JOURNAL OF
Civil DEFENSE
VOLUME 61
2026 ISSUE 2



EMERGENCY COMMUNICATIONS

www.TACDA.org

TACDA™ is a registered 501(c)3 non-profit, non-political organization.
Donations are always appreciated.

Together We Are Stronger. Let Your Voice Be Heard!

Contact your elected officials! Tell them your emphatic desire to have an official Civil Defense Program for our citizens, no matter the cost.

Our United States government currently:

- Has NO Department of Civil Defense
- Does NOT educate our children about the effects of nuclear weapons
- Has NO fallout shelters for the general public
- Has NO directives on how to build hardened fallout shelters
- Has NO information for post-war survival
- Has NO government directed warning systems, sirens, evacuation plans, or general preparations for nuclear attack available for the general public

Here are three easy ways to find and contact your Senators:

1. **By Email**
   Go to https://www.senate.gov/general/contacting.htm, locate your state's senators with the provided links, and email them.
2. **By Telephone**
   Call the United States Capitol Switchboard at (202) 224-3121.
3. **By Postal Mail**
   You can direct postal correspondence to your senator or to other U.S. Senate offices at the following address:

   For Correspondence to U.S. Senators:
   Office of Senator (Name)
   United States Senate
   Washington, D.C. 20510

   For Correspondence to Senate Committees:
   (Name of Committee)
   United States Senate
   Washington, D.C. 20510

Click here or scan the QR code to contact the United States Senate.

IN THIS ISSUE

4 **When Normal Communications Fail**
By TACDA Staff

7 **Which Radio Service Fits Your Needs?**

8 **Neighbors Helping Neighbors**
By George R. Bradford, KF5QEZ

10 **Choosing Your First Ham Radio**
By Bob Smith, N0OM

12 **My Family Emergency Communications Plan**

13 **Building a Portable HF Emergency Communications Kit**
By Ken Karpe, WA0QAR

16 **Surviving the Derecho**
By James C. Jones

19 **Filling the Gaps: ARES® and RACES**
By Bob Turner, W6RHK

22 **Tornado Response**
By Colonel Jim Smith, MSS, NRP, CPC, CLEE

24 **Radio Terms in Plain English**

25 **Think Before You Transmit**
By Randall Smith

26 **Join the TACDA Emergency Communications Group**

WARNING:

When building a shelter, seek a professional design from appropriate, certified professionals, including electrical and civil engineers and ask to see the appropriate credentials from your builder and installer. Secure your area while under construction. Consult a geotechnical engineer to test your water table and soil type, and do not place your shelter in an area that could flood or accumulate water. Wet shelters could destroy and contaminate your supplies. You must keep entrances securely covered at all times. A poorly built or flooded shelter could result in death or injury from structure failure or dangerous levels of CO or CO_2 or other chemicals. TACDA and the authors of JCD journal entries offer this material as conceptual ideas, only, and cannot legally design your shelter, nor can it ensure it has been safely constructed.

BOARD OF DIRECTORS

Jay Whimpey, P.E.
(President)
Bruce Curley
(Vice President)
Sharon Packer
(Secretary)
Gary Sandquist, Ph.D
(Treasurer)
Board Members:
Paul Seyfried
Jim Stephens
Parker Twiss
Logan VanLeigh

ADVISORS

Mike Barnett
Dave Christensen
Christopher Fey
John D. Hoyle Sr.
Kylene & Jonathan Jones
David Male
Linda Milne
Jane Orient, M.D.
Bill Perkins
Meira Pernicone, M.D.
Arthur Robinson, Ph.D
Bob Smith
Colonel Jim Smith
Dr. Randall Smith
Frank Williams

EXECUTIVE DIRECTOR

Roseanne Hassett

JOURNAL OF CIVIL DEFENSE EDITORS

Brialyn Carlsen
Roseanne Hassett
Sharon Packer

GRAPHIC DESIGNER

Brialyn Carlsen

TACDA
PO BOX 1003
Sandy, UT 84091
www.tacda.org
info@tacda.org
Office: (800) 425-5397
Fax: (801) 662-0367
ISSN: 0740-5537

PRESIDENT'S MESSAGE



Radio communications should be a very important part of our overall preparations for emergency situations. It is essential to communicate to request help, coordinate relief efforts with others, and receive information about the current status of others.

There are many options available for two-way radio communications. Family Radio Service (FRS) radios are very easy to use, require no license, and are very inexpensive. Depending on the channel, FRS radios are limited to either 0.5 or 2 watts of power and are generally used for line-of-sight communications in a relatively small area, such as a local neighborhood. Although they do not have a significant range, they cover the need for local communication, which is very important in many situations.

General Mobile Radio Service (GMRS) radios share some frequencies with FRS radios, but GMRS allows higher-powered equipment on certain channels and can use repeaters that relay signals to extend the communication range. GMRS radios require an FCC license that currently costs $35 and lasts for 10 years. There is no test required to get the license. A single individual license can cover the licensee and qualifying immediate family members.

HAM radios can use many more frequencies and several hundred watts of power and can use repeaters that can act as a chain for very long ranges. They can be used for worldwide communications given favorable atmospheric conditions. There is a test required to receive a HAM license and it is somewhat more expensive to obtain. We should also have a NOAA band radio for up-to-date information about weather conditions and hazards.

Continued on page 6.

FROM THE DIRECTOR

Emergency Communications

By Roseanne Hassett, Executive Director

We have been wanting to dedicate an issue of the Journal of Civil Defense to emergency communications for some time, so I am very happy to finally share this issue with you. I am especially grateful for the talented and knowledgeable contributors who have shared their experience and expertise with us. I hope you will find information here that will strengthen your own preparedness and help you stay connected when normal communications are disrupted.

We have also wanted to create a way for TACDA members interested in emergency communications to connect, learn from one another, and practice together. I am pleased to welcome TACDA member Bob Smith, N0OM, who has generously volunteered his time and experience to help make that happen.

The FIR-EMCOMM Working Group is open to both licensed Ham radio operators and those who are simply interested in learning more about emergency communications. Members will have opportunities to practice through Zello nets, Winlink exercises, HF radio tests and other activities, while sharing knowledge and helping one another develop practical communication skills.

We have created a new Emergency Communications page on the TACDA website where TACDA members can learn more about the group and how to join. Additional information is also listed on the last page of this Journal.

I hope many of you will take advantage of this opportunity to connect, learn, practice, and become better prepared together.

SUBSCRIBE TO THE JOURNAL!

Electronics can fail during natural disasters. Having trusted, printed information on hand can be critical to your survival.

When you subscribe to the Journal of Civil Defense, you'll receive our publication by mail twice per year—in April and October—delivered directly to your home.

$15/yearly

Photo by Volodymyr Hryshchenko on Unsplash

WHEN NORMAL COMMUNICATIONS FAIL



By TACDA Staff

Adapted and updated from the TACDA Academy, Civil Defense Basics, Chapter 13: Communications

Reliable information during a disaster or escalating crisis is paramount to survival. We need to know the scope of the emergency; which areas are affected; whether evacuation is necessary; where food, water, and medical assistance can be found; and when help may arrive.

We may also need to report injuries, request assistance, locate family members, or communicate conditions in our own area. For that reason, emergency communication involves two basic capabilities: receiving information and transmitting information.

Depending on the nature and extent of the emergency, the communication systems we normally rely upon may become overloaded, damaged, or unusable. Severe weather, earthquakes, wildfires and other disasters can interrupt electrical power or damage communications infrastructure. Extended power outages can eventually affect our ability to keep phones and other battery-dependent devices charged. A widespread emergency may also create more demand than communications systems can handle.

The lesson is simple: we should not assume that the communications systems available to us today will remain available during an emergency.

Civil defense therefore requires us to consider alternative methods of communication before they are needed.

RECEIVING INFORMATION IS ONLY HALF THE EQUATION

One of the simplest emergency preparations is maintaining a reliable means of receiving information when electrical power or internet service is unavailable.

AM/FM broadcast radio and NOAA Weather Radio can provide warnings, emergency instructions and other important information. Depending upon the emergency, additional radio services and receivers may provide useful local, regional, or long-distance information.

Receiving information can help answer critical questions: What happened? Where is the danger? Are roads open? Has an evacuation been ordered? Where is assistance available?

But receiving information is only half of emergency communication.

A receiver allows us to listen. Two-way communication allows us to report conditions, request assistance and exchange information with others.

That capability can become especially important when families are separated, neighborhoods are assessing damage, roads are blocked, or normal communications with the outside community have been interrupted.

COMMUNICATION IS PART OF CIVIL DEFENSE

Emergency communication is not simply about being able to talk to someone. Information itself is a resource. After a disaster, individuals and neighborhoods may be among the first to know where people are injured, which roads are blocked, where structures have been damaged, and what resources are urgently needed. That information becomes more useful when it can be passed to someone

who can act upon it.

The reverse is equally important. Families and neighborhoods need reliable information about hazards, evacuation routes, available resources, and changing conditions.

A good emergency communications system helps information move in both directions.

This is why communications planning should begin at the individual and family level and extend outward to neighborhoods, communities, and emergency organizations.

BUILD COMMUNICATIONS IN LAYERS

There is no single communications system that will work best under every circumstance. A practical emergency plan therefore uses layers of communication. Your primary method will normally be the systems you use every day: cellular voice, text messaging, and internet-based communications. A backup method provides another way to receive information or communicate if those systems become unavailable or overloaded.

A contingency method should be capable of operating as independently as practical from the infrastructure that has already failed.

The appropriate methods will depend upon your circumstances. A family trying to communicate between home and a nearby school has different requirements than a neighborhood attempting to coordinate after a tornado. A community communicating across a county has different requirements than an operator attempting to send a message hundreds or thousands of miles outside a disaster area.

Before purchasing equipment, ask:

With whom do I need to communicate, and how far away are they?

The answer should help determine the equipment and level of training you need.

YOU HAVE MORE THAN ONE RADIO OPTION

Amateur radio, commonly called ham radio, has long played an important role in civil defense and emergency communications. Licensed amateur operators can communicate locally, regionally and over long distances using a wide range of frequencies, equipment, and operating methods. Amateur radio also supports organized emergency communications when conventional systems fail.

It is an excellent capability to develop, but it is not the only option.

Several radio services are available for people who need simpler or shorter-range communications:

Family Radio Service (FRS) can provide basic short-range communication without an individual license.

General Mobile Radio Service (GMRS) requires an FCC license but no examination and provides additional options for family and local communications.

