until after the G-8 meeting in September.

What will happen if Israel hits Iran?
Al Qaida has threatened that they will hit Europe and ten cities in the United States if anyone strikes Iran. I personally doubt they have the capacity to hit that many targets at once, but we all saw what happened on 9/11.

Iran will then try to close the Strait of Hormuz. Twenty percent of the world's oil and forty percent of seaborne oil must pass through this choke point. The Strait is 21 miles wide at that point.

All of this could take place at the peak of the worst flu season we have seen in years. These events will add to an already crippled economy. Some are saying this could lead to a bank holiday.

Should these events take place, my real concern is the possibility of civil unrest.

If there was ever a time when families needed to be prepared, it is now. I would caution you to check your water, food, and medical supplies (be sure to check the dates on your medications as well).

I will conclude with a couple of questions:

Are you prepared to go home, close your doors and not come out for 90 days?

Are you capable and willing to defend your family and supplies if you are forced to do so?

Think about it NOW! Decide what you will do today, not when action is required. Indecision at a crucial time could lead to a decision you may regret later or even to disaster for your family.

Always pray for the best, but prepare for the worst. ●

William David Perkins
Email: kd4fjl@aol.com

Photo by iStockphoto

Getting Started in AMATEUR RADIO

By Rex Estes

Another hurricane is forming in the Atlantic. You know you need reliable long-range communication for a possible emergency, and you know your cell phone won't work in many types of disasters. You want a two-way short wave radio for your car and also for your house. You tried the venerable CB radio, but every channel seems to be occupied by someone who chats about the weather, and if you hear "That's a big 10-4 good buddy!" one more time…

That leaves Ham radio. What in the world is Ham or Amateur radio? Your high school teacher, Mr. Turnbuckle with his pocket protector filled with multi-colored pencils, was a "Ham". He introduced the class to Amateur Radio with a stirring lecture on Thermionic Diodes, Zzzzzzz, but that was 20 years ago. Maybe you should reconsider this option; but how do you get a license? How do you learn the material and find other Hams?

Well, amateur radio is not boring. And it sure isn't CB radio with all the mindless chatter. Ham Radio is not only useful, but a lifesaver. Unlike CB, Marine Band, MURS, FRS and the like, Ham radio can span the continents or an ocean. In remote areas like Alaska, it is often the only form of communication.

Many people have heard about "Ham Radio" (or "Amateur Radio"), but don't choose to get a license. Some of the common reasons are: "It's too hard", or "I don't want to learn Morse code", or "What good is it anyway?" (This last one, the "What good is it, anyway?" question will be the subject of another whole article). Recent changes in the requirements have helped to make it a little easier to get your license. For example, Morse Code is no longer a "requirement" for any class of license. Doing code is a lot of fun, however, and many people are still learning it, even though it is not required.

Amateur Radio does require a license to transmit (you can listen all you want without a license). We will discuss this in the article on Radios and Antennas.

The FCC will issue you a license and your own "Call Sign" after you pass the test. "Test....What test?" I can just hear the cold chills racing up and down many spines out there. But this test is *not* like any other test you have ever taken. They just want you to get the information. So, how do you get the information you will need?

How to Get Started

First, let's assume that you live in a rural area many miles from a town or your nearest neighbor. You want to learn Ham Radio but you don't know anyone who can answer your questions. You do not have access to the Internet, and you do not pass by any houses with very tall antennas that "sure don't look like TV antennas". So, where do you look?

The national organization that works with the Amateur Radio community is called "The American Radio Relay League" (ARRL). Their headquarters is in Newington, Connecticut. They have many friendly people there to help you (you will find that most Amateurs just love helping people). Call the switchboard (860-594-0200), and ask for someone to help you find a club in your specific area. They may transfer you to someone like Norm Susaro (860 -594-0230). He, or someone like him, can give you the names and phone numbers of the clubs and officers in your area. When people are first beginning to learn radio, they are usually given an 'Elmer'. This is a person who will help you, and answer your many questions.

Next, let's say that you do have access to the internet. The ARRL web site is http://www.arrl.org. On the home page, in the big blue banner at the top, on the left side, is the link to "Clubs." Here, you will find five different ways to search for radio club information in your area - within the mile range that you specify. The listings contain the club names and the club officers along with their phone numbers. Also, on the home page below "Clubs," is a yellow box that says "Licensing". In the pull down, the top category says, "Getting Started in Amateur Radio." I recommend that you access all the categories in the "Licensing" pull down box. There is a lot of good information in each one.

Items and information you need for the test:

- The instruction book
- The dates and locations for the test sessions in your area.
- Money for the exam fee (preferably cash and in exact change)
- The required forms (all filled in before the session is best)
- A calculator (with a good battery)
- A #2 pencil (and some spares)
- Personal I.D.

Now let's look at each of these items in more detail.

The Instruction Book

Purchase an instruction book. It has all the information you will need for the test. One thing that used to bug me in school was when a professor would talk about subjects 'A' and 'B' in class, and then test you on subjects 'C' and 'D' on the test. *These tests are not like that.* The books contain the instruction material, the EXACT questions that will be asked on the test (word for word), and the EXACT answers to those questions (word for word). Everything you need to know in order to pass the test is in the instruction book. The questions are all multiple choice. There are also "distracter" answers for each question. Ignore them completely. Just read and remember the correct answers.

For each 'Class' of license, there is a pool of questions from which they randomly pick a few questions for the test. For example in the Technician Class test, from a pool of 392 questions, they will randomly pick 35 questions. Of those 35 questions, you will be required to answer 26 (or 74 %) correctly. Unlike most schools, there are NO penalties for failing the test. You can take the test as many times as you wish. You can take the test again right there, or go home and study and try again on the next test session. There is no time limit to the test. You do not need to hurry (although the test coordinators may want to get home for dinner).

There are two types of books. One is published by the ARRL and is designed for people with a more technical background who like to know how things work. The people at the W5YI GROUP in Texas do the other, which emphasizes more on just the information you need to pass the test. Both are excellent books and contain the questions and the answers in the exact word for word format used on the test.

