Hurricane Shelter WIFI Ham Radio Information Prototype System

by Gordon Gibby KX4Z

How This Started—The Problem Statement

Local ARES/GARS hams who served as backup radio comms volunteers during Hurricane IRMA were invited to the EOC After-Action Review. I was surprised and intrigued when the head of the shelter services group pointed out their huge difficulty with simply getting information and announcements out to the thousands of people huddled in their hurriedly-deployed shelters --- over a dozen of them. Families were bedding down in classroom after classroom in schools and other buildings all over town, and over-worked shelter managers and helper just didn't have a very good way to disseminate information.

On Feb 1, 2018, the official Alachua County After Action Report and Improvement Plan was released (see: http://qsl.net/nf4rc/2018/AlachuaCountyHurricaneIrmaAfterActionReport.pdf) and included 3 improvement plan requirements related to this:

SHLT-007 Shelters were in a situational awareness sile, limiting the information know to the shelter staff and the shelterees.

SHLT-007.1 Develop a strategy to increase situational awareness to shelters

SHLT-007.2 Explore the possibility of equipping each shelter with a smartphone to increase situational awareness and more easily share information.

SHLT-007.3 Increase the amount of information shared with the amateur radio operators to ensure greater situational awareness at the shelters.

Conceptual Solution

Over half of the truly historic number of shelters opened by Alachua County during Hurricane IRMA were staffed with a ham radio volunteer. Thus information flow was possible even if power, cell, and internet were cut off. The EOC was staffed with a very capable crew of ham radio operators who interface well with EOC officials.

How to move information from the EOC / Ham radio volunteers to the hundreds of citizens in each shelter? In retrospect, the answer seems simple: almost every resident has a CELL PHONE and even in the loss of power and cell towers, these can connect to a WIFI router and access information – if we had a simple web server populated with important information for a storm shelter, and updated with weather information and press releases from the EOC.

An elegant solution to this soon emerged, with an inexpensive Raspberry Pi providing an Apache Web Server to any cheap consumer WIFI router. The Raspberry Pi is easy to set up so that it acts like an Internet Service Provider, dispensing all the dhcp ip numbers, nameservices and web server output required to feed information to any shelteree.

And further, by using wifi extenders, and allowing additional wifi routers to connect, it is possible to reach a very large area!! The Raspberry Pi is configured to handle dozens and dozens of wifi routers.

This system was quickly put together using a free Apache web server, free DNS and DHCP server (dnsmasq) and free firewall and security solutions. It works great!

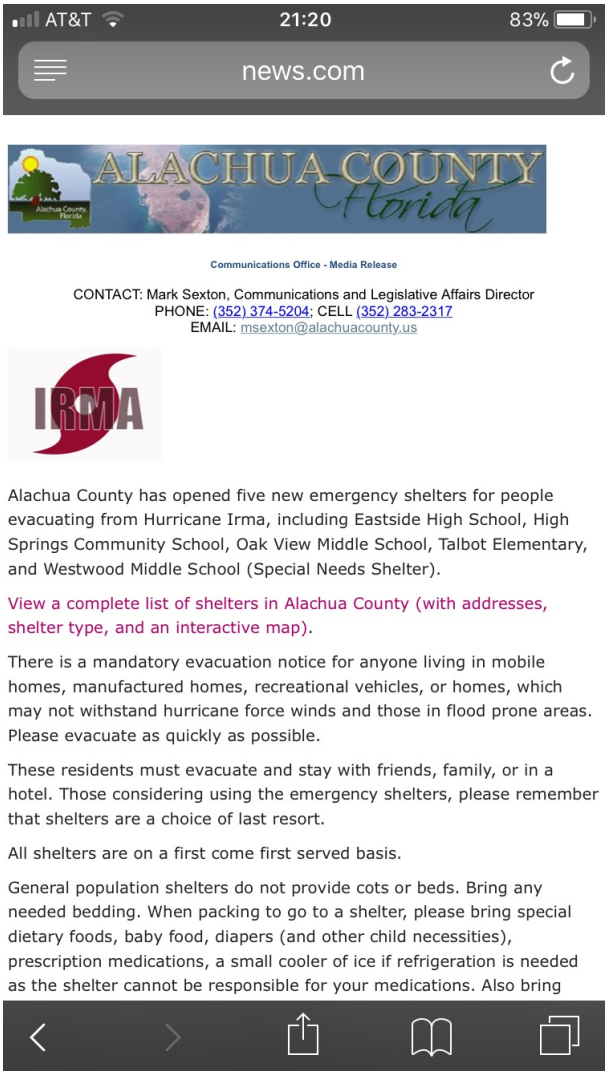
CONTENT

As originally envisioned, an opening screen allows the user to select official announcements and information from the EOC, or to access the "ham radio" pages.

Official announcements from the EOC can include weather updates, road information, fuel availability information, damage reports, information on how to apply for aid, debris pickup schedules, and other governmental information of importance to people sitting out a storm. Much of this can be "pre-loaded" into the Raspberry Pi's (and chips can be replicated so that all the servers have the same

information).