Citizens Band (CB) and Multi-Use Radio Service (MURS) provide additional communications choices without an individual operator license.

Each service has different strengths and limitations. Range, allowable equipment, antennas, power, licensing requirements, and repeater capabilities vary. The important point is that **emergency radio does not have to begin with amateur radio.**

A family can begin with a simple communications capability and build upon it as its needs, knowledge, and interest increase.

EQUIPMENT ALONE IS NOT PREPAREDNESS

The TACDA Academy has long emphasized a basic principle of emergency communications: obtaining a radio is only the beginning. You must also learn how to use it.

A radio stored unopened in an emergency kit may be of little value when a disaster occurs.

Everyone expected to use the equipment should know how to turn it on, select the proper channel or frequency, adjust basic controls, and make contact. Important channels, frequencies, contacts, and operating instructions should be written down rather than stored only on a phone or computer.

Power must also be considered. Batteries eventually discharge. Rechargeable equipment requires a charging source. An extended emergency may require spare batteries, vehicle charging, solar power, or another dependable source of electricity.

And a communications plan must be practiced.



Photo by Vardan Papikyan on Unsplash

Family members should know which method to try first, what to try if it fails, when to check in, and where important communications information is kept.

The time to discover that a radio is not charged, that nobody remembers the channel, or that the equipment cannot reach the intended location is before the emergency - not during it.

FOUR PARTS OF A BASIC EMERGENCY COMMUNICATIONS PLAN

RADIO — Have a dependable way to receive information and communicate with others.

POWER — Have a way to keep communications equipment operating when normal power is unavailable.

PLAN — Know whom you need to reach, how you will reach them and what you will do if the primary method fails.

PRACTICE — Learn to operate the equipment and test the plan before an emergency.

START WITH THE NEED

Do not begin your emergency communications planning by asking which radio has the greatest range or the most features.

Begin by determining what you need your communications system to accomplish.

Who must you be able to reach? Are they across the street, across town or across the country? Do you primarily need emergency information, two-way family communication, neighborhood coordination, or long-distance communication? What will provide power if the electrical grid is unavailable? What is your backup if the first method fails?

Once those questions are answered, selecting appropriate equipment becomes much easier.

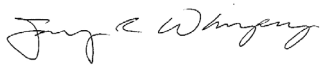
The first step is determining what you need your emergency communications system to accomplish. The next is understanding the tools available to accomplish it.

President's Message, Continued from page 3.

There are many other types of mesh-type digital communication systems and satellite link systems that can be very helpful. We have many useful options for communications, but we have to get prepared before the emergency.

I would suggest that you start small and use FRS radios with your friends and family and invest in a small, solar-powered battery charger to provide power for the radios. An EMP-resistant pouch is also a good investment to store the radios and charging system. Once you are familiar with that system, you can add more capable radios as you increase your communications capabilities.

I wish you well in your future endeavors!



Jay Whimpey, PE
TACDA President

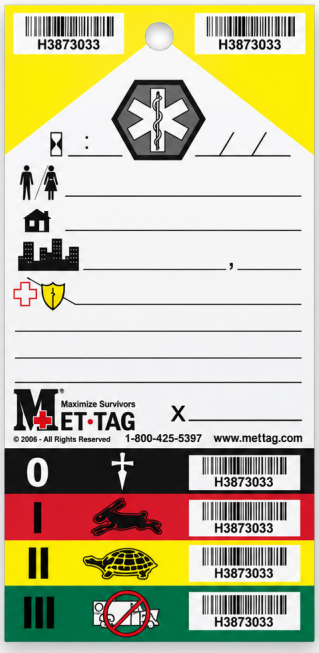
Scan here to purchase!

When lives count, count on METTAG.®

MT-137
GLOBAL TRIAGE TAG

Durable, field-proven triage tags designed for rapid patient identification, prioritization, and tracking.

METTAG®
TRUSTED WORLDWIDE SINCE 1976
METTAG.com | 800-425-5397



WHICH RADIO SERVICE FITS YOUR NEEDS?

A QUICK GUIDE TO COMMON TWO-WAY RADIO OPTIONS

There is no single best radio for every emergency. Start with who you need to reach, how far away they are, and the level of capability you need.

SERVICE	LICENSE REQUIRED?	EXAM REQUIRED?	BEST SUITED FOR	TYPICAL EQUIPMENT	REPEATER CAPABILITY	LEARNING CURVE	GOOD EMERGENCY STARTING POINT?
FRS Family Radio Service	No individual license	No	Family and very local use	Handheld radios	No	Low	✓ Simple
GMRS General Mobile Radio Service	Yes (FCC license)	**No NO EXAM**	Family, neighborhood and local use	Handheld, mobile, base stations	**Yes**	Low to moderate	✓ Excellent
CB Citizens Band Radio	No individual license	No	Local and vehicle communications	Handheld, mobile, base stations	No	Low	✓ Useful
MURS Multi-Use Radio Service	No individual license	No	Local communications	Handheld, mobile/base stations	No	Low	✓ Useful
AMATEUR (HAM) Amateur Radio Service	Yes (FCC license)	Yes	Local through long-distance communications	Handheld, mobile, base/ portable stations	**Yes**	Moderate to advanced	✓ Most capable

FRS – SIMPLE FAMILY COMMUNICATION

FRS is the easiest place to begin. There is no individual license or examination, and the radios are generally simple to operate. It works well when the people you need to reach are relatively close—family members, people on your property, or members of a nearby group.

THINK: Simple, short-range communications.

GMRS – A STEP UP WITHOUT AN EXAM

GMRS requires an FCC license, but there is no examination. It provides additional options beyond basic FRS, including repeater use, which can greatly extend usable range when a repeater is available. It's an excellent choice for families and neighborhoods who want more capability and room to grow.

THINK: Family and neighborhood communications with room to grow.

We will take a much closer look at GMRS on the following pages.

CB – AN ESTABLISHED INDEPENDENT OPTION

Citizens Band radio has been used for decades for local and mobile communications. It does not require an individual operator license and can be useful when communications are needed without dependence on cellular or internet infrastructure.

THINK: Vehicle, local and community communications.

MURS – SIMPLE VHF COMMUNICATION

The Multi-Use Radio Service provides five VHF channels and permits up to 2 watts transmitter output. No individual license is required. Repeaters are not permitted.

THINK: Relatively simple local communications where MURS equipment fits the need.

(See FCC Part 95, Subpart M)

AMATEUR RADIO – THE MOST CAPABILITY, WITH MORE TRAINING

Amateur radio provides capabilities well beyond the basic personal radio services. Depending on your license privileges, equipment and operating conditions, you can communicate locally, regionally and around the world, and participate in organized emergency communications.

That capability comes with additional responsibility. An FCC amateur license and examination are required, and effective emergency operation requires knowledge and practice.

THINK: Greater capability, flexibility and opportunities for advanced emergency communications.

(See FCC Part 97)



WHAT DOES RANGE REALLY MEAN?

Radio range is not a fixed number. Buildings, hills, trees, antenna height, frequency, radio configuration, and the location of the other station can dramatically affect how far you can communicate. A radio advertised for a particular number of miles will not necessarily achieve that distance under real-world conditions.

PLAN FOR THE TERRAIN WHERE YOU ACTUALLY LIVE—AND TEST YOUR EQUIPMENT BEFORE DEPENDING UPON IT.

Regulatory requirements and rules can change. Always consult the FCC website (www.fcc.gov) for the most current information.



Photo by Mathyas Kurmann on Unsplash

NEIGHBORS HELPING NEIGHBORS

Using FRS and GMRS for Emergency Neighborhood Communications

By George R. Bradford, KF5QEZ

Condensed from Radio Amateur's "Getting Back to Civil Defense: A Plan Just for You and Your Neighbors During Disasters"

Emergency response will never be just about radios. Even at the neighborhood level, the work is complicated and will require quick, calm and decisive action from the collective effort of your entire neighborhood in order to minimize impact.

You and your neighbors will always be the first to arrive on any emergency impacting your own neighborhood. You will be in the best position to take the most effective initial emergency action.

The next critical goal will always be to get your family back together. They may be isolated because of damaged roadways, road blocks that prevent family from getting home, downed trees, flooded rivers, etc. Before radio operators can deploy to their amateur communication commitments, they must make sure that all of their family is safe and back together. This will require a pre-planned Family Re-Unification Strategy.

THE FAMILY RE-UNIFICATION STRATEGY

1. Pre-designate a meeting place with an alternate. If nothing else, any place where you know the people by first name. All family members must make every effort to get to these pre-designated locations. Consider designating a neighborhood safe-home where underage kids can safely wait until their parents get home.
2. Write these locations down in a small address book. Don't count on your phone; pretend it is lost or damaged. Family members will start looking for you at these pre-designated locations.
3. Go ahead and try to use your cell phone but don't call; send a text message. A text may go through when a voice call will not. Under no circumstances try to send photos or videos over an already overworked cellular system.
4. Make a point of carrying a small, inexpensive Family Radio Service (FRS) walkie-talkie. Example: the kids are out riding their bikes but you are not sure where. Cell service is out but two-way radios will still work.
5. Leave messages at any place you have been and the destination you are trying to get to.
6. Make every effort to move before nightfall; it will be different in the dark!
7. If you can't drive to a meeting place and you have the physical ability, walk to your meeting place. You might be surprised how far you can get on foot.

HOW ARE THE NEIGHBORS DOING?

Once your family has been accounted for, implement a collective of Neighbors Helping Neighbors (NHN). This is where getting to know your neighbors will pay off. It can become its own reward. Identify which resources they can offer to the neighborhood recovery effort.

This is not a government assistance program. The program is all yours. There are no formal organizations to join or qualify for; just get to know your neighbors and agree to be available to help each other.

Offer to help your neighbors obtain their amateur radio license if they show an interest. If they are not interested, an inexpensive FRS or GMRS walkie-talkie is a good tool for short-range coordination.

The elderly may have been through something similar

and may have some useful ideas. Make sure they are protected from heat and cold. Stop by every elderly person's home in the neighborhood as often as conditions dictate.

Knowing your neighbors is only half the job, you also need a reliable way to confirm, day to day, that everyone is actually okay. That's where a regular check-in routine comes in.

RADIO CHECK-INS AND WELFARE CHECKS

If travel is difficult between neighbors, set a time each day for all your neighbors to check in on their FRS/GMRS radios. If they don't check in, send someone to do a welfare check.

Most of the people in your neighborhood will have at least one area of expertise that might be helpful during a disaster. While getting to know your neighbors, ask what tools and expertise they can provide while waiting for the government to respond. I expect you will find contractors, electricians, paramedics, etc. Make a list of personnel and resources.