As you study from the book, there are two study aids that are very helpful. One aid comes in the form of online websites, such as QRZ.com and HAMTEST.com. These sites offer randomized tests for you out of the pool of test questions. After you take the online test, they will score your test, tell you if you passed or failed and tell you which questions you missed so you can study them. You can take as many tests as you like. These tests do not count for the 'official tests' given at the test sessions, but they are identical in every way to what you will see on the real test and can give you a lot of confidence for the real test day.

The other help I highly recommend is to take a Ham Class. Find out from your area club where and when the

Continues on page 21

Radios & Antennas

Photo by iStockphoto

Understanding the options

By Rex Estes

Radios generally fall into two major categories: 'Listen Only' and 'Listen and Transmit'. In this article I will discuss these categories and give some examples of each, with the goal of teaching you the 'vocabulary' and helping you to understand the options that are available to you. I have emphasized some of the vocabulary words that you may want to note for future reference.

Listen Only Radios
'Listen Only Radios' need no explanation. Most all of us living today grew up with some kind of AM or FM radio at home. Now, there are new kinds of listen only type radios such as the following:

WiFi Radios that use the internet to access stations around the world. When the internet acts as a relay between stations, it is referred to as 'voice over internet protocol' (VOIP).

XM/Sirius Satellite Radios that access signals from satellites so there are no blank spots for reception anyplace in the country.

Weather and Weather Alert Radios that send out a signal from the National Weather Service (KEC78) so you can listen to the weather forecast and get warnings of dangerous weather coming your way.

S.A.M.E. Radios (Specific Area Message Encoding) that use the National Weather service system to alert you to possible man-made threats. This function can be included in a WX Alert radio if you know to ask for it.

Scanners that scan frequencies for certain kinds of public service, emergency service, etc.

Short Wave Radios, most of which cover all frequencies in the electromagnetic spectrum from below the AM band all the way up to 30 MHz.

Short Wave radios come in two types: Continuous Coverage and Band Oriented.

Continuous Coverage Radios cover the entire frequency range and there are no gaps in coverage. These radios are more expensive (around $250) than band oriented radios, and have an available option that is very important - the option that will let you listen to Single Side Band (SSB). Listening on SSB means you will be able to listen to Amateur Radio transmissions. In some emergency situations, Amateurs may be the only ones on the air (more about that in another article).

Band Oriented Radios are pre-set to the most popular stations. Some of these radios use a multi-position switch so you can select the 41-meter band, or the 49-meter band, etc. You can hear a group of frequencies in one area, then skip over many other frequencies and listen to another group. These radios are a lot less expensive ($30 and up). I am not aware of any SSB capabilities on these radios.

Antennas for Listen Only Radios
Most 'Listen Only' radios come with their own, built in, telescoping antennas that can be extended if needed. Sometimes just throwing a long piece of wire out of your window can be a big improvement over the existing antenna. Specialty radios, such as the XM/Sirius, have specifically engineered antennas that sit on your dashboard or other hard surface, or hard-mount to the roof of your car. Large out-board antennas are available for continuous coverage and other type radios. Some of these antennas are powered with an *electronic pre-amp system.* This addition magnifies the incoming signal before it even gets to the radio tuner, which makes it possible to hear weaker and more distant stations. It is important to check this option when you are looking to buy a radio. If the radio does not have an antenna jack, you have no other option but than to use the antenna that comes with the radio.

Listen and Transmit Radios
The ability to transmit a signal to another station adds a whole new dimension to your communication experience. The following radios are common 'Listen and Transmit' type radios:

FRS Radios are 1/2 watt, line-of-site, transmitters. The acronym, FRS, stands for Family Radio Service. They can have features like 'privacy codes' and call buttons. They are short range, inexpensive radios and NO license is required!

GMRS Radios transmit on 1/2 or two watts. This radio is much like the FRS, but in order to transmit on this radio you MUST obtain a license. No test is given for this license - just mail $85 to the FCC and they will send you a license (good for five years), and a Call Sign. All members of your immediate family can use this same Call Sign.

XRS Radios are much like the above two radios, but with lots more options. They operate in the 900 MHz range,

and *do not* require a license. It is sort of like a cell phone, but it does not send your signal to a cell tower *(repeater)* or cell system. You can even send text messages on this radio. (Search the Internet for more detailed information on these radios).

CB Radios have been around for a long time, but they are now mostly used by truckers. They *do not* require a license for use. 'Walkie-Talky' type CBs come with a telescoping type antenna that is not removable. Mobile CBs generally operate on five watts and require that a separate antenna be mounted to the outside of the vehicle. This antenna needs to be properly tuned to operate in the CB band.

"I recently sat on my front porch with my hand held 5-watt HT and talked to folks in Germany, Alaska, and Australia. Truly amazing!"

Amateur Radios are more powerful than any of the other radios we have discussed. A test is required in order to get a license to operate this radio (see the article on "Getting Started in Amateur Radio"). If you decide to get your license, the material that you will study will cover the subject in detail. In this article, I will only give a general overview of the huge field of Amateur Radio.

Amateur Radio
There are two main categories in Amateur Radio - short range and long range.

Short Range, line-of-site, radios operate in the very high frequency *(VHF)* and the ultra high frequency *(UHF)* range of the radio band. That band lies between the 146 MHz and the 440 MHz frequencies. These radios can legally be used between the powers of .01 watts up to 75 watts. Repeaters on mountaintops and tall buildings use 200 watts to extend the range of these radios. They can be found as either HTs (stands for Handy Talky, which is Ham for Walky-Talky), or as *mobiles*, which are about the size of a small book.

The mobile can be used as a base station at your house, or in your car. During emergencies this is 'where the action is'. Large radio *nets* are set up to handle communications when all else has failed (*see the article on this subject*).

