

**HURRICANE IRMA
SEPTEMBER 2017
Alachua County ARES After Action Report**

DRAFT

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Andrew, KM4YDD, volunteering at Buchholz Shelter

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Note: This format follows the After Action Template utilized by the Virginia Department of Transportation.

SECTION ONE: INCIDENT DESCRIPTION

Hurricane IRMA broke numerous records, but wasn't the strongest storm ever...

- *185 mph lifetime max winds, tied with Florida Keys (1935), Gilbert 1988) and Wilma (2005) for the second strongest max winds of all times in Atlantic hurricanes. The first place went to Hurricane Allen, 190 mph in 180.*
- *First Cat 5 hurricane in the Atlantic since Hurricane Matthew of 2016.*
- *Spent 3.25 days as a Cat 5 hurricane.*

Irma made first continental US landfall in the Cudjoe Key, Florida at 130 mph, 929 mb, Cat 4. This was the first Cat 4 hurricane to landfall in Florida since Hurricane Charley 2004. ¹

Its next landfall was in the Marco island, FL, at Cat 3, 115 mph. It then went up through Florida, with the eye moving past Alachua County somewhat to the west of the county, with maximum gust winds at the Gainesville airport in the low 60mph range.

ALACHUA COUNTY ARES PREPARATIONS

The Alachua County ARES began a nightly 8PM voice “Tropical Net” on the 146.82 (-, 123) repeater as soon as the 5-day projected track included Gainesville, Florida, as per plan, to keep local amateurs informed and generate involvement and volunteers.

Over a period of days, increasing numbers of Floridians were ordered to evacuate. At first, landfall was anticipated on the east coast of Florida, and low lying areas of that area as well as the Keys were evacuated. As the hurricane neared, more and more people were evacuated; then the evacuation shifted to the west coast as the hurricane's course altered. Volunteer monitoring of the I-75 northbound lanes suggested that 140,000 persons were evacuating past Gainesville Florida every day for multiple days. In the end several million Floridians were ordered to evacuate.

This was the largest evacuation in the history of the United States.

The Alachua County School District originally planned to hold normal classes on Friday, with an anticipated arrival of tropical storm winds in Gainesville late Sunday evening (Sept 10) or early Monday (Sept 11); the University of Florida wished to continue holding a home game in Gainesville, an event that normally generates city-choking traffic flows.

¹ <https://webcms.colostate.edu/tropical/media/sites/111/2017/09/Hurricane-Irma-Records.pdf>

As the storm got closer, Floridians were evacuating by the hundreds of thousands northward, fleeing this monster storm, with a width exceeding the breadth of the State of Florida.

The Governor of Florida by executive order closed all schools on Friday, and discussions resulted in an increasing number of schools becoming available for emergency shelters; by the maximum, all 18 planned Shelters in Alachua County were opened, and over 2,000 persons were sheltered. The University of Florida canceled the football game and eventually opened shelters, with a notable criticism from a former FEMA administrator regarding the slowness with which shelters from the University of Florida were made available to the taxpayers who paid for them.

At the EOC, there were multiple pieces of amateur radio equipment purchased to assist in the amateur radio communications, chosen by Larry Rovak WB2SVB, and including (among others):

- 2 Dual Band FM transceivers for the EOC
- 4 Dual Band FT-7900 transceivers for Shelters
- AC power supplies
- Polyphaser lightning arresters
- 3 Headsets (without microphone)
- PowerGate devices to auto-switch between AC power supplies and battery power
- 2 Diamond X-50 dual band antennas

Additionally, Jeff Bielling of the EM group purchased and personally transported ten AGM Group 24-sized 12 volt storage batteries. *This established a larger bank of backup power than ever before for ARES volunteers.*



Volunteer-assembled “go-box”

The Alachua County ARES group had never before been asked to staff 18 shelters, and scrambled to find volunteers; this number of shelters exceeding even the number of volunteers in our May 2017 Hurricane Exercise, and many volunteers for exercises do not normally actually serve during real weather events. The entire ARES list was contacted, but many members (for whatever reason) did not volunteer for a shelter. Multiple requests for volunteers were made to the 146.82 repeater traffic – which was increasing --- but the GARS mailing list was overlooked.