INFORMATION SHARING

Once your neighborhood has a working radio network, that same network will start carrying more than just check-ins. It will carry rumor as easily as fact, so managing information becomes its own responsibility. Anyone with an operational radio will hear plenty of informational reports; most will not have been confirmed.

Be cautious about passing on reports from unofficial sources unless you or the trusted source has personally witnessed the situation.

Properly vetted, the situational information you hear on your radio may help alleviate some of the helpless feeling and pointless wandering around often seen by victims of a disaster that have no idea what is happening. Just be cautious and confirm situational information.

MOVING BEYOND FRS: WHERE GMRS FITS

FRS radios are enough to get a neighborhood talking, but as the network grows, a bit more range and capability make coordination much easier - that's the gap GMRS fills. The General Mobile Radio Service (GMRS) is another radio service covered under the FCC Personal Radio Services. These radios are readily available and only a little more expensive than basic FRS radios. The transmitters in this group of radios have higher output, so they can have a longer effective range. Mobile radios can also be fitted with an external antenna, which can increase the range even further.

They are capable of talking to FRS radios on the channels shared by the two services. With greater capability, these radios can be a good tool for neighborhood coordination by a Local Gateway operator.

Like FRS radios, handheld GMRS radios are battery operated, so maintain your battery cache. Because this group of radios has greater capability, GMRS service does require an FCC license. There is no special training or test required.

EXPANDING THE NEIGHBORHOOD: THE LOCAL GATEWAY

With FRS handling family reunification and GMRS extending the network's range, the final piece is a person to anchor it all: the Local Gateway.

A Local Gateway Station is an individual radio operator who employs a VHF/UHF or GMRS base station operating from a home or other stationary location, using an external antenna to increase communication range.

The primary function is coordination of Neighbors Helping Neighbors and relaying messages toward another station capable of carrying them beyond the neighborhood.

GMRS radios are inexpensive and require minimal technical radio experience to operate. For this purpose, GMRS serves the greater purpose of simplicity as compared to entry-level amateur licensed radio service.

Small groups are always going to be easiest to organize. Implement as much or as little of this program as fits your needs and your ability. Review your plan and practice these skills often. Instinctive reactions will only come with practice.

George Bradford is a retired fire officer, fire academy instructor, and U.S. Navy veteran. He is the author of Self-Reliance during Natural Disasters and Civil Unrest, which trains "immediate responders", or ordinary citizens, to handle early-stage emergencies. A specialist in emergency communications, George co-founded the North Texas Near Vertical Incident Skywave (NVIS) net to facilitate rapid post-disaster communication recovery. He shares emergency preparedness strategies on the Community Disaster Messenger YouTube channel.

CHOOSING YOUR FIRST HAM RADIO

By Bob Smith – N0OM

Photo courtesy of Stryker Radios



I'm often asked, "What's a good first radio to buy?" I think my inquisitors generally hope to hear make/model but it's just not that simple.

First of all, HAM radio is a thousand hobbies in one, many of which require dedicated equipment. The old cliché "ask ten experts, get ten different answers" applies here perfectly, and here's my answer. I ask them what they want to do with it. From there I go to the better answer.

START WITH A LOCAL CLUB

Go online and search for "HAM Radio clubs near me" (or "near [your ZIP code]" might work better). Most clubs are very welcoming to newbies and will be happy to talk with you. If you don't feel that, visit the next club on the list.

Finding out which bands, modes and technologies are most used in your area is a great place to start. You'll likely find a good bit of helpful technical guidance while you're at it, plus you might even luck out and find someone willing to loan you a radio to help you get started.

Beyond that, here are a few things to consider.

LOCAL OR LONG DISTANCE?

Do you want to listen to "your grandfather's HAM radio"? That is, long-distance signals that bounce off the ionosphere and connect you to HAMs on the other side of the world?

That requires more than the entry-level license for talking, but listening is free. You'll actually have access to small portions of the HF bands with your Technician license, but the General Class license opens that door wide for you.

Or would you rather get traffic and weather reports and chat (once you're licensed) with folks around town? Most HAMs do both, but each requires distinctly different radios.

Want to know what gets the most usage in your area? Go online and search for HAM Radio clubs near you.

THERE'S MORE THAN VOICE?

Maybe you're into computers and you've heard about the digital modes that allow you to pull weak signals "out of the noise" (otherwise undiscernible to the human ear) for keyboard-to-keyboard exchanges.

That doesn't require a third type of radio, but it does require a computer and a way to connect it to the radio, along with a bit of know-how to set up the software.

Where do you get support to learn more about that

sort of system?

My advice? Yup! Go online and search for HAM Radio clubs near you.

DON'T BUY A RADIO YOU CAN'T USE

I could give you the make and model of a neat little handheld "starter" radio, but the radio by itself will do you no good as it needs to be programmed before first use. I'd be glad to help with that, but my local frequencies are sure to be different than what you'll need in your area. All I can tell you is to (you guessed it) go online and search for HAM Radio clubs near you. HAM radio involves a lot of talking. Don't be bashful!

The QRZ.com website is also a great learning resource and offers what they call their "New Ham Jumpstart Program." Eligible newly licensed HAMs can receive a substantial discount on a VHF/UHF handheld radio for local chats, weather reports and other uses.

EDITOR'S NOTE: At the time of this publication, the QRZ New Ham Jumpstart Program is available to eligible U.S. amateur radio operators who obtained their first FCC license within the previous six months. Program details, pricing and availability are subject to change.

A FEW LAST BITS OF ADVICE

Buying a used rig at a swap fest.* This can be a gamble unless you know the seller well. If you encounter problems getting on the air with a second-hand rig, you won't know for certain if you're encountering a problem with the radio or if you're doing something wrong. This can be very frustrating!

Pay attention to the antenna. A high-powered (1500-watt legal limit) amplifier can push a signal through a coat hanger, but it may just as likely resonate through your microwave oven and/or the neighbor kid's orthodontia. On the other hand, a good, well-tuned antenna attached to a 5-watt radio can get you talking coast to coast. Remember that!



Photo courtesy of Georgia Health News

Digital voice is another option. Digital Mobile Radio (DMR) is fairly new to the HAM community (business and law enforcement have been using it for years). DMR radios allow you to talk around the world, via the internet, with a 5-watt, hand-held radio! Many manufacturers offer different digital systems that don't necessarily talk to one another. (There's a way around that, but I'd tell newbies to steer clear for now.)

DMR is an open digital radio standard developed by ETSI. D-Star is another digital protocol, with radios offered by manufacturers including Icom and Kenwood. System Fusion/C4FM is used in many Yaesu radios. You can spend anywhere from $200 to $500 or more on each one. The best one to buy is the one most used in your area. (Here I go again...) Go online and search for "HAM Radio clubs [near me]."

Learn before you buy. My local club has built a number of "Go Boxes" that members can check out for fun and familiarity while they consider building or buying their own setups. We have an HF Go Box (again, your grandfather's HAM radio), a DMR Go Box and a Packet/Winlink Go Box. (Winlink is a computer program which allows you to send & receive email around the world via radio with no internet connection!) If you're lucky, you might find a club in your area doing something similar. Best way to find out? Uh huh - go online and search for "HAM Radio clubs [near me]"!

Some may argue with this but, in my opinion, the exam and license are merely the keys that unlock the door to the hobby for you. Once you're there, your club's activities and social gatherings are where you really learn how to be a HAM.

All for now, 73 (HAM speak for "Best Regards")

Bob – N0OM

**A swap fest or HAM fest is basically a flea market for HAM Radio gear. Many clubs make this an annual fund-raising event. In many metro areas you might find one just about every month!*

First licensed in 1972 as WN0HKS, Bob Smith returned to amateur radio in 1993 and achieved his Amateur Extra license in 2023, securing the vanity callsign N0OM ("Old Man"). He grew up building radio kits and has built a decades-long background in emergency communications. Bob is a former USAF Aux / CAP Communications Officer, a 2003 Region Communicator of the Year, and a Boulder / Broomfield Counties ARES Board Member. He serves as the Black Sky EMCOMM Work Group Leader for the Joint Communications Task Force (JCTF.us) and is a volunteer instructor for HamRadioSchool.com.

WHAT TO COMMUNICATE

WHO	Who are you?
WHERE	Where are you?
WHAT	What happened or what do you need?
WHEN	When did it happen?
ACTION	What are you doing next?

Keep messages short, clear and complete. Repeat important information back to confirm you heard it correctly.

THINK BEFORE YOU TRANSMIT



Radio transmissions are not private. Other people may be able to hear what you say.

Avoid unnecessarily broadcasting:

- Detailed descriptions of supplies, food, fuel or equipment you have stored
- Security arrangements
- Information about an unattended home
- Private medical information
- Personal details that are not necessary to accomplish the communication

Transmit what is needed—no more.

BE READY TO OPERATE

BACKUP POWER – Be Prepared

- ☐ Spare radio batteries
- ☐ Rechargeable battery pack
- ☐ USB power bank
- ☐ 12V vehicle charger
- ☐ Solar/backup charging
- ☐ Correct cables & adapters

KEEP WITH THIS PLAN

- ☐ Important phone numbers
- ☐ Radio channel/frequency list
- ☐ Local repeater info (if applicable)
- ☐ Printed local/area maps
- ☐ Emergency contacts
- ☐ Notebook / message forms
- ☐ Pencils



Practice your plan with everyone who will use it. Know your radios and check-in times.

MY FAMILY EMERGENCY COMMUNICATIONS PLAN

Primary communication method: _____

Backup communication method: _____

Primary radio channel/frequency: _____

Backup radio channel/frequency: _____

Check-in times: _____

How long we will listen at each check-in: _____

Primary family meeting place: _____

Alternate meeting place: _____

Out-of-area contact: _____

Phone: _____

Family members who carry radios: _____

_____

Where backup radios are stored: _____

_____

Where spare batteries/charging equipment are stored: _____

_____

If we cannot communicate, we will: _____

_____

_____



A communications plan does not need to be complicated.
It needs to be understood, written down and practiced.



Make a copy of this page or write your plan on a sheet of paper. Keep it with your communications equipment.

BUILDING A PORTABLE HF EMERGENCY COMMUNICATIONS KIT

By Ken Karpe, WA0QAR

The first sentence in the TACDA Academy, Chapter 13.01 states: "Reliable information during a disaster is paramount to survival". No words could be truer today. We have become so dependent on the reliability of cell phone services and the Internet in our everyday lives that most of us have forgotten what it's like to live without them.