In the last few years some exciting new modes of communications have been developed using the HF frequencies. Just a note about IRLP (Internet, Radio Linking Project). With this capability, the signal goes from radio, to repeater, to computer, to the Internet, and back again. I recently sat on my front porch with my hand held 5-watt HT and talked to folks in Germany, Alaska, and Australia. Truly amazing! This capability makes a line-of-site radio into a long-range radio.

Long Range radios give *around the world coverage.* They operate in the high frequency (HF) range of the radio band. These HF bands reach from just above the AM band (1.800 MHz) clear up to 29.700 MHz). All these radios use Upper and Lower Single Side Band. They can even use other modes such as AM, where allowed.

The HF stations can be used in town, but are mainly used to pass 'Health and Welfare Traffic' across the country during emergencies, such as the Katrina Hurricane disaster. These radios are usually larger and much more expensive (from $500 to $10,000) than the other radios that have been discussed, and they require larger antenna systems. On most bands they are allowed to transmit at up to 1500 watts, which requires big power handling equipment and antennas. HF radios are also available in sizes that are small enough to go in your car and can transmit on 100 watts. It is fun to be traveling in Colorado and talk to guys in Texas and New York or on a boat sailing around the Baja.

Antennas for Transmitting Type Radios
The antenna is the most important part of a transmitter. If it is not permanently attached to the radio, like in FRS radios, getting the appropriate antenna and setting it up properly is a real challenge. Antenna Theory occupied many hours of my Electronics Engineering course of study in college.

Basically, a transmitter wants to send its signal into an antenna that matches what it needs. In other words, the antenna must be 'tuned' to the requirements of the transmitter. Some radios come with their own internal tuners. Others may need a special tool called an *Antenna Analyzer* to properly tune a new antenna. If the antenna is properly tuned, the signal leaves the antenna and goes through space to be heard by your buddy (and anyone else that's listening). If it is not tuned properly, then some portion of the signal will be reflected down the antenna and coax, and back into your own radio. If the mismatch is bad enough, the returning Radio Frequency *(RF)* energy can be enough to turn the transmitter's power transistors into 'crispy critters', and your buddy will hear nothing but static. Most new radios are sophisticated enough that if they see a really bad mismatch at the antenna they will automatically shut down the power so as not to be damaged.

Many auxiliary antennas, such as used in HTs and mobiles, come already tuned. *Mag-mounts* (an antenna held in place by a large magnet) come pretuned and can be placed on any metallic object, such as the roof of your car or your refrigerator.

There are many antenna types, and there are many other considerations, such as grounding, wind loading, lightening arresters, coax size, coax weather damage, etc. All too much for this article. You will learn a lot about antenna theory when you take your Ham Class in preparation to getting your license. Some of these areas may be discussed in future articles.

What Good Is HAM RADIO *Anyway?*

By Rex Estes

When my youngest son was in high school, the day came for him to go to his first prom. He went about all the necessary preparations, and even asked a certain young lady to go with him, not expecting that he would get a "yes" answer.

When that night finally arrived, he went to pick her up in the only vehicle that I would allow any of my three teenagers to drive - a 20 year-old Chevy pickup. Because old trucks like that develop a bad case of rust everywhere, the family had given the truck the affectionate name of Rusty.

When his young lady came out of her house and saw the 'golden carriage' that was going to take her to the 'ball', she almost burst into tears. As the night went on, she was eventually able to hide her embarrassment and they began to talk. During that conversation she asked the question, "So, what good are trucks, anyway?"

I recently bought a bumper sticker that reads: "WHEN ALL ELSE FAILS ... AMATEUR RADIO."

My son reported that question to me the next day, and it has been a family joke ever since. Anytime we use one of our three trucks to haul sheet rock, dirt for the garden, help one of the kids or our neighbors move, pull someone out of a snow bank, etc. etc. someone always asks: "So, what good … ?" Well, you get the idea.

Now, that question has migrated over to ham radio. Since my wife and all of my kids also have their licenses and call signs, we have discovered uses for our radios that we never would have imagined. We even use them to find each other when we get lost inside the 'big box' store in our neighborhood. So, that will be the theme of this article, and we will give some examples of how Amateur Radio is used to help people. Most of those uses are completely unknown to the general public, because the media never reports the huge role amateurs play in emergency communications. Therefore, I will report some of these uses, myself. Many events are well known and documented, but the efforts of amateur radio operators are seldom mentioned.

I recently bought a bumper sticker that reads: *"When all else fails ... Amateur Radio."* The sticker also shows a small drawing of a tornado and another picture of a lightning strike. My friend makes stick-on labels for cars. He gave me one that reads: *"When 911 is busy ... Ham Radio."* That pretty well sums it up.

So, before we get started with some stories, I need to mention several organizations within the 'radio community' that you may be interested in joining after you get your license.

ARES
(Amateur Radio Emergency Services)
This group handles the emergency communications for an event. ARES serves many public service functions, such as the Red Cross, municipal governments and their Emergency Operations Centers (EOCs), fire stations, hospitals, etc.

RACES
(Radio Amateur Civil Emergency Service)
This group works with the State Governments to tie the whole state together. The State EOC will be linked by radio relay and repeater links to the city and county EOCs.

MARA
(Mercury Amateur Radio Association)
This group handles communications for the shelters, and people in those shelters, who have been forced to evacuate because of an emergency of some kind. You can belong to all three.

There are many, many other groups. For example, The Salvation Army has a big net that handles long and short range 'health and welfare traffic'. Very few people have any idea about the power and sophistication of these radio groups and the amazing equipment they are using. These people practice constantly, so that when something does happen, they just do what they practiced. You may hear them say, "This is simulated emergency traffic", so if you are listening to your 'short wave' radio and hear that phrase, you will know that they are only 'practicing' for the real thing.

