Grassroots Emergency Communications Operations

EchoLink® for EmComm: A Concept Paper Follow-On

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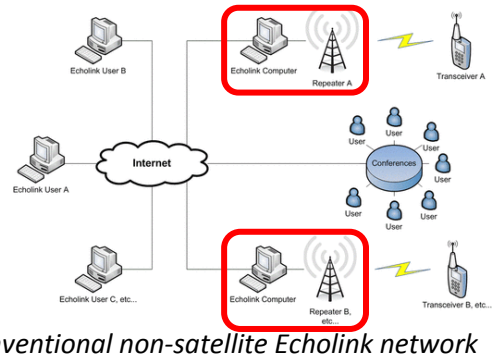
Ready to Serve and Sustain Our Community

The Internet and VoIP has changed the EmComm landscape by offering another means of communication. Echolink integrated radio to the Internet using VoIP (Voice over Internet Protocol). "Any and all means of communication" is the operative EmComm phrase. Echolink is a means of communication. So Echolink could and should be a part of the EmComm inventory. Yet some critics say loss of the Internet renders Echolink useless for EmComm. It is interesting that poor band conditions are not considered a reason to abandon HF for EmComm.

The loss of commercial power is a common denominator for disasters. Many people assume that the phone company must maintain backup power to keep landline phones operative during power outages. This was and may still be true IF you are using copper landline phone service. However, high speed internet service is something that many people consider to be a necessity in these digital times. VoIP and video streaming require faster connectivity speeds that exceed the capacity of many older copper landline systems. Fiber optics and wireless technologies are not supported by the former utility supplied back up power systems of yesteryear. The FCC has considered requiring ISPs to provide back-up power to Internet customers. The companies are lobbying against this requirement.

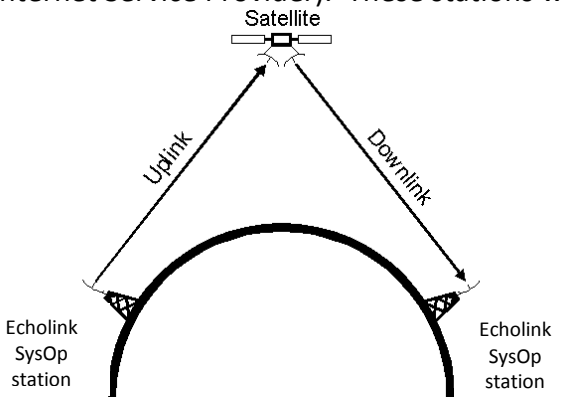
Rather than wait or depend on others for back-up power, we advocate being pro-active. Responsible EmComm operators are prepared for the inevitable loss of power during any disaster or emergency. The ARRL annual Field Day is a practicum for hams to operate using alternative power supplies. Yet when it comes to Echolink, many hams seem to simply write off using Echolink for EmComm.

The diagram on the right shows the Echolink familiar to most critics. However, "SysOp" stations (outlined in red) can also relay EmComm traffic by RF. This is the grand tradition of the ARRL (American Radio Relay League). Eventually the messages reach an Echolink "SysOp" station with Internet connectivity. The news can then spread faster by the Internet.



A conventional non-satellite Echolink network

A possibility not show in this diagram is an Echolink "SysOp" station with a satellite ISP (Internet Service Provider). These stations would not lose Internet connectivity in the same way as non-satellite ISP stations. Satellite ISP stations have different advantages and disadvantages. This is why any EmComm plan needs other communication options.



Loss of internet connectivity can occur for various reasons: A physical break in the ISP line/cable, loss of power, electrical surge damaging modem/router or computer. Of these reasons, the Echolink EmComm ham can take reasonable precautions against power surges and power loss. Providing back-up power for an Echolink station is not so different from a regular ham station. In addition to power for radios, an Echolink "SysOp" station also needs to have power for the modem/router and computer. In some cases, associated USB hubs and an interface unit may require power. If you examine the wall warts for your modem and router, you can set them up to run directly on 12 VDC. For many, it will be easier to run the Echolink computer by using a DC/AC inverter. However, the truly power conscious would probably consider running Echolink on raspberry pi to conserve electrical power.