Even with cell phones working, the phone systems became overwhelmed during 9/11 as many people tried to find out if their families were okay. With tense situations around the world and many threats directed in some way toward the US, having an alternative form of communication only makes good sense.

One way to put an emergency communications kit together is to put your radio in a car and install a mobile radio antenna. These systems work well for many Hams. I have not used this method of emergency communications, but for some it should not be overlooked.

I'd like to focus instead on a High Frequency (HF) single-sideband (SSB) emergency kit. Should you decide on other options, such as VHF, many of the same principles will remain.

PLAN FOR MORE THAN ONE SOURCE OF POWER

There are a variety of possible emergency power supplies, including gas generators, solar power and deep-cycle batteries, each with advantages and disadvantages.

When selecting radio equipment, look for a radio that offers flexible power options. Some radios can run on household 120-volt AC power or 12-volt DC power with the appropriate power supply or adapter.

I have a couple of 120-volt AC gas generators, including one with a 12-volt DC charging winding for charging batteries.

In any case, thinking that fuel might become scarce during an extended emergency, I built a small 12-volt generator system using a car alternator to charge my 12-volt batteries directly. The advantage of having an alternative like this is that after fully charging the battery, the small engine can be turned off, thus saving fuel.

I mounted the engine and alternator on a steel frame, although a suitable alternative base could also be used. Note, there is no gas tank mounted on the engine. Rather, I used a 6-gallon boat fuel tank and fuel hose. This method allows me to store the generator when not in use, makes it a little lighter to carry, and I can keep fuel away from the generator when it's running.



Figure 1: Ken Karpe's homemade 12-volt generator system uses a small engine and automotive alternator to charge 12-volt batteries.



Figure 2: A second view shows the alternator and generator assembly mounted to the steel frame.

DISTRIBUTE 12-VOLT POWER WHERE YOU NEED IT

If you are going the route of 12-volt power, consider building a 12-volt termination distribution box complete with cigarette lighter sockets with USB ports and wire terminals.

The termination box will allow for multiple connections depending on what radio, light, cell phone etc. needs power (see picture below). Note, I have a light bulb connected to the terminals.

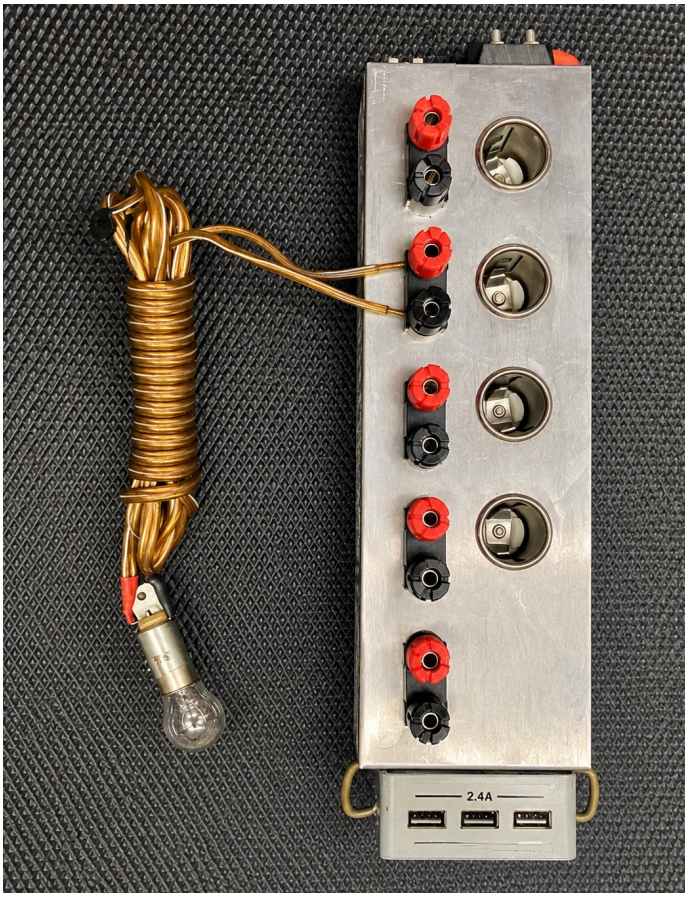


Figure 3: Ken's 12-volt distribution box provides multiple connection points, 12-volt accessory sockets, and USB power.

DON'T NEGLECT THE ANTENNA

There are volumes of books written on the subject of antennas. Chapter 13.06 of the TACDA Academy lesson manual discusses SOME of the many types of antennas available. For receiving transmissions only, any wire strung up a tree or fence can work. For an Emergency Communications Kit, an antenna becomes critical. You can have the most expensive radio, but if a good antenna isn't used, all that money goes to waste.

An important consideration is matching the antenna to the frequencies on which you intend to transmit. For a standard half-wave dipole, a commonly used starting formula for overall length is:

HALF-WAVE DIPOLE

Length (feet) = 468 ÷ Frequency (MHz)

At 14.3 MHz: approximately 32 ft. 9 in.

So, in the case of a dipole at 14.3 MHz, the antenna length should be cut for about 32 feet 9 inches. The dipole mentioned above is designed around a particular frequency. If you want to operate efficiently across multiple bands, a basic single-band dipole can become limiting and a big hassle.

A simple wire dipole is particularly useful for portable HF communications because it can be inexpensive, lightweight and easily supported between trees or portable masts.

Another antenna for emergency communications that you don't have to keep cutting to length is the trapped dipole or folded dipole. These types of antennas can cover a wider range of frequencies without the need to cut and re-cut the antenna each time you change operating bands.



Figure 4: Example of a wire dipole configuration using a balun.

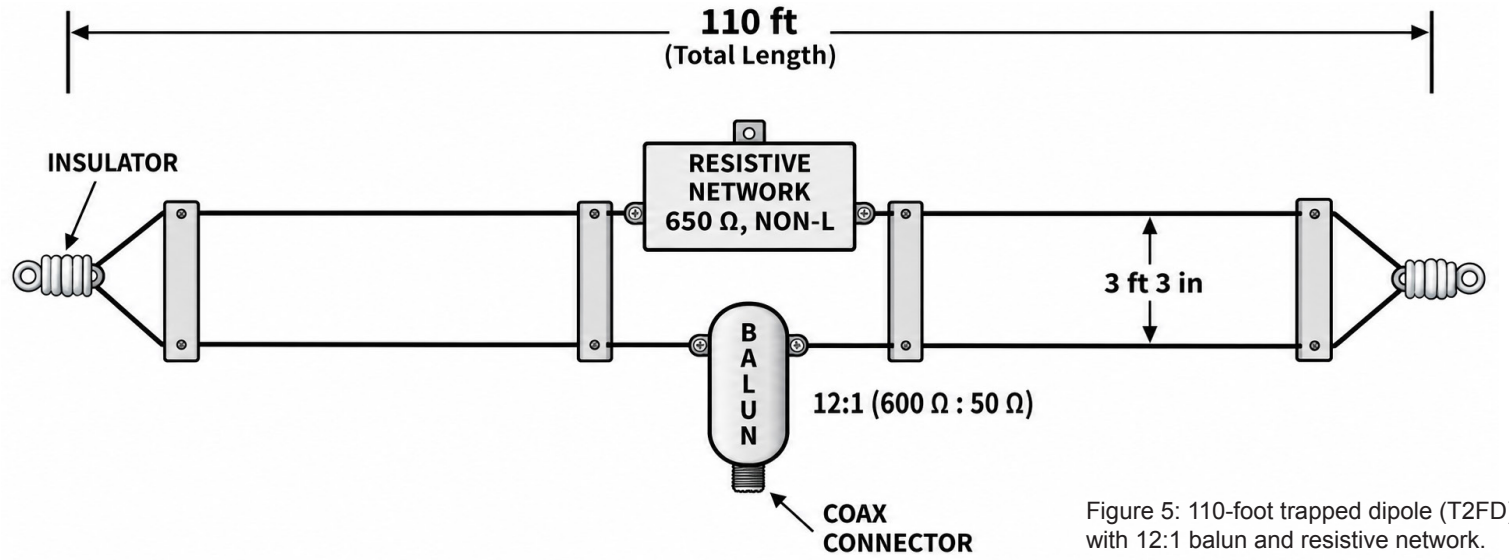


Figure 5: 110-foot trapped dipole (T2FD) with 12:1 balun and resistive network.

ANTENNA MASTS

I think any Ham would advise trying to get the antenna up as high as possible. Don't forget about using that old oak tree in the back yard. Just be careful while trying to reach a high branch.

I have used antennas mounted to the military AN/GRA-4 and AN/GRA-12 antenna masts. Different configurations can be used depending on the antenna type and the amount of real estate available.

I have used these antenna masts with great success. The GRA-4 is approximately 40 feet tall when erected. This mast can be used with a dipole, inverted V antenna or vertical antenna. When fully collapsed for storage, the mast sections are around 5 feet long.

One can also fabricate a shorter mast pole to do the same work as the GRA-4 by using fence piping and guy lines.

SAFETY FIRST

Finally, it is critical to properly ground your radio station when setting up any of this equipment. For installations that require an outdoor grounding electrode, an 8-foot ground rod is commonly used and should be properly installed and bonded. While interior metal water pipes were traditionally used for grounding, they should not be assumed to provide a proper radio or lightning ground.

Be careful. Generators present electrical and carbon-monoxide hazards. Antennas and masts can bring people dangerously close to overhead power lines. Wet conditions increase electrical hazards.

Never operate a fuel-burning generator inside a home, garage or other enclosed space, and keep antennas, masts and ladders well away from electrical power lines.

Set up and test your equipment under normal conditions before you ever need to deploy it during an emergency.