During the summer of 2009, there were about 30,000 people in California who were forced to evacuate their homes because of wild fires. You can be sure that there were many Hams involved. They set up Emergency Nets (groups of people who communicate with each other under the direction of a Net Control Station). There were Hams working with the fire command, the police, the city and state EOCs, etc., providing radio coverage that linked these various functions together. Details about the work and service provided by these Hams can be found in the American Radio Relay League's magazine, *QST*. The same system is used when California, or any state, has a big earthquake such as the Northridge quake. Amateurs are usually on the scene with the very first responders to help in rescue coordination and inter-agency radio linking.

Perhaps the best known emergency in recent memory is Hurricane Katrina (and Rita, and the others in that group). Many hurricanes had marched across the length of Florida just prior to Katrina. All the big major nets in the country mobilized as soon as the winds slowed down. They set up their short range VHF/UHF nets to handle the needs of people in their local areas. These nets reported the information to other net controls out of the area at long range HF collection points, who in turn, called in to resource points to start the stream of

supplies back into the hard hit areas - this was set up and running very quickly, over a huge geographic area, without the help of any municipal power.

For many weeks, the only form of communication was from Amateur Radio (just like my bumper sticker says). As the local radio stations and cell phone service gradually came back on line, the role of the Hams shifted to helping people on other levels. Information about lost people was gathered and sent from net to net. I know of many instances of families being reunited, thanks to these radio volunteers.

"One of my favorite pastimes is to try to talk to the astronauts on the shuttle and the International Space Station when they pass over our area."

I recently read an article about a group of radio amateurs in Germany who just bounced a radio signal off of the planet Venus. "Moon bounce" (Earth-Moon-Earth) and meteor scatter signal bouncing techniques are regularly used to communicate with people around the world; but I can only imagine the kind of equipment and power requirements that were needed to send a signal to Venus and then to hear it when it came back!

One of my favorite pastimes is to try to talk to the astronauts on the shuttle and the International Space Station when they pass over our area. The astronauts on these flights have their own Amateur Radio call signs, and can talk to stations on the ground when their duties allow. It is not too difficult to get the calls and schedules and frequencies to make these calls.

Some time ago, when the Columbia went down and the debris scattered over three states, the volunteers who were in the highest demand were mobile Amateur Radio operators who had GPS capability. These hams would call in to their net controls and report the coordinates of the pieces they found. The recovery teams would then punch the coordinates into their helicopters, fly directly to that location and take the parts back to the assembly points. It's sad, but very satisfying to participate in this kind of service.

Often times, Hams are instrumental in the actual saving of lives. Each year in Utah, there is a motorcycle race that covers 100 miles over mountains and desert floor (no paved roads at all). Recently, during the race, a rider crashed into his handlebars and hurt his chest quite badly. There were Ham radio stations every few miles out in the middle of nowhere. The station near him called the information in to Net Control. They called Life Flight in the town many miles away. The chopper was directed right to the injured rider who was flown back to the hospital. The later reports said that, without the help of Amateur Radio, he probably would have died before help could have arrived.

In the days before cell phones, I was out in the California desert riding quad-runners with a group of friends. We burned a trailer bearing badly and it was questionable whether we would get back home, as planned, that week. I had a 10-meter (HF long range) radio with me. The band got an opening for a short period of time and the only station I could find was a station in New York State. I asked the operator to call my wife and tell her we would be late and why. He did. But my wife was not about to accept a collect call from New York. He said, behind the operator: "Tell her I am _____" and then gave his Amateur call sign. She then, unquestioningly, accepted the call and did not worry when we were a few days late getting out to a phone to call her.

Hams help in many different types of events, non-emergency as well as emergency. The net system is the same for most of them and consists of many volunteers at fixed and mobile stations working with Net Controls who are linked to various agencies. (*"When all else fails ..."*). The following are just a few instances that are covered by Hams:

- Recent ice storms in Kansas that knocked down 5000 power poles.
- Big parades in many cities (Hams at the corners and in the rescue trucks).
- Midwestern tornadoes that knock down everything.
- A recent incident where "vandals" cut fiber optic cables in southern California leaving several cities without phones, etc. Hams covered the hospitals and many other services until the cables could be repaired.
- There was a failure of our own small town police radio repeater in the mountains of Utah. The ARES group was called and they put a radio operator in each police car and at the EOC. We were the police radio system for many days.
- The recent Seattle power outages of 2009.
- Floods in the Midwest.
- Bike races and foot races around the country. Hams every few miles to call for bananas and sports drinks at the aid stations, and to pick up and transport participants who couldn't finish or needed the repair truck.

Most people have no idea how much ham radio operators contribute to their towns.

What Good Is Ham Radio Anyway? Get involved. You will love it!

Photo by iStockphoto

How **EMERGENCY REGISTRIES** benefit people with special needs

By Jim Serre, Copyright © 2006 GetReadyGear.com

If you or a family member has a disability or special need, which may make evacuation during an emergency more difficult, be sure that your emergency preparedness plan addresses those needs. Emergencies and disasters can strike quickly and without warning and can force you to evacuate your neighborhood or confine you to your home. Having a plan that addresses your situation and a survival kit will greatly reduce the chance of injury and the stress of dealing with a disaster.

Emergency Management (along with the other Health and Human Services agencies) is extremely concerned with the Special Needs population. During a disaster many unique problems may be encountered by this population; therefore, it is important to identify these individuals (in advance of an emergency) so that we may better plan and provide for their needs.

Generally speaking, special needs constitute communication, hearing, mobility, and visual impairments along with other disabilities. Special needs could also include: being 60 years of age or older, frail, oxygen dependent, medically needy, dependent on electricity, disabled, having a contagious health condition, not being served in a residential care facility, or not being served by an in-home care program. If you have a mental or physical impairment and your level of care would go beyond the normal first aid level found in a public shelter, then you should be in your local special needs registry. If you are electric-dependent, be sure to check with your local utility company in regards to how you can help minimize electrical outages to your home/facility.