The dynamic updating of the system is also possible because our ham group has the ability to transmit computer files faultlessly by not one, but several methods! WINLINK provides a way to send email to all the shelter volunteers including attachments, and is error-free. Packet radio provides the error-free file transfer protocol YAPP that even accepts files in an unattended ham radio station if so configured. The NBEMS FLDIGI-based system also includes error-corrected methods for file transfers. Once the update weather and other announcements are received from the EOC, it is easy to transfer them (over WIFI) to the little wifi server, using either a .bat batch file, or free point-and-click FTP client software such as Coffee Cup FTP (https://www.coffeecup.com/free-ftp/). The little Raspberry Pi has all the passwords and firewall and other security to make it a secure and reliable system.

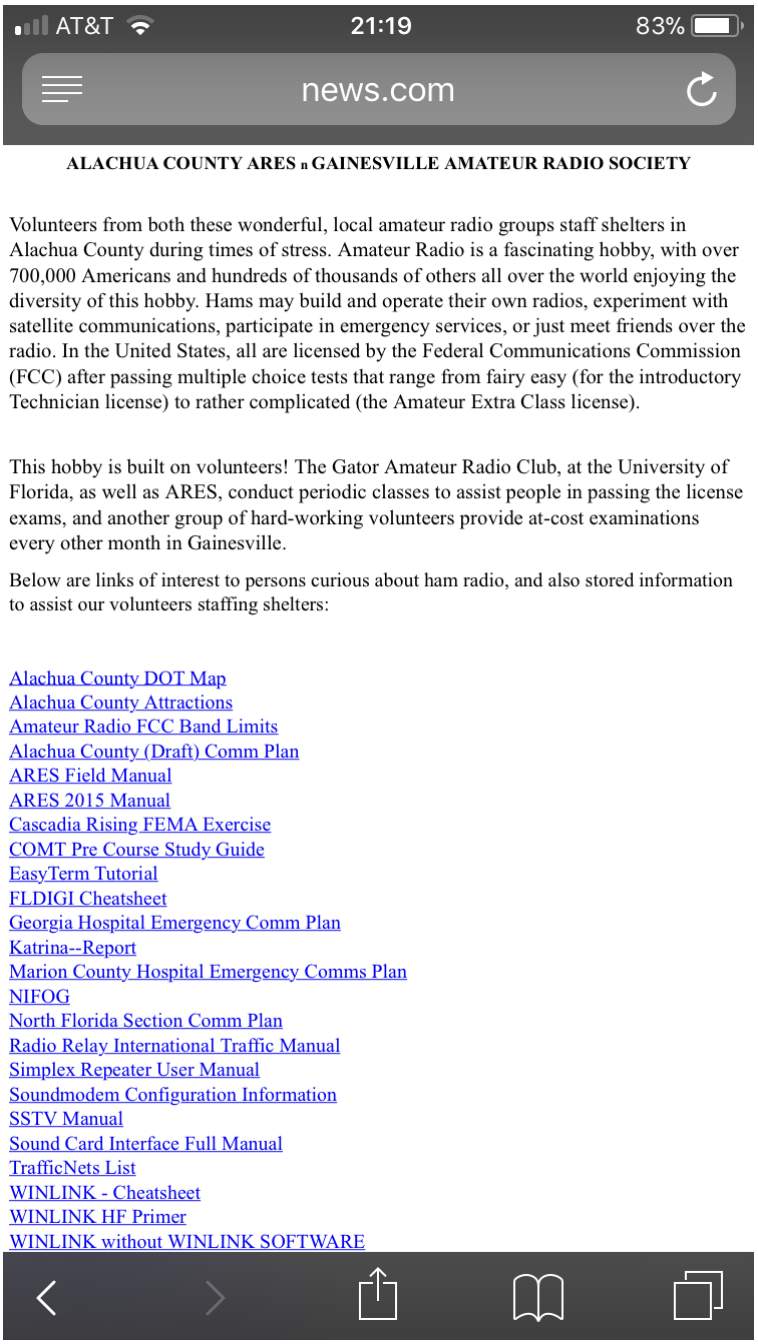


SIMULATED CONTENT

HAM RADIO CONTENT

Shelter residents quickly become BORED. On the amateur radio page, put all the ARES, radiogram, procedures and instructions you wish, but also put some educational information on ham

radio, how to get into the hobby, and maybe even put in some tutorials to get people started toward getting their first license!! The little server probably can't handle streaming many videos, but you could easily have several simple educational slide shows etc.



How To Implement This In Your County

If you would like information on how to get a free working copy of the entire Raspberry-Pi software, contact the author at docvacuumtubes@gmail.com. As you'd expect, there are no guarantees

or warrantees and the author cannot accept responsibility for any untoward events, but this looks like a very useful solution that can help amateurs better serve their communities.