

Alachua ARES Practices Puerto-Rico Style For S.E.T.

By Gordon Gibby KX4Z



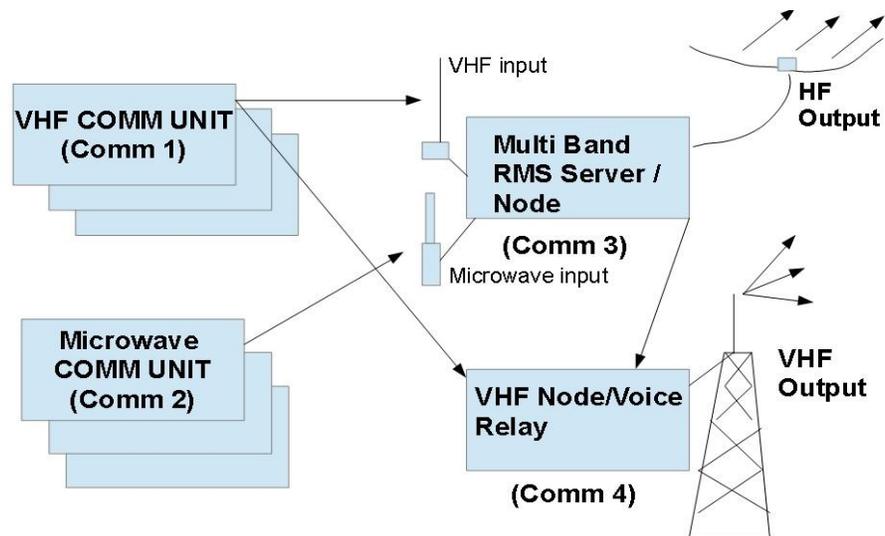
The group assembled at the "Check-In" location before moving to their assigned Units. (L to R: John Troupe KM4JTE, Leland Gallup AA3YB, Jeff Capehart W4UFL, Susan Halbert KG4VWI, Rosemary Jones KI4QBZ, Shawn Payne W4LTE, Vann Chesney AC4QS, Cindy Grant KM4YGG and Art Grant KM4YGH.



Incident Commander Jeff Capehart W4UFL and Comm Unit 1 Leader Vann Chesney AC4QS at work.

Alachua County ARES planned their Simulated Emergency Test months ago – and still picked just about every technique actually utilized in the ham radio Puerto Rico response—and maybe more.

The goal was to simulate forward-deployed communications units of two types – VHF and Microwave-- communicating back to two different kinds of long-range relays: a WINLINK RMS server, and a “high-perch” VHF node. The VHF node was capable of both Packet and voice.



A real deployment could replicate VHF and Microwave units as needed; Alachua County volunteers tried just one of each. Voice VHF Simplex communications were the tactical method of coordination throughout.

The WINLINK RMS server station (Comm 3) had both VHF and Microwave (Ubiquity; AREDN) inputs, with automated forwarding outbound on HF ham bands. It simultaneously provided both VHF WINLINK input and packet node relay as needed to the more distant VHF Node/Voice Relay (Comm 4) stationed at a 110-foot fire lookout tower.

Despite recent service with Hurricane Irma, ten Alachua volunteers trekked 60 miles west to the little fishing village of Steinhatchee, Florida to try all this out, simulating emergency comms after a hurricane/flood. Steinhatchee well remembers their 2016 devastating flood, and local establishments and authorities warmly responded to our requests for necessary permissions. One manager even wanted to watch! Developing our internal organization, we produced extensive ICS-style documents, and utilized Logistics and Operations Chiefs, Safety Officer, Incident Commander, and Unit Leaders. (ARES groups are just as free as hospitals and private companies to take advantage of the ICS structure internally.)

RESULTS

Of course, things didn't go completely according to plan. Here's a rundown on the systems/techniques we tested and how well or poorly they functioned:

FM Voice Simplex: Worked well during the 70-minute caravan ride, but once spread out over 6 miles of city and brush, relays were frequently necessary. After the vagrant living in the fire lookout tower (permission graciously given by The Crapps Family) ambled away, Comm 4 set up a 40-foot high simplex antenna to supplement the top antenna used for digital.

FM Voice back to Gainesville 146.82 Repeater – 70+ miles – worked from the 110-foot antenna, but needed 65 watts for full quieting.