ARES volunteers retrieved equipment for three emergency portable VHF FM stations (“Go-Boxes”), purchased three RIDGID tool cases, and assembled waterproof VHF Go-boxes on Friday and Saturday before the hurricane.

At the EOC, there was concern that a fragile 800 MHz trunked radio system might fail during a cell phone failure, at which point the amateur radio systems would be the last remaining way to reach first responders and shelters.

The local ARES group carried out a Full Scale Exercise in May 2017, directed at internet- and power-loss situations, with a heavy emphasis on digital communications, as well as repeater-out communications. Thirty issues were noted during that Exercise and work commenced on resolving each of those issues. At the start of Hurricane Irma, the following issues remained unresolved:

#6	EOC inadequate antennas, both HF and VHF -- and UHF also!!
#7	Simplex repeater needs more sensitive receiver
#9	New transceivers for EOC to allow more frequencies to be monitored -- not installed, no extra antennas available
#11	No satisfactory HF amateur or SHARES antennas at EOC -- ARES practiced slingshot temporary antennas in trees south of the building as replacement
#12	Partial: unclear if the ARES member has better HF antenna tuning assets/capabilities at this point.
#15	Easton Newberry antennas not installed; worse, there is no transmission cable passthrough out of building. There are no antennas at the Senior Center.
#26	Winlink Peer to Peer Training -- not yet accomplished!

In the end, volunteers were found to staff the EOC for multiple days and to staff as many as nine shelters during the peak of the storm, which passed through between midnight of Sunday Sept 10 and 0400 of Monday Sept 11. Logistics prevented all the Go-boxes being deployed, but a malfunctioning radio of a volunteer at Eastside High School was replaced by one of the Goboxes, and at least 2 of the AGM batteries were put to use as power failed at multiple shelters. 40% of the Gainesville GRU customers lost power for variable lengths of time, exceeding 7 days in some instances.

VOICE REPEATER SYSTEM

All of the Gainesville Radio Society tower-mounted high performance voice analog VHF repeaters continued in action throughout the hurricane. A total of at least five voice repeater are available and on three different towers. 146.82 and some others (including 146.91) are on backed-up power systems.

DIGITAL PACKET REPEATER SYSTEM

On the Saturday before the storm, a volunteer added a charged Group 24 deep cycle marine battery to the NEWB repeater providing coverage to the western side of the county and Gilchrist county. Of the digital packet repeater nodes, GARC2 and NEWB continued throughout the storm. KM4YGH-7 elected to lower their antenna, and the heavy, homemade dual-collinear antenna 60 feet up in a tree at NK3F-7 fell as the branch broke. KI4QBZ-7's antenna failed as the branch holding it broke. All of KX4Z's antennas (both HF and VHF) remained intact.

WINLINK GATEWAY STATIONS

Gainesville has two digital email radio systems that can transact email even without any existing Internet in the area. It was expected that Internet service would be lost at multiple locations due to power failures, line failures etc. Digital gateway KX4Z-10 (VHF, dual frequency) and KX4Z (HF) remained in service without interruption, performing as automated radio relays when Internet was lost on amateur radio frequencies. For the Federal SHARES digital system (utilized by the Tallahassee EOC and multiple other federal, state and local government authorities), Gateway NCS521 operated at the same location as KX4Z remained in service as well throughout. Both of these systems were on solar/battery backup, with propane- and gas-operated generators as further backup.

MESSAGE TRAFFIC

There was no formal traffic passed on the voice local 146.82 net which functioned for multiple days with two volunteers and ample support from the EOC. During the 14 days surrounding the hurricane, there were over 170 traffic passed on KX4Z and over 2.5 Mbyte of data passed, particularly weather products to amateur radio operators located near the path of the storm through the Caribbean.

