

Activist Communications

by Longwire

ACTIVIST COMMUNICATIONS

I. SIMPLE LIVING and ADVANCED TECHNIQUES

Most of us feel ambivalent about technology. For many years technology has been a weapon used by the powerful against the weak. Time has changed things; the technology built around the digital revolution is becoming cheaper and easier to use. Gone are the days when people with advanced degrees and astronomically expensive equipment were the only ones "tuned in".

Our fear of technology is exemplified by George Orwell's vision of Big Brother: an unseen force, constantly monitoring us through a technological "one-way-mirror". Our current reality is even stranger than Orwell could have predicted when he wrote 1984: we now have the tools to turn the "one-way mirror" into a window that looks back at those looking at us.

Tools such as scanners, the worldwide web, cellular phones and new communications satellites give us capabilities once available only to the military-industrial complex. It is our belief that these tools are most effective when used in the Spirit of Peace for a focused purpose. Government security services, the paramilitary right, survivalists, and cop wannabes have been using this stuff for years - since the technology is morally "neutral", it is up to us to give it the power to do good. We focus on what we need and remain respectful of personal privacy, especially our own.

My goal is to introduce the powerful tools of communications and information technology to those in the environmental and social justice movements. I will focus on practical application rather than technical explanations of how things work. There is an interesting mix of time-tested ways and the cutting edge techniques available that could be of great assistance to those planning good deeds.

This technology, used correctly, can:

- Provide a margin of safety in sketchy circumstances
- Allow widely separated participants to coordinate their activity
- It allows you to listen to public agencies as they react to your situation
- It can give you the tools to get out words and images IMMEDIATELY

It should be noted that many effective activities have taken place WITHOUT radios, cell phones, scanners and computers. Not having fancy equipment should NOT keep folks from doing an action or demonstration; mass movements such as the labor struggles of the 30's, the civil rights movement and the anti Viet Nam war demonstrations took place with only motivated participants. As always the passion and commitment of the participants are the most important factors in the success of any undertaking ?the rest are details.

II. ASSESSING YOUR NEEDS - A CHECKLIST

Making a communications plan is integral with any plan of action. Questions such as the following need to be addressed:

-Are the participants going to be putting themselves in a physically dangerous situation (i.e., climbing)? It is a good idea for participants in a potentially hazardous activity to be equipped with two-way radio; also access to a cell phone is advised in order to summon emergency crews, if necessary.

-In rural areas that don't have cell coverage, the location of the nearest phone should be established. Alternately, if you have the resources, new technologies such as satellite phones are being made available that permits communication from remote areas.

-Is the activity going to be spread out enough to require radios hear each other?

-Is the area of activity in a hilly area? If so, your com location needs to be at the top of a hill or ridge to be able to remain in contact and relay messages. If this activity will be ongoing, you might need the use of a commercial repeater and programmable Duplex radios. This needs to be set up in advance.

-Will the radio users be arrested? If so, a more inexpensive radio is desirable if safety permits.

-Will scouting be done to gather information on a facility's security and routine?" If so, the use of a radio scanner and frequency counter) might be appropriate. In this case, some preliminary research to find the frequencies of the company or agency would be needed beforehand. (This is also good time to check cell phone and hand held radio coverage that will approximate what you will be doing in the action.)

-Would a scanner be useful for listening to Public Safety agencies response to the situation? The monitoring of an agency response to a situation is not only of tactical value: it could potentially be help insure the safety of both participants AND public "servants".

III. ORGANIZING COMMUNICATIONS AND MONITORING

Communications work best as a structured environment - where participants have an agreed-upon reality as to who makes the decisions. The incoming information of note can be evaluated and passed on to those making tactical decisions. Communications channels are kept in open and information flows.

It is usually best to have a person (sometimes persons) as a designated "com-person" or "com". Ideally, the com is a "transparent" role: you stay in the background and only jump in when needed for a matter relating to communications. The action coordinator and/or campaigners also will have radios to communicate as needed. In some actions, the coordinator has done the com role.

The job of the com is to:

- act as a resource in the planning of the activity and the training of the participants in use of the equipment. To conduct radio path tests and conduct "dry runs" with radio users.