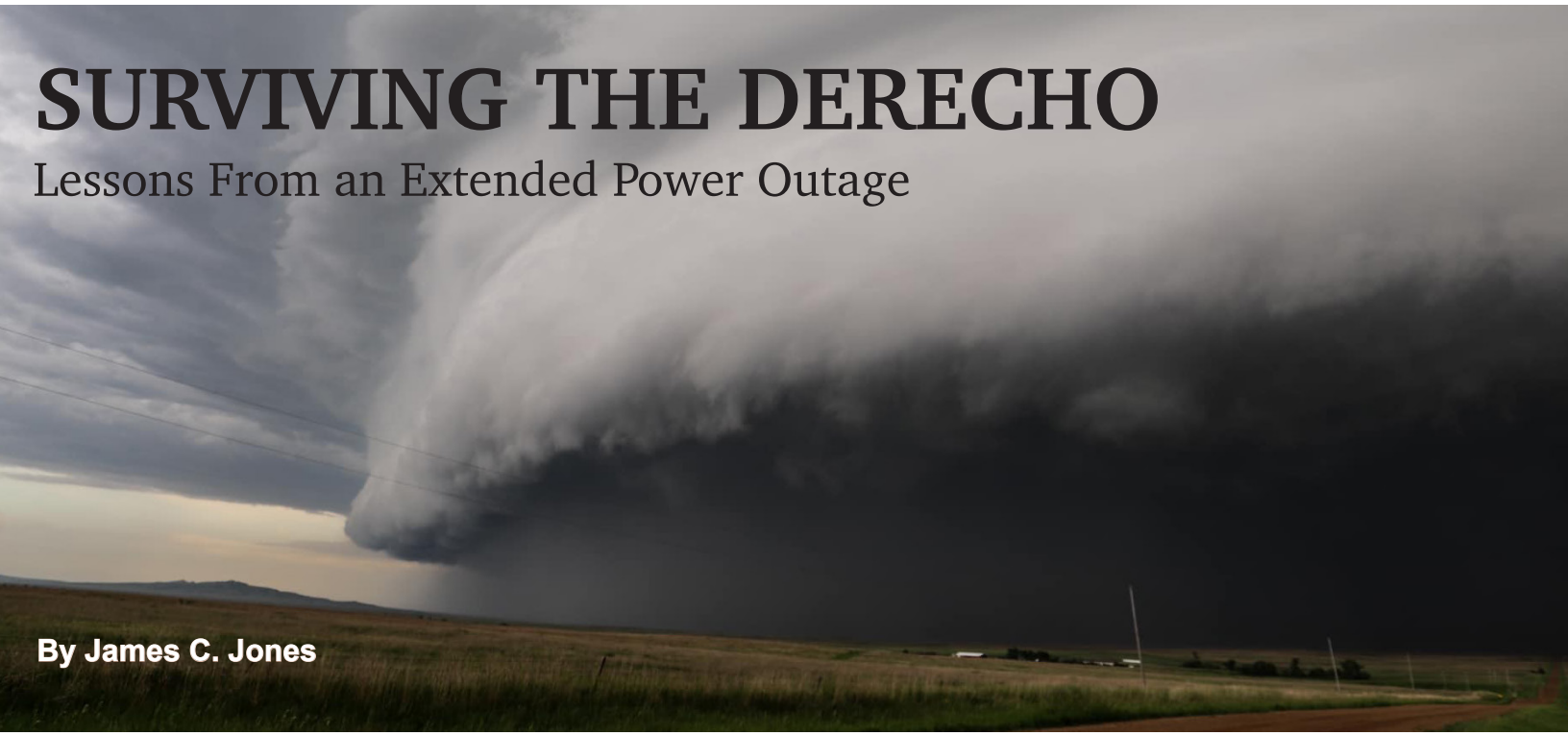
Sources

- *AN/GRA-4 and AN/GRA-12 Antenna Group Technical Manual, TM 11-2651.*
- *DX Engineering.*
- *Air Force Communications Command. Compendium of High Frequency Communications Articles. DCS/Logistics, August 1, 1986.*
- *Barker & Williamson, B&W Model AC3.5-30 Antenna.*

Ken Karpe received his General Class Amateur Radio License at age 17 and later served in the U.S. Marine Corps, including deployments to Vietnam and Okinawa. While stationed in Okinawa, he worked at a MARS (Military Affiliate Radio System) amateur radio station, handling approximately 100 phone patches a day to connect military personnel with loved ones in the United States.

Ken later served in the Air National Guard and deployed to Saudi Arabia during Operation Desert Storm, where HF radio supported aeromedical evacuation operations. He also assembled a self-sustaining radio equipment pallet designed to operate for months without resupply at a remote desert base.

Now retired, Ken remains active in amateur radio and is building his own station for personal and emergency communications.



SURVIVING THE DERECHO

Lessons From an Extended Power Outage

By James C. Jones

Photo courtesy of the National Weather Service, June 6, 2020 Derecho

While we are all familiar with tornadoes and hurricanes, derechos are a less well understood wind event. The word comes from the Spanish for "straight ahead," a term physicist Gustavus Hinrichs borrowed in 1888 to describe the linear wind damage he was studying in Iowa.

Hurricanes can often be tracked well in advance, while tornadoes usually follow a relatively narrow path of destruction. Derechos can develop and move rapidly, be many miles wide, and march over hundreds of miles. This wall of wind can reach velocities over 100 mph. The effect is like a gigantic bulldozer knocking down power poles, uprooting trees and destroying infrastructure over hundreds of square miles.

While the damage is comparable to tornadoes, the scope is far more extensive. Derechos are often accompanied by torrential rains, thunderstorms and embedded tornadoes that exacerbate the damage and inhibit recovery.

At 11:42 am on August 11, 2026, a derecho struck the south suburbs of Chicago and swept through Northwest Indiana devastating at least four counties. Storms were predicted and the possibility of a derecho was included in the forecast, but the intensity and timing were unknown.

The region had experienced more than sixty-five tornadoes in the preceding months, ranging from F-0 to F-3, and recovery was still underway. When the sirens sounded my wife and I went to the basement and activated our weather radio.

There was just a bit of rain and some distant thunder before we heard a huge roaring sound accompanied by a lot of crashing and banging outside. The lights went off and on again several times and then went out and stayed out.

After a few minutes, it got brighter outside and very quiet. I came upstairs and looked outside to see damage everywhere. My six-foot-high wooden fence was blown down. Streets were blocked by whole trees that had either broken or simply been uprooted. The trees had taken down power and phone lines on every block and behind every house.

Ninety-five percent of the residents in three whole counties lost power, and most would be in the dark for between six to twelve days.

I was out in the street with neighbors assessing the damage and trying to prioritize actions. At first everyone thought that the power might be restored in a day or two and the streets would be open soon. But as darkness fell and the scope of the damage became apparent, I started to go into my long-term survival mode.

Since I could not access the cord for the refrigerator, I moved as much as I could to the small freezer. The next-door neighbor already had his generator running and

offered a hookup until I could get mine out of the garage. I only needed it for the freezer that runs periodically and the sump pump. With no power, the garage door would not open and the door release was jammed, so I used the battery from my Grid Doctor™ solar power unit to open the door. That allowed me to move the SUV and get to my generator, but I had only a limited supply of fuel.

All of the gas stations for miles were closed, and the unaffected ones either ran out of fuel, or you had to wait over an hour to get it. In the end I just gave my neighbors money for gas.

I brought out my stock of 120-hour emergency candles, tactical flashlights and rechargeable electric lanterns. That night we sat on the front porch and read from our Kindles. I placed candles in a few rooms for general lighting. These burned from 7:00 PM to 9:00 PM for ten nights and still had a long way to go. I left one burning all night in the bathroom and it still had a bit to go. I have ordered 12 more for my stock.

Every morning I would put out the Grid Doctor ™ solar panels to recharge the battery. On a sunny day I could get a full charge in about six hours, but if it was cloudy, it could take at least eight hours. We used this system to recharge our Kindles, cell phones, electric lanterns and flashlights, and to run the TV an hour each evening to watch the local news. I have since ordered another battery and additional panels.

While I lost most of the refrigerated food, I saved most of what was in the freezer.

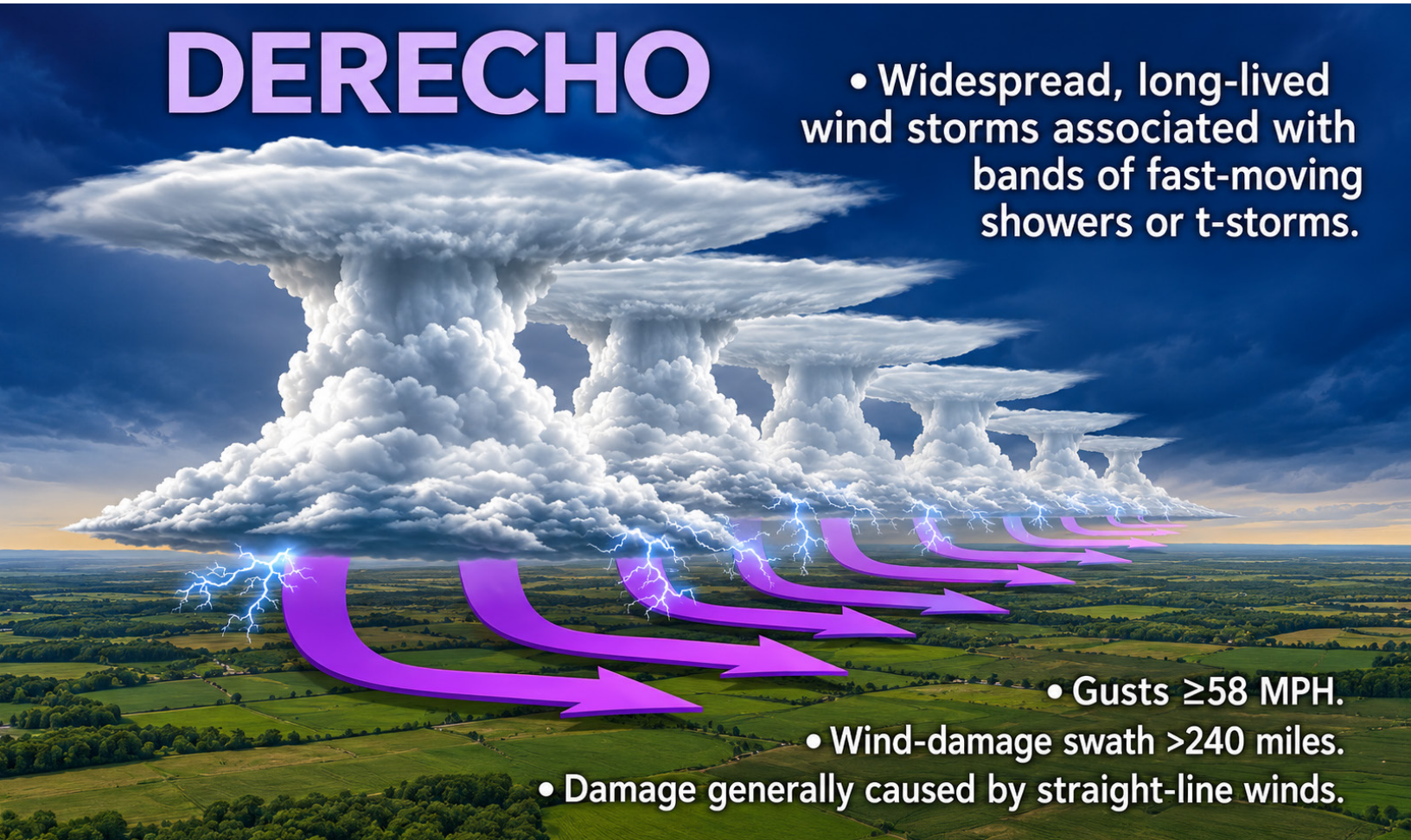
On the second day, we found that the local grocery store was open and stocked. More importantly, they had plenty of ice. I got out two camp coolers, filled them with ice, and was able to keep a limited supply of iced tea, milk, juice and other essentials. While the ice lasted about two days, I made daily trips to get fresh ice.