If you or a relative have special needs, you should contact your local Office or Department of Emergency Services, as many cities and counties maintain a registry of special needs individuals in the event of a disaster or evacuation. In the case of an evacuation, local authorities would mobilize to evacuate those special needs individuals very early in the process to ensure their safety. A brief phone interview will readily confirm your acceptance into such a registry. Many assisted living facilities are already registered with local fire departments and emergency service offices. Should you have a relative in such a facility, contact them to ensure they are registered with local support agencies.

From Sacramento County, California to Newport News, Virginia, municipalities, cities and counties across the country have special needs registries, where people can sign up and provide their health information. Eligible candidates are required to complete and sign a Special Needs Registry Application as well as the HIPAA Disclosure of Information and HIPAA Privacy Act forms before they will be placed on the registry.

If there is a disaster, those on the registry will be called and given information about how to prepare for or respond to the disaster, given information regarding facilities or shelters, and to check on their well being. The information may also be used to assist emergency personnel and volunteers in providing assistance. Participation in a Special Needs registry is voluntary. Individuals on the registry may decide whether to accept assistance and/or remain responsible for themselves in the event of an emergency.

Finally, if you have special needs or disabilities, it is important to be ready to evacuate when voluntary evacuation notices are given. If a special needs individual waits until mandatory evacuation is ordered, he may get caught in the confusion and heavy traffic (foot and vehicle) that sometimes accompanies evacuations and the assistance he needs to move to a safer locale may be delayed.

Take the following steps if you or a family member has special needs or disabilities:

- Create a network of neighbors, relatives, friends, and coworkers that understand the special needs or disabilities of you or your family members(s). Make sure everyone knows how to operate necessary equipment.
- Discuss your special needs with your employer. If you are mobility impaired and live or work in a high-rise building, discuss escape routes with your employer.
- If you live in an apartment building or condominium, ask the management to mark accessible exits clearly and to make arrangements to help you leave the building.
- Keep specialized items ready, including extra wheelchair batteries, oxygen, catheters, medication, food for service animals, and any other items you might need.
- Be sure to make provisions for medications that require refrigeration.
- Maintain a list of the type and model numbers of the medical devices that are required.
- Know the size and weight of your wheelchair, in addition to whether or not it is collapsible, in case it has to be transported.
- Decide what you will be able to do for yourself and what assis-

tance you may need before, during and after a disaster. This will be based on the environment after the disaster, your capabilities and your limitations.

For someone that is communication impaired: Determine how you will communicate with emergency personnel if you do not have your communication devices.

Store paper, writing materials, copies of a word or letter board and pre-printed key phrases specific to anticipated emergencies in all your emergency kits, your wallet, purse, etc.

For someone who is hearing impaired: Store extra batteries for hearing aids, implants TTY and light phone signaler.

Store hearing aids in a consistent, convenient and secure place, so you can quickly and easily locate them after a disaster. Consider storing them in a container attached to your night stand or bed post. Missing or damaged hearing aids will be difficult to replace or fix following a major disaster. If available, keep an extra hearing aid with your emergency supplies.

Determine how you will communicate with emergency personnel if there is no interpreter or if you do not have your hearing aid(s). Store paper and pens.

Consider carrying a pre-printed copy of key phrases, such as "I speak American Sign Language (ASL) and need an ASL interpreter." Determine which broadcasting systems will provide continuous news that will be captioned and/or signed.

For someone who is mobility impaired: Store emergency supplies in a pack or backpack that can attach to your walker, wheelchair or scooter. Store needed mobility aids (canes, crutches, walkers, wheelchairs) close to you in a consistent, convenient and secured location. Keep extra aids in several locations, if available.

Keep a pair of heavy gloves in your supply kit to use while wheeling or making your way over glass and debris.

If you do not have puncture-proof tires, keep a patch kit or can of "seal-in-air" to repair flat tires and/or keep an extra supply of inner tubes.

Store a lightweight, manual wheelchair if available.

For someone who is visually impaired: If you use a cane, keep extras in strategic, consistent and secured locations at work, home, school, volunteer sites, etc. to help you maneuver around obstacles and hazards.

Keep a spare cane in your emergency kit.

If you have some vision, place security lights in each room to light paths of travel. These lights plug into electrical wall outlets and light up automatically if there is a loss of power. They will, depending on type, continue to operate for 1 to 6 hours and can be turned off manually to be used as a flashlight.

Store high-powered flashlights (with wide beams) and extra batteries.

Plan on losing the auditory clues you normally rely on following a major disaster.

Service Animals and Pets: Make sure your service animals and pets have I.D. tags with both your cell phone number and that of your primary out-of-town contact person. Make sure your animal's license is current.

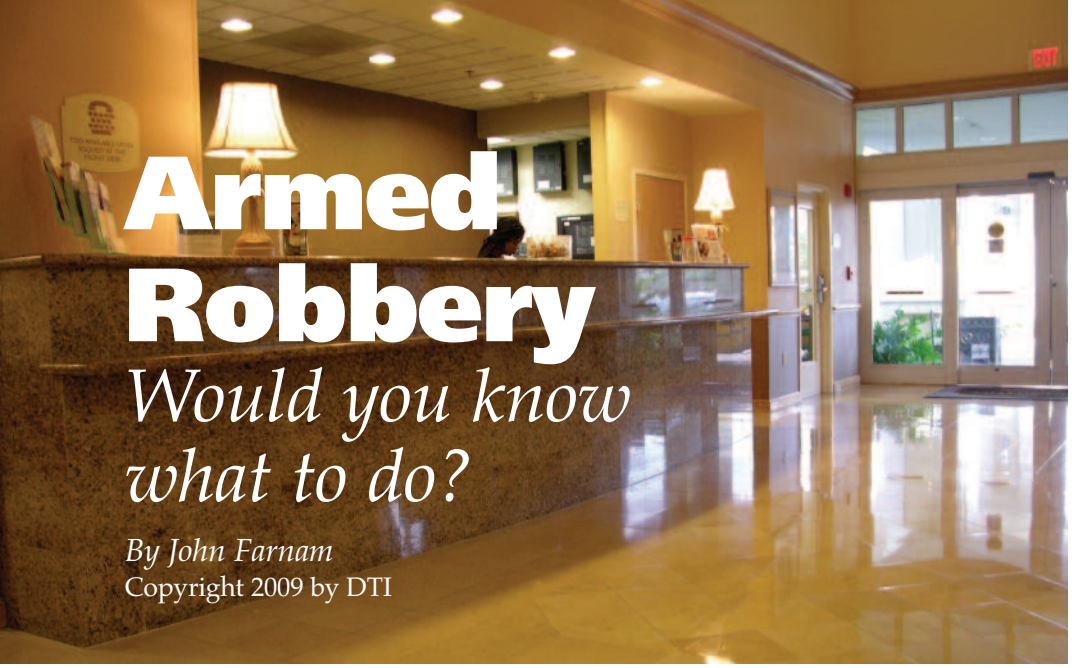
Plan how your pets will be cared for if you have to evacuate. Although service animals should be allowed in emergency shelters, pets may not be, so have some animal shelters identified.