- maintain order on the communications channel. This function would be analogous to that of a "dispatcher" or "net control". This means you determine who talks: prioritizing, if needed what needs to be communicated. relaying any information to and from the participants and the action coordinator and campaigners. This also can involve keeping people from being too talkative and maintaining radio discipline. "Radio discipline" isn't just maintained as a power trip: it is important that transmissions be kept to a minimum for both security and to keep batteries from being run down.

- test the radios and batteries to cull out poor equipment. Test re-chargeable batteries to see if they will hold a charge. Charge them for the specified period and test them 3 days later to see if it held the charge. If you have the time, it is best to have the batteries tested on battery-analyzer/charger. If you have enough radios, it would be worth it to obtain one of these. Alternately, you can bring them to a commercial radio shop.

- It is always a good idea to include the use of the radios in any "dry run" of the activity to work out any technical bugs and/or weak-points in the user's radio knowledge; it is best to find out the problem areas BEFORE the main event than during the heat of the moment?

NEVER USE JAMMING as a tool. It can cost someone their life and the jammer some time in prison!

If you are going to use (non-family radio) UHF radios often, it might be a good idea to get a GMRS license. You can get one online at the Feds fcc.gov WWW site.

Handheld users Guidelines:

- Always assume your radio conversations are being listened to by the Law or hobbyists

-Be discrete: sound like a survey crew or whatever else would fit into your location. Don't sound like hippies or CBers.

-Chose code names that don't draw attention, i.e. "Unit 12" is better than "Kind Bud 8"

-Keep talk to a minimum to save batteries and keep a low profile

-Keep the radio hidden as much as possible, use a handmike if you have one.

-Don't be a RADIO FACIST!

IV. MONITORING BASICS

A. RESEARCHING FREQUENCIES & SCANNER PROGRAMMING

-Determine which law enforcement agency has jurisdiction to your area of concern.

-Determine the corporate names of any private business involved

-Look these up in a frequency guide, such as Radio Shack "Police Call" frequency guide for your state. "Police Call" has all licensed radios for a given area listed both alphabetically or by frequency

-If you have a computer, you can purchase CD ROMs that have the entire FCC Database, searchable by licensee, location or frequency). The Per Con WWW site (<http://perconcorp.com>) has search FREE ONLINE capabilities and also sells the database for \$30. There are sites on the WWW that have the FCC database downloadable, one state (or so) at a time. I prefer to have the CD-ROM (and not need a web connection) to get quick info.

-There are many WWW resources for finding scanner frequencies. The easiest way is to use a WWW search engine (such as Hotbot.com or Dogpile.com) and simply enter something like "Portland, Oregon scanner frequencies" and see what sites pops up. Often you will find what you need right away; sometimes you might have to dig.

-Make a list of all possible radio users that could be in play during your activity: consider not only law enforcement and /or a business, include private security, the Fire Dept., public utilities and the media (which do their own scanning!). Keep in mind it is difficult to keep track of more than a few channels; only monitor what is important.

-Program each jurisdiction's frequency to the scanner. When possible use separate scanner banks for each entity, i.e.: one for the local police, one for the sheriff, one for the corporate entity?

B. SCANNING and SCANNERS

Scanners are radio receivers that cover a wide range of radio frequencies (or "channels") used by government agencies and private industry for regional communications. They can be pre-set to the frequencies of the jurisdiction or company you will be dealing with. They can also "search" between two specified frequencies. They range from larger "base" models that have many hundreds of channels and features, to hand-helds. Some of the hand-helds have advanced features as well.

During the last 10 years, most of the urban public service radio networks have gone to a type of "cellular": (TRUNKED) system. This necessitates the use of a special scanner that is equipped to follow and receive trunked radios. (Uniden BC-895XLT base, BC-245XLT hand-held) "Trunktracker" type of radios only can receive Motorola Type II and Ericson systems, which comprise %90 of the systems. For anyone wanting to listen to PDs in urban centers, one of the above scanners is a must. Fortunately, they are relatively inexpensive.