Our meals were a bit eclectic, ranging from canned goods to items off the shelf from the store. We could light the top burners on the gas stove,* but the oven had electric controls, so it was out. Of course, the microwave was not available, but we were able to thaw some microwave meals and cook them in pans.

Between what was on the shelf and a few items from my "stage-one" survival stores, we had plenty of food. I did not need to get into my dehydrated stock. Fortunately, we had an old-fashioned coffee pot in the camping gear, so coffee was not a problem.

The gas hot water heater worked, so hot showers were still available. After a while laundry started to pile up, and there were no laundromats open in the area. I would hand-wash small batches in the basement sink and hang them out to dry on the few nice days we had.

Being older, I felt fatigued and suffered from back







Figures 1 and 2: Destruction from the August 11, 2026 derecho which stretched across northeastern Illinois and northwestern Indiana.

strain, and a recent leg injury added to the challenges.

Everything was harder and more complicated, but everything was manageable.

LESSONS FROM THE STORM

- Don't procrastinate on anything. A lot of home maintenance and preparedness paid off. We didn't wait until we were out of paper goods, food, medications, cleaning supplies, and repair items to stock up. Both our vehicles had almost full tanks of gas. Live like the power will be off tomorrow.
- Be truly prepared. We had four good tactical flashlights and two rechargeable lanterns, along with a NOAA weather radio and battery/crank multi-band radio. The solar-powered battery unit and available 2,000-watt generator proved more than adequate.
- Go solar. Gas or multi-fuel generators are adequate for short-term local emergencies, but they run and burn fuel even when not under load. Fuel may not be available, stored fuel is a hazard, and generators are noisy. I would hear one of my neighbors going out every night at about 3:00 AM to refuel his generator. This went on for almost two weeks. Solar is quiet and reliable. While we all went to bed early, the generators kept us awake until we got used to them.
- Stock up on emergency candles. Candles are still a reliable and easy-to-store source of emergency light, but they must be used safely and away from flammable materials.
- Know your neighbors. This is probably the most important lesson. My neighbors got out and cleared the streets. Whole families helped many of the more elderly people. Nice people from the community and the church stopped by to see if we were okay. One family brought us a meal, and another neighbor's son cleaned my gutters of storm debris.
- Recover, repair, restock, replan. If it happened yesterday, it can happen tomorrow. Reset and upgrade your equipment and supplies ASAP.
- Stay calm and prioritize. In an instant everything changes. You must adjust. What was important this morning must be postponed or forgotten in favor of basic needs. This can be frustrating and make you angry. The sooner you accept the new reality and plan on getting through the new normal, the easier it will be.

My wife and I enjoyed the quiet evenings on the porch and talking with neighbors. All disasters are opportunities to learn and grow stronger.

**I also had a two-burner camp stove with plenty of LP (liquid propane) gas cylinders if needed.*

James C. Jones is the founder of Live Free USA, a non-profit educational organization dedicated to emergency preparedness, disaster survival, and self-reliance. He is a Certified Hazard Control Manager, Emergency Medical Technician, and retired Safety and Security Manager for a Fortune 200 corporation. He has spent more than 40 years teaching survival skills, emergency preparedness, and family self-reliance.

James has authored numerous preparedness articles and six books, including: Advanced Survival, Total Survival, 150 Survival Secrets, Ultimate Book of Survival Gear, The Preppers Medical Manual, and Surviving the Coming War. He can be reached at survivorjj@aol.com.

FILLING THE GAPS: HOW ARES® AND RACES KEEP EMERGENCY COMMUNICATIONS MOVING

By Bob Turner, W6RHK



EOC at Robins Air Force Base, GA

In examining communications failures, we need to first consider who has communications systems. If one stops to think of the variety of agencies, you realize that there are just as many different communications systems as there are communicators. Who has communications systems? Cities and counties, law enforcement agencies, fire departments, school districts, transportation systems both public and private, railway systems, state, county, and national park services, hospitals, various non-governmental organizations, and public works. This list is by no means exhaustive, yet it demonstrates the wide variety of agencies requiring communications throughout the nation.

As there are many agencies, there are also many communications systems in use. There are systems utilizing UHF or VHF analog systems. There are those that have 700-&-800-megahertz systems. These include FRS, GMRS, and CB radios, as well as push-to-talk over cellular (PoC) devices. The list also includes Radio over IP (RoIP) systems, trunked, encrypted, simplex, and repeater systems, P25 and other digital radio systems, satellite phones, and, ultimately, personal or business cellular phones. If you have a need to communicate, there are a wide assortment of devices and operating modes to choose from. So how do we talk to each other in an emergency?

When some form of emergency or disaster occurs, depending upon where and what has occurred the scenario could play out in the following manner: The local school district officials at the district office need to communicate with their various school sites. The school sites may need to talk with other school sites. The district office may need to communicate with a neighboring school district. For instance, in my hometown there is an elementary school district, a high school district, and a unified school district. All neighboring each other, all relying on the same cities' resources, all needing to be able to communicate with one another, and all having their own separate radio system. A school district may need to communicate with their transportation services, should a school site's population need to be relocated. In some areas, schools utilize public transportation by contracting with the public bus system. Students with a school ID may ride for free. This all has to be coordinated, and the only practical means of communication is radio.



The city's emergency operations center may be activated. They too must be able to contact the schools and the school's transportation system. They may need to contact other cities and other government agencies such as county or state regional offices. There is also the need to communicate with the responders at ground zero, such as public works, mutual aid responders, law enforcement, or fire services. This all needs to occur quickly and efficiently.

This can easily devolve into a communications emergency. A communications emergency exists when a critical communication system fails or is overloaded. This is where emergency communications take place. These are the actions taken to continue to move information between governments (Federal, State, Local), non-governmental agencies (VOAD), and citizens during a communications emergency.

THE INTEROPERABILITY GAP

You may say, "We have interoperability." We do, but not every agency takes part. September 11, 2001 was the perfect example of separate agencies not participating in interoperability. At the time of the World Trade Center attack on 9/11, there were VHF and UHF frequencies designated for interoperable use, yet those responding agencies did not have those frequencies programmed into their radios for communications between Fire, Law, and the Port Authority.

Since then, technology has advanced, but adoption has not always kept pace.

Currently there are interoperable channels that can be programmed into modern radio systems; however, those system users must participate by having their radio equipment programmed properly, and not all non-governmental agencies can absorb the cost of that newer technology. Therefore, there are still gaps in communications and the need to rely on auxiliary communication services to fill that gap is still present.

Amateur radio operators can help fill the gap during a communications emergency by having pre-arranged agreements with the different agencies and organizations that may require continued communications. Volunteer radio operators may dispatch to a local school district office or school site and set up communications with other schools, the city, and even the county. Amateur radio operators can deploy to the city's EOC and begin taking reports from operators in the field. The various responding organizations from the local VOAD may have radio operators that can assist in coordinating with other responding organizations.

It is true that most local governments have communication systems in place for continuity of government and mutual aid, but as we can see from the above scenario, there are more than just governments that require communications.

Two organizations in particular are built specifically to answer that need.

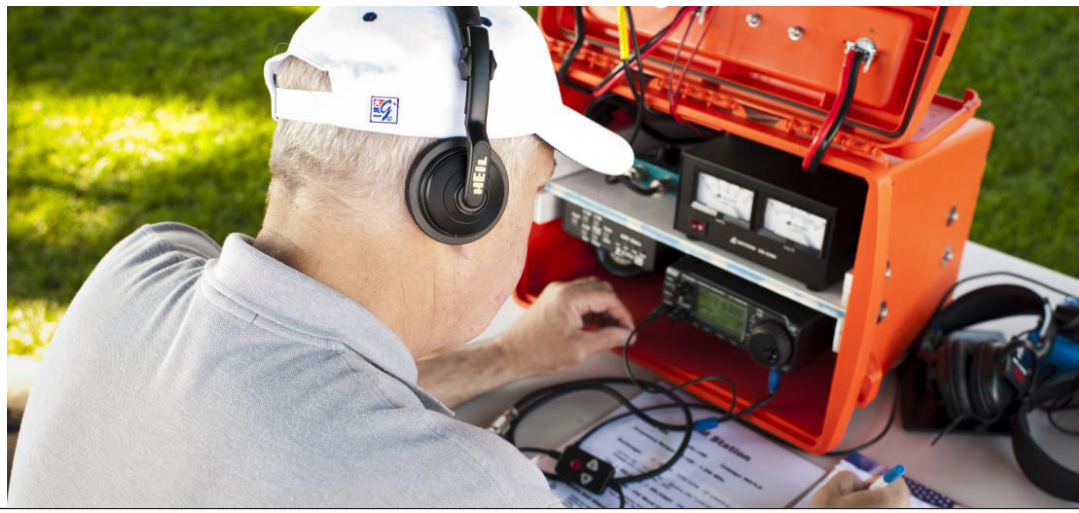
The two main organizations that have emergency communications as their purpose are the Amateur Radio Emergency Service® (ARES®) and the Radio Amateur Civil Emergency Service (RACES). Let's take a closer look at each organization.

ARES

ARES is the emergency communications program of the American Radio Relay League (ARRL), a private, nonprofit organization for amateur radio operators. ARES began operating as a service in 1935 and continues today as a corps of trained amateur radio volunteers organized to assist with communications during emergencies and disasters.

ARES has a formal training program and leadership structure. ARES members may self-activate when necessary and begin to build the on-air networks that collect information and move that information, known colloquially as traffic, to either other ARES members or local, county and state agencies who may then act on that information. Do not get confused by what is meant by self-activation. When something occurs, the ARES member turns on their equipment (radio) and announces they are ARES. They can then begin to serve as the net controller, assist in relaying traffic or simply report on their condition and the condition of their neighborhood. At that point they have activated as an ARES volunteer.