VHF digital connected nodes – 60-mile link from 110-foot fire tower antenna to the identical Newberry fire tower was an unexpected failure after a successful test earlier in the year (possibly with less foliage growth). *If we want VHF packet back to Gainesville, we'll need a node perhaps at the Trenton fire tower.*



Comm Unit 2 Leader Susan Halbert KG4VWI (even with broken wrist) pushes message through the microwave system.

Microwave: Our first exercise involving microwave (2.4 GHz) was intentionally set up to be a easy success: omnidirectional 5 db 600 mW Ubiquiti Bullet node (<https://www.amazon.com/Ubiquiti-BULLET-M2-HP-Outdoor-802-11-M2HP/dp/B002SYS22E>) as close to the Steinhatchee Bridge's high span as we could park, and a 10 dB 600 mW Ubiquiti NanoStation (<https://www.amazon.com/Ubiquiti-NanoStation-M2-Wireless-Access/dp/B00HXT8K4O>) just down the river at Hungry Howies in their outdoor seating. Concern about traffic hazard had our Comm 3 pickup truck farther from the bridge top than hoped, forcing signals to plow through a stand of trees. We still had a 24 dB signal to noise ratio, so the Grandstream voice over IP telephones were crystal clear, with rings initiated by “dial by IP number.” Over the same microwave link, WINLINK TELNET was utilized to almost instantaneously deposit and retrieve email from the RMS RELAY server at COMM 3.

Puerto Rico Microwave Mesh? Jeff Capehart, ARES EC, noted Puerto Rico is mountainous – and that simply hanging one of our microwave nodes on one side of a mountain aimed at the valley below, with ethernet cable to a second node placed on the other side of the mountain, could provide high speed digital connection between two cities. Repeated mountain-after-mountain, a WIFI mesh network would automatically form. The low-power Ubiquiti weatherproof nodes can be solar- or auto battery-powered.



The two microwave systems, one with vertical omni antenna, the more portable unit with pole mounted 10 dB sector antenna. Both systems have network hubs and VOIP telephones.

VHF digital WINLINK: Good success. Comm Unit #1 2 miles down the river from the Bridge was easily able to deposit WINLINK email into the Raspberry Pi VHF digital gateway in the Bridge Comm 3 pickup, and it auto transferred to the HF radio.

HF Forwarding from temporary WINLINK server gateway: *PROBLEMS.* Antenna went quickly despite thick brush/rattlesnake concerns, with a slingshot. The HF station worked and ordinary (client) WINLINK connections worked....but we were trying to test the automation of a portable RMS_RELAY WINLINK server. Such a system would – without human intervention – move messages to and from our deployed units back to “undamaged world” finding HF relay points anywhere in the nation. *Unfortunately, both WINLINK and Microsoft released updates right before the exercise and after we had tested our configured system....and something between them didn't jive.* In some way, one of the winlink components became unable to speak to another. I sheepishly realized I had not made a thumbdrive with complete re-installation software for all WINLINK components—a crucial error. Not only was I forced to allow Microsoft to do its time-consuming update, I had to break protocol and download the forgotten WINLINK installation software. Once all was installed, it worked perfectly. With the VHF digital link to Gainesville unsuccessful, the HF WINLINK system was the only way out to our proxy dispatching authorities. Messages from both VHF and microwave deployed units flowed smoothly.



Balky RMS RELAY pickup-truck station with Gordon Gibby KX4Z (driver) and immensely patient Shawn Payne KM4LTE (passenger side). Computer above the steering wheel, and both VHF and HF stations in the back seat.

After “declaring victory” (a couple of hours later than planned) all 10 volunteers headed to Roy's Restaurant for a delicious lunch and enthusiastic “hot wash” feedback session. We learned several lessons ---

- 1) ***always*** bring full re-installation software on thumb drives; try to avoid computers picking up Windows updates before deployment;
- 2) voice back to Gainesville repeaters works but harder than expected;
- 3) those Steinhatchee marsh/woods are THICK and putting up a roadside HF antenna requires some courage & effort (beware rattlesnakes!);
- 4) simplex over several miles is difficult without HIGH antennas;
- 5) our microwave system ***worked*** in a real test;
- 6) ALL our outdoors operators said they badly needed “shades” for their computer screens.

Our experiences have been written up more fully in our After Action Report (<http://qsl.net/nf4rc/2017AlachuaCountyCreateSpaceSteinhatcheeAAR.pdf>) and we're done exercising until next year! Two full scale exercises and one real hurricane deployment is enough for this year!