It is best to have more than one scanner. You can listen to the main PD frequency on one scanner while scanning other stuff with the other.

C. HINTS FOR SCANNING DURING ACTIONS

-Find the main frequency that the authorities are using for your area. This is usually a dispatch frequency or a special "splinter" frequency that is being used for your event. It is always a good idea to listen to the frequency for several days to learn which units are covering which areas as well as their "lingo". There are often lists of police "disposition codes" and beat maps that are available on the WWW.

-MAKE SURE you have your list of WHO is on WHAT channel!

-Use the frequency counter occasionally, in case unlisted frequencies are being used nearby

-Scan media outlets- they often have sophisticated scanner sites that enable them to locate "beaking news". You can use them as an extension of YOUR scanning and skim off useful info from them as they report to their people at the activity's location.

V. OTHER EQUIPMENT

USING RADIOS ON SITE.

If I am on my feet at an event, I prefer to use a padded photo-type shoulder bag to keep my radios and scanners together and accessible. If you are in a noisy area, it is good to have a plug earphone for the scanner and have the handhelds', speaker-microphone clipped near the other ear.

It is usually more desirable to be in a vehicle somewhat out of the way of the main activity if you are monitoring. You have less distractions, you are less visible (therefore

less vulnerable), and you can utilize a better antenna while in a vehicle. A passenger vehicle with a few small magnetic-mount antennas is less noticeable than a van. If close enough, a private residence or hotel room can be a relatively secure com center.

A. FREQUENCY COUNTERS, NEARFIELD RECEIERS AND SPECTRUM ANALYSERS

Frequency counters are devices which will detect and display ANY radio transmission within a few hundred yards. It is a valuable tool for scouting frequencies that might not be available in frequency guides. There are several types available ranging in price from \$150-\$400 made by Optoelectronics (<http://www.optoelectronics.com>) The least expensive ones (Opto. Cub) will detect and display one frequency at a time. You need to re-set it after you note the frequency. The Opto Scout will not only detect a frequency, it will save a hundred of them into its memory. One only needs to have it in their pocket and check it later for all the "hits". With the Scout you also have the option of connecting it directly to a computer, which will allow you to save an almost infinite amount of hits.

A nearfield receiver can not only detect the radio signal, it will let you hear the transmission. The Opto R-11 costs \$400 and will play the transmission without displaying the frequency. The Opto. Xplorer costs \$900 and will note the frequency, save them in memory and/or play the audio. The Xplorer has been used to successfully listen to nearby cellular transmissions.

A spectrum analyzer ranges in price from \$3500 to \$20000. It has the ability to visually display large parts of the frequency spectrum at once, allowing the operator to detect transmissions and figure out it's relative proximity by the size of the "spike" on it's display. Although this is a wonderful tool, its price puts it out of range by most of us low-baggers. Avcomm makes a quality spectrum analyzer for the lowest cost.

B. TWO-WAY HANDHELD RADIOS

UHF VS VHF

Almost all radio activity done in action work is done by direct (AKA Simplex to radioheads) connection to other radios without going through a network. They are available in a variety of capabilities and prices.

The radio spectrum for handhelds used can be either VHF (150-170 MHz) or UHF (450-470). VHF is better at going over hills and foliage than UHF and has been the mode of choice for rural users such as the forest service and rural law enforcement. The disadvantage to non-governmental users is that there are no VHF relays available for public use in the VHF scheme of things. These relays (known as repeaters) enable handhelds to be received and relayed from a ridge top, this giving the radios a range of 30-80 miles to other ridge tops? There are many commercial repeaters available on the UHF spectrum. Since the repeater uses TWO frequencies (for low power In and high

power Out), their channels are known as DUPLEX channels. Since UHF has shorter wavelengths, small compact gain antennas can be used to increase its range.

There are inexpensive (\$100) simplex Repeaters available from Radio Shack that allow hand held radios to serve as repeaters.