Each communication mode has advantages and disadvantages. In EmComm, the key is to know the capabilities and limitations of the various communication modes. Then use the most appropriate communications tool(s) available for the situation. [**Note:** In our station EmComm plan, priority is given to power the radios. Echolink connectivity is given lower priority when power is scarce.]

An EmComm Echolink "SysOp" station without Internet connectivity simply reverts to using the radio for EmComm. The "SysOp" stations can relay EmComm traffic RF to any other ham who ultimately passes the traffic to a station with Internet connectivity. At that point, the power of the Internet can be used to rapidly disseminate the EmComm traffic to the rest of the world. This was aptly demonstrated in the Fukushima and Nepal disasters. Once word got out of the disaster area, news spread rapidly around the world due to the Internet.

This paper shows the power backup systems for our Echolink "SysOp" station. One harsh reality for our station is constraints imposed by living in an apartment. We are limited to using commercial mains for battery recharging. We are not able to set up solar panels sufficient to charge our station battery banks. We are limited to VHF/UHF antennas.

Our Echolink "SysOp" repeater station has a dual battery back-up power system. The first battery bank has 12 batteries for the radios and other 12 VDC equipment. The second has 9 batteries for the DC/AC inverter set up to power the Echolink laptop computer and 120 VAC

equipment (mainly battery chargers for the HTs, AA/AAA batteries, and antenna rotator. All station equipment draws power through their designated battery bank. The battery banks are on float charge. If commercial main power drops, there is no interruption in the power supply from the battery banks. A separate bank of 6 batteries are on float charge to support our mobile radio operations. We also have two single 12 VDC field radio batteries for our person-portable field radios. These are on small 1.5-watt solar float chargers.

Station 12 VDC System & Components

12 VDC Charging System

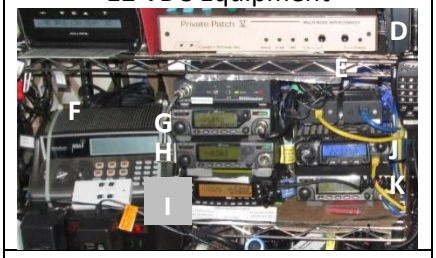
A. Radio Shack 19 amp switching power supply

B. Samlex BBM-12100 Battery Backup Module

Battery Bank

C. Battery Bank: 12 batteries; 16 aH deep cycle sealed lead acid.

12 VDC Equipment



D Private Patch V
E LED light bar
F Radio Shack Scanner
G ADI AR-447 (440 TX)
H ADI AR 445 (440 RX)
I TYT TH9800 (Base)
J TYT TH9000 (220 TX)
K ADI AR-147 (2m TX)
L 2 cooling fans (behind radios)

Station 120 VAC System & Components

A UPS unit (charger / DC-AC inverter)

B Battery Bank: 9 batteries; 16 aH deep cycle sealed lead acid.

C Netgear router
D Arris Modem

E Acurite weather display

F Laptop & USB powered hubs

The 12 VDC equipment battery bank capacity is about 28.4 hours before we need to re-charge the batteries. Our plan is to expect to be re-supplied in 72-hours (best case) or 2 weeks (worst case). This limits our on-air operations. Living in an apartment severely constrains our options for battery recharging without commercial main power. When the station is relocated to a more favorable situation, the battery re- charging system will be upgraded to include both solar and generator options.

The 120 VAC equipment is on a separate battery bank. The inefficiency of stepping up from 12 VDC to 120 VAC will tend to drawn down this battery bank faster. In an actual EmComm situation, we need to carefully assess the power situation in allocating power for Echolink use.

The very nature of an "emergency" requires flexibility. However it plays out, we have the option to use Echolink in our EmComm operations. It is just one more tool in our EmComm inventory of communications modes.