EOC volunteers were able to successfully transact multiple radio-based emails to and from ARES volunteer KX4Z using the WINLINK system.

HF NETS

There did not appear to be a 24-hour HF amateur radio net. There was a multi-day, 24-hour SHARES HF net, and one volunteer (KX4Z, acting as NCS521) did successfully check into that net on both voice and MT63 during the eye of the storm on Monday morning.

SECTION TWO: LESSONS LEARNED



An Emergency VHF Vertical Antenna

Item	Area	Issue
1	Advance notification	Jeff Capehart, local Emergency Coordinator was not on the EOC email list. (This was corrected)
2	Advance equipment preparation	The purchased amateur FM transceiver gear had not been assembled into portable stations. (3 systems were rapidly built by a team of volunteers.)

3	EOC Antenna Preparation	HF antenna improvements requested in Summer, 2016 have not been accomplished.
4	EOC Antenna Preparation	VHF antenna improvements requested in Summer, 2016, have not been accomplished
5	EOC Antenna Preparation	UHF antenna is too near the tower and will not connect to the SARNET.
6	Radio room 800 MHz radio	Was set to an outdated template (This was corrected.)
7	Radio room computer	Software (multiple types) was out of date (This was updated)
8	Shelter radio accommodations	Multiple shelters did not have a suitable area for volunteer radio operators
9	Shelter transmission line accommodations	Multiple shelters did not have any method for safely passing transmission lines out of the building. (A small number of shelters have had their walls drilled and pass-throughs installed.)
10	Shelter radio antennas	The planned fixed antennas at the Senior Center and at the Easton Newberry center were not installed. In particular the Easton Newberry center did not have a suitable site for a radio; did not accommodate volunteers during the May Hurricane Exercise, and has impenetrable walls. The only space offered was incommunicado with the remainder of the building, and also unable to pass a transmission line out, and with no suitable placement for an external antenna. As a result, no volunteer was ever able to be placed at this key center.
11	EOC radio equipment preparation	The desktop mic at the EOC has a faulty mic button that stuck “ON”
12	EOC radio station preparation	There were multiple old papers laying around.
13	EOC radio station preparation	Wall clock did not work.



Emergency HF dipole and VHF magmounts on the truck hood.

The following table indicates the situations discovered and staffing at the shelters opened:

Hurricane Irma: September 10-11 2017

SHELTER	Radio Conducive Volunteer	Radio Obstructive
Alachua Elem School	(no volunteer) PASSTHRU: Classroom building into teacher planning area 2” conduit bldg 6, room 023A	
Archer Comm School	(no volunteer)	

<p>Buchholz High School</p>	<p>Andfrew, KM4YDD Hallway – north end of hallway used for residents. This allowed him to put a mag mount antenna onto the door and shut the door o the cable.</p> <p>Generator runs the entire facility so he never lost electircal power; he had a backup UPS.</p>	<p>No pathway through wall. Difficulty finding location that could receive the repeater.</p>
<p>Chiles Elem School</p>	<p>WA4ET waiting on a report</p>	
<p>Eastside High School</p>	<p>Chris Carr, KG4NGR Office in front building. Antenna went by a window. (Used Alachua County Go-Box successfully with Diamond Antenna) – worked even inside.</p>	<p>No possible attachment for an outside antenna. Would have required very long cable. No path thru wall.</p>
<p>High Springs Comm School</p>	<p>Karl, KG4FRT</p>	
<p>Kanapaha Middle School</p>	<p>(no volunteer, I think)</p>	
<p>MLK Multipurpose Center</p>	<p>KC1TN Set up in a storage room on the side of the gymnasium. Earl used a coathanger vertical-- worked adequate to get to the repeater but nothing more</p> <p>Air Force gave him access to their WIFI – prior to that he had no wifi access.- information gathering, jax chat, weather services, Army and Air Force had good local information but were appreciative of the state wide updates that Harry was able to provide.</p>	<p>No path rthough wall.</p>
<p>Meadowbrook Elem School</p>	<p>Don Fuhrlong, KM4EOY</p>	