For our purposes, I will provide some basic descriptions of the varying features and expenses involved with some available handhelds. Each of these would be an appropriate radio for a given situation. For, climbers (or anyone who might be banging around their radios), I would encourage the use of a more durable radio such as the first two mentioned. These are only representative examples of the types of radios available; there are other manufacturers that make gear in each category

Motorola GP-350, GP-300, P-100, P-200 (or any of the Radius Series)

UHF, 5 watt, 4 channel

computer programmable

\$600 New

\$400 Used

(+\$250 for voice encryption) In my experience with handheld radios that have been used by the trades and public agencies: Motorola makes the best product in terms of survivability and usability. It takes Motorolas three times longer to make it to the junk box (no, I don't own their stock? I root through junk-boxes!). They are the most likely to hold up under extreme conditions. If money is not a big problem and you want radios that will hold up for years, this is a good way to go.

Used Motorola "MX" series

UHF 5 watt 16 channel

Shop Programmable

\$200 This was the previous generation of public safety radios. They are easily available in quantity as governments go to "Trunked" (government cellular) systems. There are ruggedized versions available for extreme conditions. They can be re-channelled by a Motorola dealer for \$125 and new batteries can be had for \$50-\$100. Keep an eye on government auctions (you can get on free mailing/notification lists) or try contacting the "Surplus Property" offices for local governments. The price of converting them makes them less practical than just buying the newer Radius types

New Icom, Kenwood, Yaesu

Dual band, UHF/VHF Handheld

Includes off band scanning

\$500 new, \$350 used. These would be a good all-around radio for a com person, but would be impractical for field use due to both their relative delicacy and steep learning curve. It has user-programmable features, which allow it to do a variety of useful, advanced tasks. Most models require some shop adjustment to get them off the ham bands.

Kenwood Mini Handheld (UBZ-LF14y)

UHF 16 channel with tones and scrambling

Low power, 1/3 watt, 1-10 mile range

\$125 Excellent radio for "close in" work. Has the advantage of being inexpensive enough to be used as "throw-aways" for those in legal situations. Uses 3 AA batteries, alkaline batteries last THREE times longer than the re-chargeable nicads). They are best purchased in black; they look more like cell phones.

ICOM, KENWOOD, YAESU Marine Handheld

-New \$200. Uses USCG VHF Marine channels. A Must Have for anything taking place on or near the water. Some of the "ship to ship" channels are useful for ship-shore and ship-inflatable use. If one plans using such radios in small craft or poor weather, it would be necessary to obtain a specialized waterproofing bag (\$50) or box (\$150). Some models that are advertised as waterproof often aren't. VHF MARINE RADIOS ARE NOT TO BE USED FOR LAND BASED "ALTERNATIVE" COMMUNICATION? The FCC, Canadian and other authorities have and will strictly enforce the Marine-only nature of these channels. Some folks using marine radios as walkie-talkies while hiking were recently fined \$5000 for interfering with the vessel traffic system. It is best to follow the regs when using these radios.) We are not in CB anymore, Toto?

C. CELL PHONES-NEXTEL

The use of a cell phones are of great value in doing media work on site. The addition of a laptop computer with cell-phone (or Wireless Internet Connection) allows media coordinators the ability to send out press releases via email, FAX or update World Wide Web sites. New technology is becoming easily available that permits digital photographs to be sent into Internet via cell phone. Images of the activity can be sent immediately from the site?.

Nextel is a cellular phone system that can work as a two-way radio. The cell system relays the cell phone giving users wide coverage without the hassle of setting up the use of a commercial repeater and programming multiple radios. Although the units are

cheaper than "normal" VHF or UHF two-ways, they require a monthly fee and some per-minute charges. They would be only of value in relatively urban areas covered by cell phone sites.

D. PAGERS

In addition to being an invaluable tool during the considerable legwork of setting up an activity, pages can be a good, secure way of sending messages during actions. One can use "broadcast pages" from a WWW based paging service to send alerts and bulletins to multiple pagers at once. They are quite inexpensive and have low monthly usage fees.

Pagers have been used in tree sits along with cell phones as a means of saving cell battery capacity. The person in the tree gets a page to call a number. They then turn on their cell phone to make the call.