An ARES volunteer would only deploy, as opposed to activate, if requested by a served agency. A served agency would be virtually any agency or jurisdiction that requires auxiliary communications during a communications breakdown and has an agreement with either a local ARES team or individual ARES members that have pre-registered with that organization. ARES is not limited to any particular agency or jurisdiction; it is this flexibility of the ARES that makes it the most robust



emergency communications service in the nation. The ARRL currently has Memorandum of Understanding agreements nationally with organizations such as the American Red Cross, Citizen Corps (Department of Homeland Security), Federal Emergency Management Agency (FEMA), National Volunteer Organizations Active in Disaster (NVOAD), and SkyWarn (National Weather Service), to name just a few. Again, any local response agreements with those agencies would have to be confirmed in advance.

RACES

Where ARES thrives on flexibility and self-activation, RACES operates under a very different, more tightly controlled framework. RACES is a part of the amateur radio service that provides radio communications for civil-preparedness purposes only, during periods of local, regional or national civil emergencies. As defined in Part 97.407 of FCC regulations, RACES is a radio communications service, conducted by volunteer licensed amateurs, designed to provide emergency communications to local or state civil preparedness agencies. RACES operation is authorized by emergency management officials only and is strictly limited to official civil-preparedness activity in the event of an emergency communications situation.

RACES was developed in the early 1950s as part of the Civil Defense era and relied on volunteers to serve as radio communicators to pass information or request resources with other Civil Defense agencies and the government at large. RACES over time morphed from a radio service to a pseudo-organization that a volunteer radio operator would join. Still, the service performed was limited to communicating only with other civil defense and government agencies.

RACES is still going through changes, and many emergency managers refer to their RACES group as their auxiliary communications group. In some cases, emergency management has dropped the label RACES altogether. Therefore, these volunteers are not limited to FCC rules set in place for RACES but rather support other functions that the local government may be involved in, such as parades, fairs, and other community events not requiring an emergency declaration. Volunteers serve and are deployed under the control of the local government. RACES volunteers typically do not self-activate. Since their main purpose is to support local government, those volunteers must wait for a call to deploy to radio facilities owned by the local government. Since they are being deployed under the auspices of the local government, those volunteers fall under the liability protection of that local agency.

WORKING TOGETHER

With both structures in place, one flexible and self-activating, the other formal and government-controlled, here is how they come together when an actual communications emergency strikes: In a communications emergency, both ARES and RACES swing into action to fill the gaps of communication failures. ARES and other auxiliary communicators strive to work together to maintain the flow of information, from the emergency operations center (RACES) down to the last mile (ARES) until normal communication systems can be restored.

Bob Turner is a communications and safety specialist with more than 30 years of experience in the education sector. He is the Section Manager of the ARRL Orange Section, supporting Amateur Radio in the Southern California counties of Inyo, Orange, Riverside, and San Bernardino. He holds a Master's degree in Emergency & Disaster Management and is an InfraGard member, Infrastructure Liaison Officer, and Electrical Security Council member. Through his company, California Preparedness Resource, LLC, he provides emergency communications consulting for schools and critical-infrastructure organizations.



TACDA would not exist without the generous donations and support of its members. Because of you, TACDA can continue its mission to educate and empower Americans to survive any disaster or emergency.

All donations given to The American Civil Defense Association are tax deductible. Save your receipts!

TORNADO RESPONSE

COMMUNICATIONS LESSONS FROM A SMALL-TOWN DISASTER

By Colonel Jim Smith, MSS, NRP, CPC, CLEE

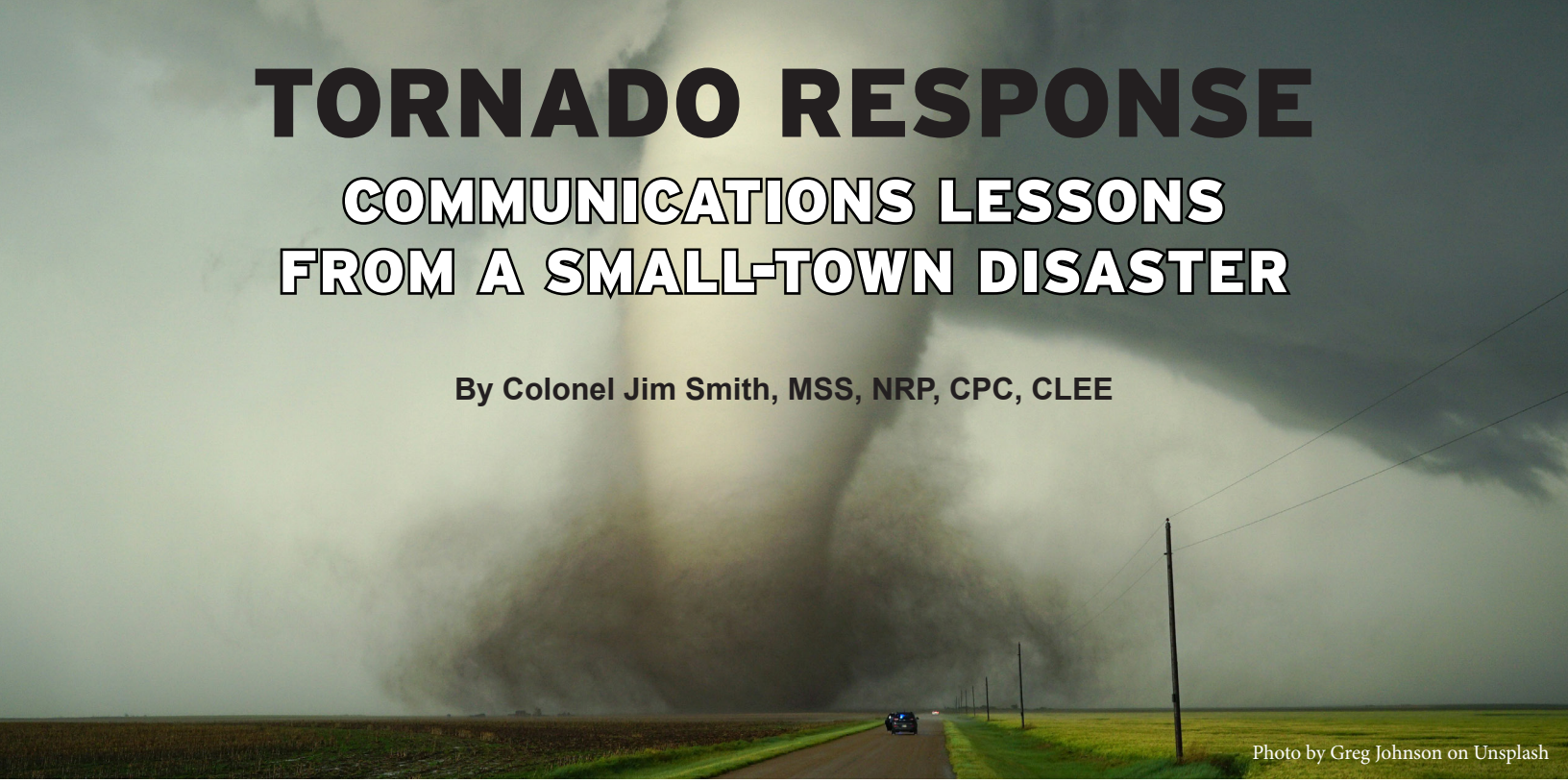


Photo by Greg Johnson on Unsplash

This article describes the response to a tornado strike in a small, isolated town with a 45-square-mile police jurisdiction and a population of roughly 4,500. The nearest assistance is approximately 11 miles away.

Alabama is well known for severe weather in the form of hurricanes and tornadoes. The National Weather Service had repeatedly warned public safety officials and the public of an approaching potent storm system in which intense and strong tornadoes were possible.

At 5:39 a.m., an EF1 tornado struck within two miles of the town but was short-lived, causing minor damage and no injuries. At 8:09 a.m., during the second of back-to-back tornado warnings, an EF2 tornado with winds of approximately 130 mph struck. Its path went directly through the center of town.

The six town-owned buildings were severely damaged or destroyed and rendered unusable. Both fire stations were damaged to the point that their roll-up doors could not be opened, preventing firefighters from accessing equipment. The public works department lost every vehicle in its fleet, and the police department had six vehicles destroyed.

Power was lost throughout the town. Restoring power to the town's three water wells, seven lift stations and sewage lagoon became essential because the sewer system had only about 72 hours of capacity without power.

COMMAND POSTS LOST

The immediate priorities were searching for the injured and opening access into town for outside assistance.

The primary command post was the fire department, but that structure had been destroyed. The secondary command post was town hall, but it had no power and the building was open to the environment after flying debris knocked out windows and damaged the roof.

The tertiary command post was the school agricultural education building. The problem was that this facility also had no power.

The local Emergency Management Agency eventually provided a mobile command-post trailer with independent power and its own radio system. This proved important as personnel and resources from numerous jurisdictions began arriving.

More than 20 state troopers responded, along with county and local agencies. More than 50 police officers were present during the initial phase of the incident. Three county sheriffs responded in person along with multiple deputies. At one point, more than a dozen engine companies and more than a dozen advanced life-support EMS units were on site.

WHEN THE RADIOS COULDN'T TALK TO EACH OTHER

As the response expanded, one problem became apparent: no common radio group existed for every responder.

State assets had one radio system. Local police, fire and EMS had another system and could communicate with one another, but responders arriving from outside the county could not communicate directly with the local agencies.

A simple solution was used.

A local responder with a compatible radio was assigned to each responding agency.

It was not a sophisticated technological solution, but it allowed information to continue moving among responders despite incompatible radio systems.

The cellular telephone system did not fail, although it became very busy. Town personnel using FirstNet® experienced no issues, and their Internet-based service remained within normal limits.

COMMUNICATIONS ARE MORE THAN RADIOS

The response also demonstrated that emergency communications depend upon more than radio equipment.

More than half of the town's 468 housing units were severely damaged or destroyed, mostly by fallen trees. Search teams were organized using a grid pattern, with outside fire and EMS personnel paired with local firefighters who knew the community. Dozens of printed town maps were available, but they were rapidly exhausted during the response.

Clearing trees to reopen access to town took approximately two hours, with outside crews working toward local teams clearing trees from the inside. Full access to some damaged areas took much longer because downed power lines had to be confirmed deenergized before responders could safely enter.

