

Prepper Communications

Non-Standard Communications under Non-Standard Circumstances

If someone considers themselves a 'prepper', they are preparing to be more self-sufficient or self-reliant after some event which makes our current way of life no longer possible. I won't go into the 'why' this would happen, as there are at least a half dozen plausible reasons, and I'm sure others can think of many more. All of these events have things in common. To list a few characteristics that are relevant to this discussion:

1. The communications infrastructure we rely on may not be fully functional, or may be down completely.
2. Emergency first responders such as police, fire and paramedics may not be available, or response time may be degraded to the point where rational people will resort first to self-help to deal with their problems.

I would like to take a top-down approach and first describe the scenarios in which you will need communications, and then get into the nitty-gritty.

1. Preppers moving in a convoy to a new location.
2. Preppers at an encampment or permanent location.
 - a. Normal, daily communications over a large working area.
 - b. Security communications
 - c. Alarm systems
3. Communication between camps, neighborhoods
 - a. Radio
 - b. Letters, written communications
4. News from outside the area

And finally I would like to end this with a discussion of 'nuts and bolts' – the hardware necessary to get the job done.

Convoy Communications

If you are driving to a destination in a multiple vehicle 'convoy' for the purposes of your continued safety, then it's quite possible that cell phones may not be working. If this is the case, then you will be communicating between vehicles by radio. Radio is not a private medium. What you say may be heard by armed opportunists who see this as an opportunity to collect some loot.

So, what to do?

- Have the route and alternates worked out in advance.
- Have each person who may be asked to drive, drive the route at least once in advance.
- Have each vehicle equipped with a copy of THE SAME MAP.
- Have each road, highway, major intersection, and turn point that will be used in your route identified by a tactical code name or number.
- Use tactical call signs for the vehicles, and for emergency situations.

Which do you think is smarter to say over the radio:

“This is car 4, I need to 10-42 at point alpha-42.” or

“This is Bob in the food truck. I need to pull over at the rest stop on Exit 6 to change a flat tire.”

The first call says nothing, other than there is a “car 4” which is communicating to some other vehicle. The second call can make you a target.

What kind of radios to use? My choices, in descending order are:

1. VHF ham radio
2. CB radio
3. GMRS radio
4. FRS radio

Camp Communications – Daily work

For work in area the size of a camp ground, FRS radio may be completely adequate. Whatever kind of hand held radio is chosen, it needs to be handy enough that people will actually use them, and have some sort of carrier so you can work with both hands.

Whatever kind of radio you are using, remember to use the least amount of power to get the job done.

Camp Communications – Security

At some point it may be necessary to have some sort of security patrol around your camp or neighborhood. Presumably by this point there will be check points at every entrance. The purpose of the patrol is to check the perimeter of your area and the status of the entry/exit check points.

If you follow the same schedule for radio checks and patrolling the perimeter, it wouldn't be difficult for someone to figure out the schedule and defeat the security

by breaching it after the patrol has passed, as they would know how much time they have before the next patrol.

The way to defeat this is fairly simple. You develop a set of color coded patrol plans that specify the patrol route, the check in schedule, and the radio channels or frequency used. When patrollers come on shift, one of them reaches into a bag and pulls out a color coded card, and that is the plan. Having this worked out in advance ensures that the plans are adequate, and appears unpredictable to anyone watching your camp

The radio communications should use two channels or frequencies: one channel used to communicate between the patrollers, check point guards, and base station; the second channel for giving an all-hands alert. The alert channel does not change and is never used as a patrol frequency.

Note if the check point guards change shift at the same time as the patrollers, then they know what the new comm. channel is for that shift. They have a different schedule, then the base operator must notify them by radio, probably color code.

Each home must have a radio on and set to the alert channel or frequency. If the squelch is turned up, it won't make any noise unless someone is transmitting on that channel. Some radios have a 'privacy mode' where they won't turn on the speaker unless the transmitting radio also is using a matching privacy tone. This is a good idea as it prevents random channel usage from turning on the radios at night and creating false alarms.