Establish relationships with other animal owners in your neighborhood so in case you are not home, someone will be able to help your animal.

Pets and service animals may become confused, panicked, frightened or disoriented during and after a disaster. Keep them confined or securely leashed or harnessed. A leash (or harness) is an important item for managing a nervous or upset animal. Be prepared to use alternative ways to negotiate your environment.

Assemble a survival kit for your service animal that will last seven days. Place it in a pack that your animal can carry (if it is large enough to do so) in case you need to evacuate. Visit http://www.getreadygear.com/petanimalemergencyplanning.html for tips on how to assemble an emergency survival kit for your service animal or pet. ●

Jim Serre has over 30 years experience in the business world. He currently volunteers for local Search & Rescue and CERT Units. Additionally, he is a qualified instructor for Neighborhood Emergency Training courses sponsored by the Office of Homeland Security and Community Emergency Response Team training. His knowledge of survival and preparedness skills make him uniquely qualified to design survival kits that can save your life.



Armed Robbery

Would you know what to do?

By John Farnam

One of our instructors was a close witness to an armed robbery recently! We're currently in the Midwest, conducting training courses, and we, along with the instructors, were all staying at a local Holiday Inn Express. My instructor was in the hotel's lobby, working alone at the computer enclave, when an armed-robbery suspect came in and held up the hotel desk clerk at gunpoint.

His narrative:

"Thursday night (September 3, 2009), after a day on the pistol range, and before retiring to my hotel room for the evening, I was using the hotel's courtesy computer in a nook within the lobby. It was just after 11:00pm.

At the late hour at which I entered the lobby, no one else, aside from the desk clerk, appeared to be present. While seated at the computer, I witnessed a man rapidly approaching the reception counter from some point to the rear of the lobby. His hooded sweatshirt was pulled over his head, and he was wearing large sunglasses. If he had been there when I entered, I never noticed him. He pointed a black handgun (looked like a small revolver) at the clerk and loudly demanded money.

During the robbery, neither the clerk nor the robbery suspect was aware of my presence. When I realized what was happening, I immediately acquired a master grip of my concealed pistol (G23 w/DPX), took cover behind a corner, and drew to low-ready. As the clerk frantically worked to satisfy the gunman's repeated, squawky, and threatening demands, it was my decision to remain a non-participant so long as my presence was not detected. However, my mind rapidly sorted through all possibilities. Had the suspect discovered me, I concluded, I'd have only fractions of a second to react.

I considered shooting the suspect, as he certainly represented a lethal threat to the clerk, and to me too. But, I also considered the possibility that what I was witnessing was not what I thought it was. Maybe this whole thing was just a brainless joke between two friends, or maybe it was some kind of 'exercise' pre-arranged by the management. It also occurred to me that maybe the suspect had an accomplice (or two) I'd not seen!

In any event, the entire episode was over in less than a minute. The robber, cash in hand (less than $200.00, as it turns out), quickly exited and disappeared into the darkness. The traumatized clerk immediately went to the back room and presumably locked the door.

I hustled to my room, locked the door, and called the front desk. The clerk answered, confirmed the robbery, and informed me that police were on their way. The clerk called me back after the police arrived, and I went down and talked with them. During the conversation, I gave investigators a description of the suspect and described where I had been standing, along with other details; But I never mentioned that I had been armed, deeming that fact irrelevant. No arrest has yet been made, so far as I know."

My observations:

As our instructors continually emphasize to us, "when least expected, you're elected!" We were in a nice hotel, in a nice town, and even in a nice part of the nice town. No matter! We must have dangerous encounters like this constantly on our mental map. Only then can we keep our wits about us and form a plan without delay. My plan as a private citizen was *non-participation.* Yet, I was prepared to instantly engage this suspect with gunfire if necessary.

We must remember to look around for additional threats and danger. The suspect never looked around. If he had, he would surely have seen me. Thankfully, he was not well trained in this aspect.

Comment: All is well that ends well! No one was injured, and my instructor subsequently went his way in peace, none the worse for wear, and with only minimal involvement. That is the good news!

I only found out about the incident the following morning over breakfast, as I had been fast asleep in the same hotel when it occurred. While relating the details of the encounter, my instructor was visibly shaken and only then beginning to fully realize the events of the previous evening.

The rest of the instructors and I, all contemplated what we would have done had we been there; some of us silently; some of us out loud. However, none of us really knows, nor, with any luck, will we ever need to know.

Gaining information, processing information, sizing-up a situation, distinguishing the significant from the insignificant, and quickly making tactical decisions are all critical personal survival skills, in addition, of course, to weapons acumen.

My instructor did just fine. He didn't panic. He properly made the decision to remain a non-participant unless his life was threatened, and he kept his wits about him.

When and if it is my turn, I only hope I do as well. ●

EMP Protection
with Barrier Control

By Chuck Fenwick

A recent report by the federal government, has assessed the threat to the United States from a wide spread electro magnetic pulse (EMP). This report indicated that such an event could totally devastate the infrastructure of our country. It further stated that the societal effects of an EMP are not widely understood by the general public, and that the public needs to be educated to this threat.