VI. LONG DISTANCE COMMUNICATIONS

The available tools for long distance communications are expanding almost daily. New generations of low-orbit satellites are being put in place that will dramatically expand the ability of people to communicate from any place on the planet. As competition increases, the costs will be going down. The size of the hardware has

A. SATELLITES COMMUNICATIONS

The new generation of low orbit satellites will allow voice and data communication from anywhere. The new Inmarsat Mini-M transponders are smaller than a laptop computers and allow (slow) Internet access anywhere.

The Motorola Iridium satellite system allows voice communications anywhere via a cell phone sized unit. Both these systems are expensive and have high per-minute charges.

B. HF (HIGH FREQUENCY) RADIO

HF radio was the original means of long-distance wireless communications through the first half of the 20th century. HF radio signals have the ability to "skip" off the ionosphere, thus overcoming the curvature of the earth. In recent years, most of the role of HF has been taken over by the use of communications satellites.

Despite this progress, HF offers some advantages over the newer forms of communications:

The cost of equipment is significantly lower than satellite gear. In addition to this saving, direct, station to station communications do not have per-minute charges. HF radios do not rely on third party relays or accounts for the communications to take place. It is much simpler than satcom to use. In addition to voice, there are computer based tools available which permit the sending of computer files and

The range of HF communications varies. Daytime HF communications can take place over several hundred miles. During night hours, most local communications are difficult and the range increases to 500-5000 miles, depending on the frequency.

The use of HF can be a problem in the United States and Canada due to radio regulations. There is really no allocation for the use of unlicensed radio (other than CB) and the marine radio spectrum is highly regulated. The use of amateur (Ham) frequencies necessitates a difficult to obtain license; the use of the frequencies for other than B.Sing by hobbyists is frowned on. The self-policing, "traffic cop" mentality of many hams would make the tactical use of ham radio difficult if not impossible. If one were to use HF in an "irregular" manner, it would be best to use Marine frequencies and keep transmissions to a minimum. In an emergency involving life and death, it is legal to use any frequency to summon help. Ham radio is a good means of educating oneself about communications technology

HF is a more acceptable alternative in Third World countries. Poorer countries use HF extensively and have provisions for licensing such systems. The ability of HF to "bounce" over obstacles using "ground wave" and its relative low cost make it an attractive alternative for organizations that are spread out over a wide geographic area that has little infrastructure. A solar-powered HF station can be constructed for \$2500.

Several disadvantages of HF should be mentioned:

- Communications can be disrupted by heavy solar storms that occur several times a year
- HF antennas are typically wires that are 50-150 feet long. This makes it difficult for mobile communications. Vertical HF whip antennas, although smaller, are inefficient and therefore don't provide enough range for the radios to work more than 5-10 miles.
- Although HF can be used to send digital data (via RTTY, AMTOR, Packet, PACTOR) the speed is very slow compared to telephones or satellite connections. This makes it impractical for sending standard computer images. Newer, computer based, Slow Scan Television (SSTV) makes it possible to send images over HF. The image quality is roughly the equivalent of a WWW (jpeg) image.

MARINE HF RADIO

If you aboard a ship that has a HF Marine radio, there are commercial stations that can relay your radio to the phone system and allow you to talk to anywhere reachable by land telephone. There are a variety of frequencies available for various times of day and distances. The increase use of SatCom has caused many coastal HF stations to close, but there are still some in operation.

CB

The major drawback of CB is that millions of users are crammed into 40 channels. Not only are the communications difficult due to channel over-use, they are quite public. For this reason CB is almost useless for tactical communications, especially in cities.

CB radio spectrum can be used in some situations. It is useful for communication between vehicles. In rural areas, listening to the CB channels can be a useful source of information. In areas where there are no phones available for emergencies, the use of the CB emergency channel 9 can be important if you are not near a telephone. On logging roads, one often sees CB channels marked on signs at blind turns: this is to enable logging trucks to announce their presence to oncoming traffic. CBs are available new for around \$50 and can often be found in thrift stores and garage sales for \$5 or so.