	Believe he was way inside the school with no real radio way out....need more information....	
Oak View Elem School	<p>Gordon Gibby KX4Z Leland Gallup, AA3YB Science room with covered exterior door utilized; tied door shut on pliers to avoid crushing coax; outside VHF/HF antennas in convenient 25-ft trees—made contact with Federal SHARES voice & digital net, and constant contact with local ARES net on voice repeaters. Also considerable digital email – worked well with outside antennas.</p>	No access to life-safety power. No path through wall. Hurricane screens made antenna thru window impossible.
Rawlings Elem School	<p>UNABLE (at first) The first time Harry went there, the setup was simply unworkable.</p> <p>Harry Meyer, KC1TN On the following day, Harry found a more accommodating shelter staff, they become much more receptive and provided a place for Harry to set up! Was able to set up indoor HF and VHF antennas and function well. Used a 80- 10 meter vertical indoors.</p> <p>Project coordinator says there is a pass through.</p>	<p>Radio room has been made into a staff sleeping quarters. Only remaining opportunity was a handitalkie by the front door. No path through wall.</p> <p>NOTE: operating VHF and HF antennas indoors creates large losses and exposes local personnel to RF energy which may be within exposure limits, but isn't a good idea if higher powers are used to get over the large losses....if repeaters fail, communications using indoor antennas are very unlikely to be successful.</p>
Santa Fe High School	<p>(no volunteer)</p> <p>PASSTHROUGH: Bldg 34; conduit cast iron, clean out covers, 020</p>	

Shell Elem School	Earl, KI4OXD Staff break room just off cafeteria. Ran coax under door – there was enough gap exterior.. door.	Generator: switchover switch fried. 11 hours no power No path through wall. Paramedic unable to get a signal due to building shielding; sheriff's radios also failing inside building.
Talbot Elem School	(no volunteer)	
Williams Elem School	(no volunteer)	
Gainesville Sr Center	Rosemary, KI4QBZ Billiards room utilized, antenna had to go on lighting pole. (KI4QBZ).	Scheduled antenna never installed. No path through wall Building has wall penetration, but radio location was moved to opposite end of building?
Westwood Middle School	(no volunteer) PASSTHROUGH: 4” conduit through two walls. Cafeteria. bldg 18, SE wall room 002, N wall on 014. (they have run extension cords thru)	
Easton Newberry Sports Cmplx		RADIO IMPOSSIBLE Scheduled antenna never installed. No radio spot No path through wall Suggested site impenetrable to remainder of shelter, no path through wall. No outside antennas
Waldo Comm School	Shannon, W4GLM Debbie, KI4CVS Placed in Noe Hall. They asked for a location with a window –	Newer building they were in “meets codes” but the generator had never been tested. It did not work when needed, 15kW Would not run a coffee pot

	<p>teachers workroom. excellent location between kids and adult's shelters. Able to get coax/antennas out the antenna. Used tripod military-type mount for a vertical antenna. Shelter manager “Laura” – good relationship, great teamwork.</p>	<p>because carb was full of deteriorated gasoline; tires flat.</p> <p>Older building was NOT used but had a genny what worked AUTOMATICALLY --- so our crew had to switch to a truck battery, but the shelter had lots of problems, no lights, etc.</p> <p>Water went out --- can't flush those toilets with buckets at all!</p> <p>EM could not get them to the right people, but Bernard Carter shifted from primary well to secondary well that gave them water back!!</p>
<p>Emergency Operations Center</p>	<p>Susan, KG4VWI Cindy, KM4YGG Good equipment, after staff upgraded everything to current templates and software</p>	<p>Existing HF antenna inadequate Existing VHF antennas only work through repeaters. Planned upgrades not yet accomplished. Radio software WINLINK not updated Trunked software not updated Only 2 VHF antennas UFH antenna in very poor shape</p>