A large nuclear weapon detonated 125 miles (200 km) above the center of the United States would create devastating EMP over half the country. If the weapon were exploded at 250 miles (400 km) above the center of the Midwest, the entire continental United States (CONUS) would be affected, although at a lower pulse intensity. Strategically, it is believed that the enemy would use three or more weapons detonated at lower altitudes, which would produce a very high intensity electromagnetic pulse over the entire country.

Communication is a critical security concern. Every family should purchase low wattage communicators for local radio contact. A simple set of walkie-talkies could save your life. The lowly CB radio is also a good communicator and is in common use by many people. Larger, more powerful shortwave radios are critical to survival, as they will reach outside of the CONUS, and may be the only real source of contact with the outside world. This equipment must be shielded from EMP by placing it into a 'faraday cage'.

What not to do

Depending on the strength and proximity to the electro magnetic field, certain accepted procedures may not protect equipment. In some areas, just placing electronic equipment into a steel paint can, microwave oven, metal garbage can or ammunition box may be adequate, as long as the contents are insulated from the metal faraday cage. In areas of stronger fields, it may not. There may be only one chance to get it right. There is no penalty for 'over protecting' your critical equipment.

Covering electronics in several layers of aluminum foil, alone, will not help. This is called the "skin effect" and might very well add to the problem by providing a media for producing or storing a charge. All foil layers must be insulated from one another and the equipment must be insulated from the foil. When wrapping any foil layer, do not leave any gaps, as this may produce a "slot antenna" effect.

Fuses, circuit protectors, shielded cables, chicken or screen like wire cages, steel roofs of structures, lead shields, the trunk of a car, and static protectors or envelopes most likely will NOT offer adequate protection for your solid state electronic equipment. Some may even make things worse.

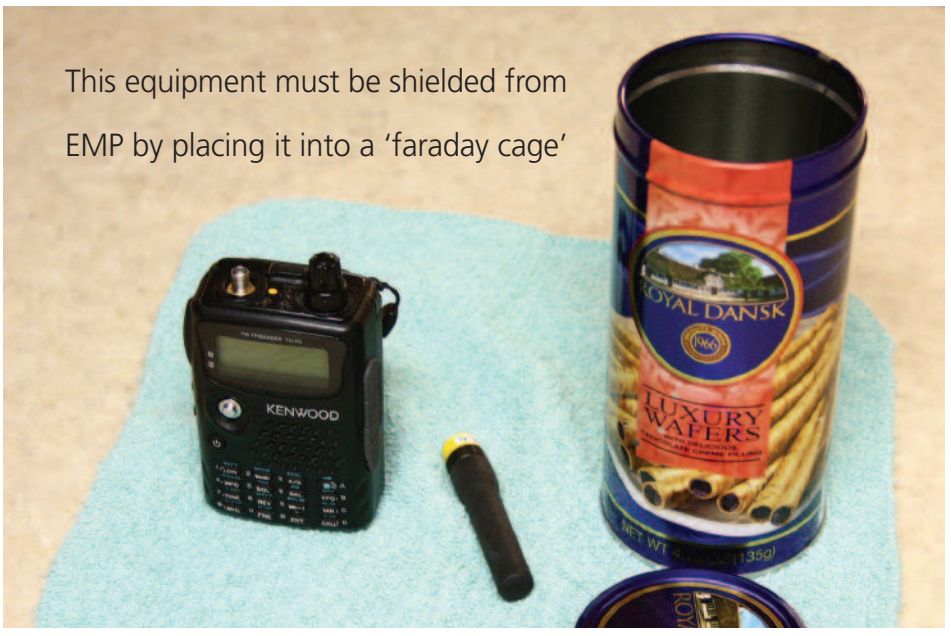
EMP Barrier Control

Testing equipment in powerful EMP simulators, has proven that barrier control offers excellent protection against EMP. Barrier control consists of wrapping electronic equipment in alternating layers of metal and insulating layer (such as bubble wrap). The following directions show an inexpensive method to protect critical communication equipment using barrier control.

Making a proper Faraday Cage

Wrap your radios in at least 3 layers of aluminum foil interspaced with non-conducting bubble wrap. You will need Heavy Duty aluminum foil. Thin bubble wrap is suitable, but if there is room, the thicker bubble wrap is better. You will need tape. Do not use duct tap or any tape that is a conductor.

To protect your radios, first remove the batteries. They may corrode, of if perchance a stray charge reaches the radios, a micro-switch could be activated and turn the radio on which would



Step one

Step two

Step three

deplete the batteries. Regular alkaline batteries will not be harmed by an EMP, but store them with the radios so you have them handy when the radios need to be used.

First layer

Using bubble wrap, carefully wrap your radio completely in the bubble wrap, leaving no gaps. The bubble wrap will insulate the radio from the foil layer. Tape the bubble wrap layer to ensure that it does not unravel. Next, carefully wrap the entire package with a layer of foil. Be careful to leave no gaps in the foil. Tape it if necessary. You have just completed your first and innermost layer.

Second layer

Apply another complete covering of bubble wrap. Tape it in place. The foil should be completely covered by the bubble wrap and gaps are not allowed. Again, carefully wrap the entire package with a layer of foil. As always, be sure to leave no gaps in the foil. If needed, secure it with tape. You have completed the second layer.

Third layer

Complete the third layer as before, with bubble wrap and then foil.

If you wish, you may continue the above steps for any number of layers.

Final step in layering

Complete the packaging with a layer of bubble wrap. The final outer layer must not end with foil because the foil will conduct and maybe even magnify an EMP, defeating the purpose of the layering. The bubble wrap will also protect the foil from being ripped in such a way as to accidentally creating the slot antenna. As this layered protective package now sits, your equipment should be protected from the effects of an EMP. However it is highly recommended that a final protective measure be taken.