Having radios on all night, every night, will require that you have some way to recharge the batteries. Small solar panels to trickle charge the batteries are probably the best way to go.

Camp Communications – Alarm Systems

I have no direct experience with this, but I do know there are several types of alarms. There are light beam alarms, where the alarm is given when something crosses the path and interrupts the light beam, ultrasonic alarms, which detect motion when something moves in front of them, and magnetic alarms, which are buried in a roadway, and alarm when a large metal object, such as a vehicle, passes over them. There are also vibration detectors that can detect people walking near by, but these tend to be expensive. If you didn't mind being obvious you would use WWII style wire strung through your fence such that someone would need to cut the wire to get through. A broken wire/open circuit sets off the alarm.

I suggest you go to www.SurvivalBlog.com and search on alarms. There are many discussion and articles on the topic.

Intra-Camp Communications – Radio

Presumably you would want to keep this as private as possible. There are a few ways to approach this.

- Low power, directional antenna

It's considered good operating practice to use as little power as possible to establish clear communications. If you use a high gain antenna, which usually also has a narrow beam width, you will focus most of the transmitted power in a narrow beam. This will allow you to reduce the transmitter power even further. In any direction other than where the beam is pointed, there is very little signal to intercept.

- Non-standard polarization

The orientation of the electrical part of the electromagnetic radio wave is the polarization. If the transmitter and receiver are close enough that the radio wave is traveling over the ground (ground wave) and not traveling through the ionosphere, then the polarization matters very much. If the transmitting antenna and the receiving antenna do not have the same polarization, then the signal loss is huge.

The way this applies to increasing the privacy of communication is by using a non-standard polarization on both ends which is unlikely to be used by someone trying to intercept your signal. Most VHF and UHF antennas are set up to use vertical polarization. So, use horizontal polarization instead, and any eavesdropper will suffer -20 dB signal loss and may not hear you at all. Also, circular polarization can be used, but it's harder to set up.

- Spread spectrum

Spread spectrum technology used to be spy technology, but the cat has been out of the bag long enough that US hams are allowed to use this on frequencies above 220 MHz.

The idea behind spread spectrum is that instead of putting all of your power into one frequency, you transmit with less power on several closely related frequencies at the same time. On the receiving end, the equipment can separate the signal from the noise by listening on those same frequencies at the same time. The result is that a clear message can be sent with such low power that the spread spectrum signal does not even move the needle on the power meter.

- Coded messages

In the licensed radio services, such as ham radio, it is illegal to use codes to hide the meaning of a transmission. When codes are used, they are of a type generally understood, such as the ASCII code for sending text data. In the unlicensed radio services, for example FRS (Family Radio Service), there is no explicit prohibition, but there is no way to do it digitally without modifying the radios, and *that* is forbidden.

However, the use of spoken tactical call signs and codes is in itself not illegal, and frankly, not enforceable in the unlicensed services. Whether this is practical or not for communications between camps is something you will need to work out if the situation arises.

Intra-Camp Communications – Written

- What
 - Offers for trade / want ads
 - General announcements
 - Person to person
- How
 - Carried by travelers ‘on their way to...’
 - Specific trip
 - Regular mail service
- Transport methods
 - On foot

Let’s not overlook the basics. ☺

- On bike

Just want to mention that there is a new kind of tire out now that is solid closed cell foam. The advantage to this kind of tire is that it can’t go flat, because there is no air in it. The disadvantage is that it rides a little harder than an air filled tire. I have one of these type of tires on my wheel barrow because I go tired of dealing with a slow leak. That tier is likely to outlive me.

- On horse back

Horses are a significant investment of time and money. Folks who have horses now are likely to keep them as long as they able. If the SHTF, it’s likely some horse owners will find themselves using their horses to make a living – such as having a courier service.