VII. COMPUTERS

The explosion in the use of computers in all areas has affected communications immensely. Some of the areas include:

- A. Can be connected to scanners to permit scanning of databases or database search results
- B. Computers can be connected directly to some (CDMA Digital) cell phones to allow portable email and www access. There are dual mode analog/digital modems which allow connectivity with either analog or digital cell systems
- C. Computers can be combined with GPS receivers to find positions, do real-time map-location, or upload routes saved on GPS units to a map.

IIX. POWER SOURCES

A. GRID

The most reliable power source is the grid. If you have a location where there is a AC power source, it is best to utilize it rather than burn up batteries. In this eventuality, it is always good to have a good supply of extension cords and power strips to run power cubes and chargers. It is also good to have a battery charger to utilize the ability to charge batteries for more remote locations.

B. FIXED BATTERIES

Where there is no grid power, we are dependent on batteries. For fixed sites, a deep cycle marine, car or sealed lead-acid gel cells are the best. Gel Cells are leak-proof and permit shipping in baggage on airliners or backpacks, but the Marine/Car battery have more capacity.

Batteries are rated in AMP-HOURS. An amp hour is how long the battery can run a one-amp drain for one hour. To find how long a battery will run a certain piece of equipment:

divide the amp rating of the gear into the amp hour rating of the battery. For example: if you have a 20 AMP HOUR battery, it would run a laptop computer that draws 2 amps for 10 hours.

C. PORTABLE EQUIPMENT BATTERIES

Most commercial two-way radios use specifically made sealed Nickel Cadmium or Nickel Oxide batteries that clip to the radio bodies. Some have 12-volt chargers that will work off a battery. But, others use drop-in chargers that require standard AC power. In this eventuality, you need a AC POWER INVERTER to convert the 12 volts DC from the storage battery to 117 Volts AC.

Some radios and almost all scanners permit the use of standard alkaline batteries. These batteries last 3-4 times longer than the rechargeable type. The main advantage of the rechargeables is that they can be recharged via a solar panel

D. SOLAR POWER

In areas where there is no power nearby, one can utilize solar panels to keep storage batteries charged. Panels have increased in efficiency to the point where backpack-sized smaller panels can provide enough power to keep scanners and low power two way radios operating.

In many remote areas of the world, Solar Plants provide power for communication equipment, pumps and lighting. A larger solar array of 2, 1000watt 2' x 4' panels can produce 5-10 amps depending on the sun and cloud conditions.

E. POWER DISTRIBUTION

A good method of providing power from a battery to different types of gadgets is to use the cigarette lighter type socket outputs from the battery. These are often available in 3 plug units that can accommodate laptops, radios, cell phones and scanners. Almost all-electronic devices have cigarette-lighter plug inputs to power the units and/or charge the batteries.

It is also a good idea to have a 6-10 amp charger to charge your portable fixed battery when you are near power.

IX. RADIO SECURITY AND COUNTERMEASURES

A. Radio Security

As mentioned earlier, the best security is to transmit as little as possible and to sound like other radio users. But, at certain points, when the action is under way, the police and their friends in the radio community can get your frequency and listen in. There are several ways to make listening harder:

-Scrambling. Scrambling a commercial radio can add hundreds of dollars to the purchase price of a radio and cut down on the range of the radio. Some of the inexpensive "Family Radios" have "speech inversion scrambling" which makes it impossible to understand. This type of scrambling is the easiest to de-scramble; one can use a similar radio, a de-scrambler box or software to decode.

-Changing channels. Changing channels in odd sequence at non-regular intervals can make it more difficult to follow

B. Eavesdropping-Countermeasures

One can use a frequency counter to find or detect the presence of hidden microphones. By slowly moving it through the room (paying particular attention to electrical outlets and phones) you might get a "hit" that can be checked out with a scanner. Given the new spy technology, this is often an inadequate tool.

Another popular method of audio surveillance is to shoot a laser beam at a windowpane and convert the records of the slight vibrations into a form in which sounds can be decoded: in effect, the window becomes a large microphone. An activist discovered (quite by accident) that a regular radar/ detector laser (of the type used in cars) could be used to detect the presence of window lasers. One can "jam" a window laser by duct-taping a small speaker to a window and playing music to modulate the window and mask voices.