The tornado demonstrated the importance of having communications capabilities that do not depend upon a single building, power source, radio system or communications network. It also demonstrated the value of simple backup solutions when sophisticated systems cannot communicate with one another.

A mobile command post with independent power and radio capability helped restore coordination. Pairing local responders with outside agencies helped bridge incompatible radio systems. Printed maps remained important when dozens of responders needed to be organized and deployed.

The equipment mattered, but so did having people who could adapt when the original communications plan no longer worked.

Colonel Jim Smith, MSS, NRP, CPC, CLEE, is the public safety director for a small town in south Alabama and has more than 50 years of public-safety experience. He has served with both large metropolitan and small rural agencies and is an APOSTC-certified law enforcement executive and certified police chief. He holds a master's degree in safety from the University of Southern California and has authored textbooks and numerous peer-reviewed articles on public safety, crisis management and tactical medicine.

NATO PHONETIC ALPHABET

When radio conditions make words or letters difficult to understand, use the phonetic alphabet to spell important information clearly.

A — Alfa	J — Juliett	S — Sierra
B — Bravo	K — Kilo	T — Tango
C — Charlie	L — Lima	U — Uniform
D — Delta	M — Mike	V — Victor
E — Echo	N — November	W — Whiskey
F — Foxtrot	O — Oscar	X — X-ray
G — Golf	P — Papa	Y — Yankee
H — Hotel	Q — Quebec	Z — Zulu
I — India	R — Romeo	

RADIO TERMS IN PLAIN ENGLISH

Antenna: The part of a radio system that sends and receives radio signals. Antenna type, placement and height can greatly affect performance.

Band: A range of radio frequencies grouped together, such as the HF, VHF or UHF bands.

Call Sign: A unique combination of letters and numbers used to identify a licensed radio station or operator.

Frequency: The specific point on the radio spectrum where a signal is transmitted or received, usually expressed in kilohertz (kHz), megahertz (MHz) or gigahertz (GHz).

HF High Frequency: Radio frequencies from 3 to 30 MHz. HF can provide communications over hundreds or even thousands of miles under suitable conditions.

Line of Sight: A radio path in which signals travel primarily between locations that can effectively "see" one another. Hills, buildings and other obstructions can reduce range, particularly on VHF and UHF frequencies.

Net: An organized group of radio operators communicating on the same frequency or channel for a particular purpose.

Net Control: The station or operator responsible for directing an organized radio net and managing the flow of communications.

PTT Push-to-Talk: The button pressed to transmit on a radio. Release it to listen.

Repeater: A radio station that receives a signal and retransmits it, usually from a higher location, to extend communications over a larger area.

Simplex: Direct radio-to-radio communication without using a repeater.

SSB Single Sideband: A voice transmission mode commonly used on HF amateur radio because it uses spectrum and transmitter power efficiently.

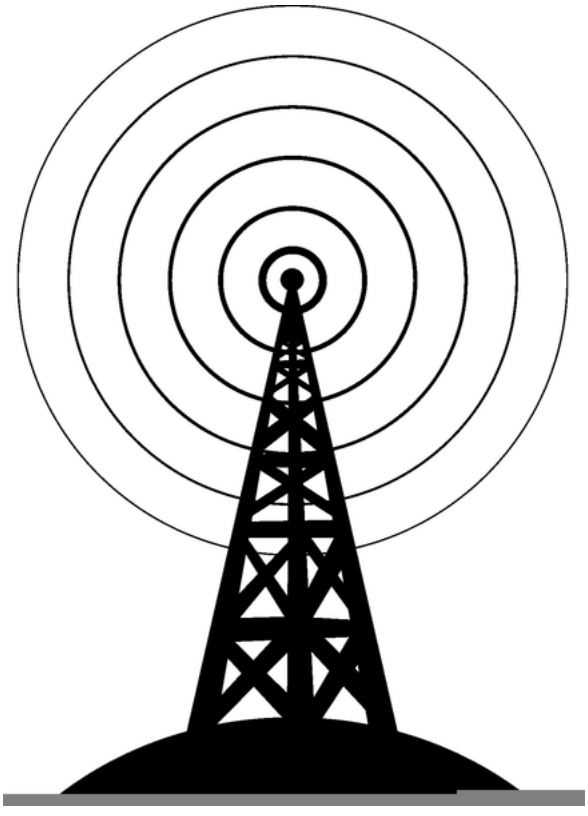
Traffic: Messages or information being passed over a radio network. In emergency communications, "traffic" does not refer to vehicles.

Transceiver: A radio that both transmits and receives.

UHF Ultra High Frequency: Radio frequencies from 300 MHz to 3 GHz. Many handheld and local communications systems operate within this range.

VHF Very High Frequency: Radio frequencies from 30 to 300 MHz. VHF is widely used for local and regional communications.

Watts: A measure of transmitter power. More watts does not automatically mean more range; antenna quality and height, terrain, frequency and other conditions also matter.



THINK BEFORE YOU TRANSMIT

A Word About Communications Security

By Randall Smith

(Excerpted from the author's original communications work prepared for TACDA.)

Disasters of practically any magnitude can have profound effects upon human emotions, thinking and the behaviors that arise from that thinking. One must remember that speaking and communicating are forms of behavior. Furthermore, different individuals respond to adverse events differently. What may be a minor irritation to one person may register as a traumatic experience to another.

As communicators, including - or perhaps especially - on the air, it is imperative that we give attention to our speech and language behavior, particularly when involved in sensitive communicative situations. The notion of "think before you speak" seems appropriate in this context.

In the event of a widespread or national disaster, the idea of practicing communications security or COMSEC takes on added gravity. At its most basic level, COMSEC means not divulging your specific location and/or status over the air unless it is a dire emergency and you need help at your location.

Those who have prepared adequately for various disaster scenarios will be well stocked with food, liquids and other necessities of daily living. Those who have not prepared will be in search of those who have, particularly when the ravages of intense hunger or thirst set in.

Whether the threat comes from fellow Americans in need, or from unquestionably hostile foreign or domestic adversaries for whom human life has little value, it is essential that, as a radio communicator, one remains fully conscious of the information that he or she shares relative to status, location, equipment, protection, etc.



Photo by Christina Telep on Unsplash

With respect to communications security, the "Communications S.O.I." (Signals Operating Instructions) published by The American Redoubt Radio Operators Network suggests:

"Never blab your location out over the air.

Guide them close to your vicinity, especially in a place where you can observe them if you can. Then give them instructions that bring them in closer. They should be implementing their own security plans as well, because they don't know who you are. Don't be offended or alarmed."

Communications operators, both civilian and military, should expect this kind of caution from each other and appreciate its practical value.

Effective emergency communication is not simply about having a radio and knowing how to operate it. It also requires judgment about what information should, and should not, be transmitted.

"Think before you speak."

Dr. Randall Smith has held an FCC license since 1984. He has served as a radio operator in the U.S. Army's Military Affiliate Radio System, and with the IBM Corporation first as a field engineer, then as a systems engineer and finally as a marketing representative. He participated in the construction of the emergency communications portion of the St. Louis Civil Defense Agency's underground emergency command center.

JOIN THE TACDA EMERGENCY COMMUNICATIONS GROUP



Connect. Learn. Practice. Be Ready.

TACDA's Emergency Communications Group brings together members interested in learning and practicing ways to stay connected when normal communications are disrupted.

Experienced operators and beginners are welcome.
You do not need a Ham Radio license to join.

LEARN & PRACTICE

Practical skills for real-world situations.

- **Monthly Zello** communication nets
- **Amateur Radio HF exercises** and nationwide tests
- **Winlink** emergency communications
- **Digital modes** including JS8Call and VarAC
- **GMRS, mesh networks,** WebSDR and other technologies
- **Equipment, station setup** and operating skills
- **Communications** during extended power, internet and cellular outages

Some radio activities require an Amateur Radio license, while others—including Zello activities—are open to everyone.

The EMCOMM Working Group is led by TACDA member **Bob Smith, NOOM**, an Amateur Extra Class operator with decades of emergency communications experience.

READY TO GET INVOLVED?

Join the **FIR-EMCOMM** group to receive announcements, participate in discussions, and learn about upcoming nets and exercises.

To request membership, send an email to:

FIR-EMCOMM+subscribe@groups.io

Your request will be sent to the group administrator for approval.

Opens a pre-addressed email to join the group.

PEOPLE | PREPAREDNESS | COMMUNICATION | RESILIENCE

TACDA

PO BOX 1003
Sandy, UT 84091
www.tacda.org
info@tacda.org
Office: (800) 425-5397
Fax: (801) 662-0367

ISSN: 0740-5537



Disclaimer Notice

Please read this disclaimer carefully before reading the Journal of Civil Defense, created by The American Civil Defense Association (TACDA). The content displayed in this journal is the intellectual property of The American Civil Defense Association. You may not reuse, republish, or reprint such content without our written consent. All information posted is merely for educational and informational purposes. It is not intended as a substitute for professional advice. Should you decide to act upon any information in this journal, you do so at your own risk. The content displayed in this journal and the opinions of the authors do not necessarily agree with the purposes, policies, or beliefs of The American Civil Defense Association, our executive directors, our editors, our advisors, or our board of directors. While the information on this website has been verified to the best of our abilities, we cannot guarantee that there are no mistakes or errors. We reserve the right to change this policy at any given time, of which you will be promptly updated. If you want to make sure that you are up to date with our latest policies, we advise you to frequently visit our website at www.tacda.org.

Together we are stronger! Join us!

The mission of The American Civil Defense Association is to empower and equip individuals, families, and communities through educational means to be prepared for emergencies and disasters.

Become a member now and receive information and resources to better understand current threats and practical solutions for handling emergencies.

www.TACDA.org

TACDA™ is a registered 501(c)3 non-profit, non-political organization.
Donations are always appreciated.

TACDA MEMBERS RECEIVE:

A FREE E-JOURNAL OF OUR BI-ANNUAL PUBLICATION, THE JOURNAL OF CIVIL DEFENSE

ACCESS TO READ, BUY, AND/OR DOWNLOAD ALL BACK ISSUES OF THE JOURNAL OF CIVIL DEFENSE ARCHIVES FROM 1968

ACCESS TO THE TACDA ACADEMY AND OTHER MEMBER RESOURCES

MEMBER DISCOUNTS ON PRODUCTS AND SERVICES THROUGH THE TACDA STORE

HARD-COPY SUBSCRIPTIONS TO THE JOURNAL OF CIVIL DEFENSE ARE NOW AVAILABLE FOR $15/YEAR!