- In a vehicle

If there is some long term disruption in life as we know it, you will see less driving and more use of alternate fuels. However, even with fuel stabilizers gasoline has a pretty short shelf life (2 years). Given that, some folks will opt to use up their remaining gas rather than have it become useless.

News from Outside the Area

- Domestic commercial broadcast

- Long distance – AM stations at night

At night time, the D Layer of the ionosphere disappears and the F1 and F2 layers recombine to the single 'F' layer. The result is that longer wave communications like those used in the broadcast AM band are more likely to 'skip' and be heard well outside their normal broadcast areas.

If regular broadcast AM stations are still on the air, you have a better chance of hearing from stations outside your area at night. Same is true of most shortwave broadcasts.

- Local – FM

It's the nature of the way FM works that either your radio is able to capture the signal, or it can't. The signal from FM broadcasts does not slowly degrade like AM. For this reason – and the higher frequency/shorter wavelength, long distance FM is typically not seen and any commercial FM broadcast you here is likely to be fairly local.

- International news in English

There are few shortwave broadcasts targeted to the US, and those few that do are usually targeted to the east coast, where the bulk of the US population lives. However, there are English language broadcasts from Australia and New Zealand that come in quite clear because the Pacific Ocean makes a pretty good radio wave reflector. As a result, broadcasts intended for Pacific rim countries can be heard in the Carson Valley at the right time of day.

- Australian Broadcasting Company
- Radio New Zealand
- China Radio International

China Radio International broadcasts in many languages, on many frequencies. Some broadcasts are targeted to the US, with transmitters both in China and Cuba (Cuba comes in better). This is not the bombastic type of news that the Russians used to use on Radio Pravda, but more like culture salesmanship. The Chinese are trying to make their culture look interesting.

Nuts and Bolts

Electronic devices

One of the truisms of electronic design is that the more parts there are in a circuit, the more opportunities for failure there are. This was realized in the 1970s when the first integrated circuits (chips) were created, and remains true today.

What this means to you, is that if you have to choose between two radios of equal quality and performance, the one with the fewer electronic parts is likely the more reliable radio.

As time goes on, products tend to have fewer chips, with more features combined on each chip, as it makes it cheaper to manufacture and more reliable for the customer. Don't take this to mean you should never buy older equipment, just keep in mind that when you do have a side-by-side choice, fewer components is the better.

Batteries

All batteries die, even those sitting on the shelf unused. And rechargeable batteries have a finite number of charge and discharge cycles they can go through before they eventually fail. Given this piece of information, it would be wise not to get locked-in to a particular shape or design of 'special' battery for your electronic devices. If your radio requires a special battery made only by the radio manufacturer, and that battery dies, you are out of luck unless Fed Ex is still working or you have some sort of back up plan.

- The "Back Up Plan"

Many, but not all, hand held radios have both a rechargeable battery made by the radio manufacturer, and a AA battery pack alternative. If your rechargeable battery fails, you can put AA batteries (conventional or rechargeable) into the battery back and use it instead of the normal rechargeable battery. When you go looking for hand held radios, see if a AA battery pack is available from the manufacturer first. If you are looking at used radios, go to Batteries Plus and see what rechargeable batteries they sell for 'standard' hand held radios. If you are sure about what you need, call them and ask. It may be that the radio you are considering is so standard that getting replacement rechargeable batteries is not difficult now. Buy a couple.

When I said "all batteries die", there are a couple of rare exceptions that I will mention here in case you run across them.

- The zinc-air battery

The zinc-air battery uses oxygen from the air as part of the chemical process to generate the battery voltage. When they are manufactured, they have the air purged from the battery with dry nitrogen, so no chemical reaction is possible. To use the battery, the air seals are broken, and air fills the battery. At that point,

it behaves like a regular dry cell. In the unopened state, some of these batteries have a 20 year shelf life, as that is as long as the manufacturer will guarantee the air tight seal.