Step four

Step five

Step five

Step seven

Step eight

The insurance layer: Your radios are now in a cocoon and will not conduct electricity. They should be placed in a steel box or ammunition can that can be sealed. This can is a Faraday box and is insurance against the elements as well as being an excellent Faraday cage in its own right. It is a good idea if the "job box" or ammunition can has a moisture seal such as a gasket. However, the pulse can penetrate the inside through the seal itself. This can be countered by placing aluminum foil wrapping around the outside of the Faraday box across the seam where the lid joins the box and then taping it in place. Do not try to put foil across the rubber gasket itself because you want the moisture seal to do its job. Water will kill your electronics as surely as the EMP.

Grounding

Do not ground your final Faraday box. The grounding wire itself can collect enough energy to damage your equipment. Rooms that house people must be grounded, but faraday cages should not be grounded.

For other sources go to http://www.armysurpluswarehouse.com/product/20mm-ammo-can-used-good-4394.cfm.

Army Surplus sells ammo cans large enough to contain your lap top. A 20 MM ammo can is a very popular size and measures approximately 17" x 14" x 7.5". It comes complete with a waterproof gasket; GI Issue.

Remove the gasket, sand the paint for metal to metal contact; or staple metal screening together to completely surround the can. Barrier wrap equipment, before placement into can.

How to Avoid Abduction

If a robber demands your wallet or purse, *do not hand it to him.* Toss it away from you. Chances are that he is more interested in your valuables than he is in you, and he will run to retrieve them. After throwing your purse, quickly *run in the other direction!*

If you are ever thrown into the trunk of a car, kick out the back tail light, stick your arm out the hole and start waving like crazy. The driver won't see you, but people driving behind you, will.

As soon as you get into your car, lock the doors and leave. People have a tendency to get into their cars after shopping, eating, working, etc., and sit for a moment before locking the door. *Don't do this!* A predator could be watching you, and this is the perfect opportunity for him to get in on the passenger side, and threaten you with a weapon.

If someone is in the car threatening you with a weapon, *do not drive off.* Instead, gun the engine and speed into anything, wrecking the car. Your air bag will save you. If the person is in the back seat, he will get the worst of it. As soon as the car crashes, jump out and run. A crash is better than the risk of being abducted and maybe killed.

A few notes about getting into your car in a parking lot, or parking garage:

Take note of the cars parked on the sides of your vehicle. If a man is sitting alone in the seat nearest your car, you may want to hurry back into the building and get a guard to walk you back out. *It's better to be paranoid than dead!*

Be aware. Look around. Look into your car at the passenger side floor, and in the back seat.

Don't unlock all the doors at the same time. Unlock only the side you are entering from.

If you are parked next to a van, enter your car from the other door. Most predators attack their victims by pulling them into their vans while the victims are attempting to get into their cars.

Always take the elevator instead of the stairs. Stairwells are a perfect crime spot, and it is very dangerous to be there alone. This is especially true at night.

If the predator has a gun pointed at you, *always run!* He will only hit a running target four out of 100 times, and even then it most likely will not be to a vital organ. Run, preferably, in a zig-zag pattern.

Women and children tend to be more sympathetic than men. Predators play on the sympathies of the unsuspecting. Sometimes they walk with a cane, or pretend they are blind or hurt. They may ask for help to enter their vehicle. *Go for help instead.* Never help if you are the only other adult there.

Never open the door of your home if you are alone, until you know who is on the other side. If someone is calling for help, get your weapon and call the police.

If you are of age, get a carry permit and always carry your weapon.

If you do not have a weapon, remember that the elbow is the strongest point on your body. If you are close enough to use it, do!

Ham Classes are being taught. There is usually a class for each license (Technician, General, or Extra). They are taught by experienced people and will give you a lot of information you can't get from the book, alone. It's a great place to ask questions on the book material, too. Do yourself a favor - take a class (and make some new friends).

Specially qualified people who volunteer their time to do the testing for the FCC conduct test sessions. There are usually several test sessions per month in each area (depending on how many clubs there are and travel miles, etc.). The clubs usually have the list of where and when these sessions are conducted. When you pass the test, these volunteers will submit your score with the required paperwork to the

FCC. This is done electronically, and the results will be registered that day or the next. The volunteers will tell you how to go to the FCC website to check on your Call Sign. Once it is issued, you can start transmitting. This usually occurs within the week. When I got my license, they had you wait for the paper license, and that took about three months. Things are much faster now.

Money

The cost for each test is around $14. Since it changes from time to time, you should ask your Elmer the current testing price. Take that exact amount - in cash - to the session. I usually took three separate envelopes to the sessions, with the exact change in each. I figured that three tries on any one day would be enough. With luck, you will only need to use one envelope.

Forms

On the day of the test session, you will need to fill out a copy of the FCC form #605. Most test coordinators will provide it for you, and will help you fill it out at the test session. You can also find this form on the fcc.gov web site under "Forms". You can print it out in advance, or you can get one from your club or your Elmer and have it ready before the test.

Calculator

Many of the basic math questions can be done in your head, but it is sometimes nice to check your work on a calculator. None of the questions are difficult, and you will have previously seen the correct answers in your instruction book.

These are some things you need to know:

- The calculator must not be pre-programmed. Pre-loading the formulas into the machine is not allowed. A test coordinator may ask you to prove that it is empty before the test starts.
- It is a good idea to take extra batteries for your calculator.
- It is a good idea to take a second calculator as a backup. Once the test starts, you will not be allowed to leave the room until you have completed your test.

#2 Pencil

Take several for back ups.

Test Forms

Bring the forms with you, or get the forms at the test site.

Identification

It is a good idea to take at least two legal forms of I.D. Your class, or club, or your Elmer can tell you what the test coordinators will require. It sounds like a lot of things to remember, but it is really easier than it might appear. The key to passing the test is to thoroughly study the material and to take practice tests over and over.

The next thing you will need is a radio. The price of a good radio ranges from $100 to $10,000 (the $100 radios will get you in on most all the 'action'); but, this will be discussed in the next article.

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