SECTION THREE: IMPROVEMENT PLAN

Item	Issue	Resolution/ Plan
1	EOC HF antennas remain inadequate <i>(this remains from previous improvement plans)</i>	Re-approach Alachua Sheriff's office to improve; continue training on ad-hoc emergency HF antennas; request transmission line pass-through as a mitigation effort in the interim
2	EOC VHF & UHF antennas remain inadequate <i>(this remains from previous improvement plans)</i>	Re-approach Alachua Sheriff's office to improve; continue training on ad-hoc emergency antennas; request transmission line pass-through as a mitigation effort in the interim
3	Fixed antennas do not exist at any Alachua County Shelter. <i>(this remains from previous improvement plans)</i>	Work with Alachua County Emergency Management to see the VHF antenna installation completed at least at the most-likely utilized shelters.
4	Transmission line pass-throughs do not exist at the majority of Alachua County shelters.	<p>Work with Alachua County Emergency Management and Tom Cowart of SBAC Facilities to see pass throughs (or SO-239 bulkhead double-female passthroughs) installed at the most likely utilized shelters.</p> <p>After discussions with Mr. Cowart --- notify amateur volunteers to remove the threshold of exterior doors where necessary to make transmission lines pass under doors and allow the doors to be securely latched.</p>
5	EOC net control absent from frequency during extended briefings	<ol style="list-style-type: none"> 1. Obtain digital press releases from PIO to reduce dependence on oral briefings 2. Transfer net control duties to other stations during oral briefings
6	Logistics difficulties moving radios and batteries around	Work to develop better plans for cachement and disbursement and recordkeeping of the EOC equipment and batteries.

7	Some ARES volunteers did not understand building-related radio signal attenuation and were not prepared to position external antennas	Continue educational activities; remind GARS members of ongoing monthly training and bi-annual Full Scale Exercise training available. Continue license advancement classes.
8	Printed or digital briefing materials were not available for the EOC radio team.	Get radio team connected to internal email press releases for the PIO
9	A paucity of ARES volunteers were capable or equipped for digital transmissions of formal messages should that be needed.	While the EOC was staffed with digitally trained individuals, only one shelter appeared to have a backup digitally trained volunteer. Continue to advance state-of-the-art training of our volunteers.
10	Digital repeater NEWB failed 7 days after the hurricane	RESOLVED: Loose screws at the circuit breaker caused power to be lost to the battery backup system, which then ran out of storage power several days later.
11	Multiple volunteers secured at the last minute did not feel they were adequately trained.	Have announced at GARS meetings the ready availability of multiple types of training; continue to encourage additional membership in ARES, attendance at training meetings and Full Scale Exercises

SECTION FOUR: AFTER ACTION REVIEW MEETING SUMMARY

The review of the hurricane was carried out formally by ARES on Wednesday September 13th, two days after the storm, and informally by GARS on Tuesday, September 19th. An hour of discussion was held at the ARES meeting with good discussion and written comments were solicited using a structured comment-gathering form from the Virginia Department of Transportation. The comments received were incorporated into this document. In general, most of the difficulties experienced had to do with lack of EOC or shelter building accommodations for radio volunteers, their transmission lines, and their antennas, or failure of the EOC to make requested changes in HF and VHF antennas in time for this hurricane. It is well known that the EOC is almost completely dependent on functioning repeaters, due to the poor performance of their existing amateur radio antennas on all bands. These items have been documented multiple times in the past.² A meeting was held in June 2017 with representatives of the Alachua County EM group as well as the Alachua County Sheriff's office where plans were laid to resolve these difficulties. A written set of suggested improvements were submitted³, but were not completed before this hurricane.

2 <http://www.qsl.net/kx4z/CompleteEOCProposal.pdf>; and <http://www.qsl.net/kx4z/MyNewVHFandHFproposal2.pdf>

3 <http://qsl.net/nf4rc/July2017EOCAntennaRecommendations.pdf>



Volunteer at Buchholz High School



Volunteer in WALDO



Ad Hoc Emergency VHF Antenna



Ad Hoc VHF and HF Antennas



Volunteer-created go-box



Combined VHF / HF voice/digital station in a shelter