- Dry-stored automotive batteries

In some circumstances it is possible to buy an automotive or truck style lead-acid battery without the acid installed. The idea is that you would fill the battery with sulfuric acid later. The point here is that with no acid, there is no chemical reaction, and no possibility of the battery dying (failing). This assumes you have access to a supply of sulfuric acid.

Dying on the shelf

This sounds odd, but all batteries 'self discharge'. That is, even when there is no power demand on them, they will eventually lose their charge through an internal leakage current. Better batteries have less self discharge current, and will hold their charge longer. The latest generation of lithium-metal-hydride batteries are much better than the predecessors in that they hold more charge and have a lower self-discharge rate.

Battery "Boosters"

When I sat down to figure out exactly how long I could operate my ham radios with the Optima battery I had bought for that purpose, I got a nasty surprise. The voltage range that my radios require is much more narrow than the voltage range of your typical lead-acid car battery. What this means is that when the car battery is fully charged, everything is fine. As the charge in the battery is used up, the voltage drops, and it eventually falls below the minimum requirements for the radio. In my case, it meant that I could only use about HALF the power in the lead acid battery.

So what to do?

I bought a 'battery booster' for \$40 that will take the too-low battery voltage and boost it to 12 volts. Since there is no free lunch, I need to tell you that the trade off is that the current is reduced to make up for the voltage increase, and you are also limited by the amount of power the booster is designed to handle.

In my case, the booster will handle 40 watts, which is much less than I can get directly connected to the battery, but it will give me power that would otherwise be unavailable. In fact, the device is 78% efficient, so it gives me 78% of the bottom 50% of the battery charge.

One related item – radios, as a rule of thumb, are about 50% efficient. So if I only have my radio connected to the booster, I have 40 watts in and 20 watts maximum output. That's not a lot, but it can be enough.

Please note that battery boosters can run from \$40 to several hundred dollars depending on the input and output voltages, and how much power they can handle. If you think you may want to buy one, let's talk about it first.

Battery Charging

It should go without saying that you need some way of charging all of your rechargeable batteries. While it may sound obvious, it has some implications you may not have thought of, such as: how are you going to recharge your AA batteries if grid power is not available? You may have a means of recharging car batteries for stationary use, but what about the AAs?

There are some companies that make AA chargers directly powered by solar cells, and this is the simplest solution, but you ought to also consider some way of charging your AAs directly from your 12 volt system. Some AA chargers already work from a 12 volt "wall wart" power supply, so if you can bypass the wall wart and connect to 12 volt batteries that can handle the current (car batteries), then you are good to go. This is something I still need to do.

Sharing Power – Standardize Batteries, Connections

Many ham radio operators volunteer to provide communications for public events, and do so for a number of reasons. Perhaps the best reason is that it gets you out of your comfort zone and gives you a preparedness reality check. Are you really ready to grab your stuff, leave the home ham shack and work out in the real world?

Sometimes the answer is 'no, not really.'

The most common reason, believe it or not, is something as simple as dead or undercharged batteries. Some ham organizations that do a lot of public service have come up with a solution – require all of the radios which use an external 12 volt power source to have Anderson Powerpole connectors, so that any radio in the group can use any 12 volt battery. Also, Anderson sells a couple of versions of 12 volt power distribution devices, so that 1 battery can supply several devices. This is sort of like a 12 volt extension chord. In my home ham shack, I have an Anderson power distribution strip to which I've connected all of my gear. There is a spot on the end where the plugin 12 volt power supply connects. If the grid power goes out, I pull that one plug and connect a 12 volt Optima battery to Anderson power distribution strip, and I'm back on the air in seconds with no fuss. This is possible because I already made up a cable for my battery with an Anderson Powerpole connector on the end.

Resources

Anderson Power Pole connectors

<http://www.powerwerx.com/anderson-powerpoles/>

Batteries Plus

<http://www.batteriesplus.com/>

Rawles' Survival Blog

<http://www.survivalblog.com>