

2021 Alachua County S.E.T. After-Action Report & Improvement Plan

North Florida Amateur Radio Club
Alachua County ARES ®
Gainesville, Florida
October 2, 2021



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ISBN:

DEDICATION

This text is dedicated to all the leaders who made it possible to hold the
2021 Alachua County ARRL Simulated Emergency Test.

CONTENTS

Chapter	Title	Page
1	Alachua County 2021 S.E.T. Overview	1
2	Tasks	4
3	Exercise Schedule	5
4	Results	6
5	Exercise Categorization	19
6	Analysis of Core Capabilities	21
7	Review of Previous Year's Exercise	28
8	Improvement Plan	31
9	Hotwash Transcript	35

CHAPTER 1: ALACHUA COUNTY 2021 S.E.T. OVERVIEW



Emily Wallace KO4JWC operating data during the 2021 S.E.T.

EXERCISE SCENARIO

“Several days ago, a series of software attacks on Domain Name Services(DNS) and other features of routers in the Internet, began to degrade service of the Internet and of the public switched telephone system to the point that they became unusable, throughout a changing and unknown large area. Many TV and radio stations are off the air or transmitting a carrier only

because they depend on Internet for programming. Cable services are likewise out of service.¹

Multiple power generation systems are also failing. It is unknown at this time whether public service trunked radio systems are affected.

Your group was asked to provide staffing for radio communications there, and to begin accumulating periodic status reports from volunteers naturally dispersed throughout your community.

Fuel supplies and stored batteries have gradually been drained down as this disaster has worn on, and at this point you are nearing the end of conventional backup energy sources.

Your Individual Situation

Use the LAST NUMBER of your house address number to determine the current status of your location, to be reported in structured format:

Last Digit of House Address	Landline status	Cell phone status	AM/FM	TV Status	Public Works	Comm . Power	Internet	Other comments
0	works	busy	1 stn	none	water off	none	none	smoke to the east
1	N/A	busy	none	none	water on	none	none	gunshots from the west
2	not working	no bars	none	none	water off	none	none	fire to the south
3	working	no bars	none	none	water on	none	none	Neighbor in labor
4	busy tone	no bars	2 stns	none	water brown	none	none	Neighbor having heart attack
5	working	busy	none	none	water stinks	none	occas.	smoke visible south
6	not working	occ. text msgs	none	PBS	water off	none	none	smoke visible north
7	not working	not working	none	none	water on	none	none	gunshots from the east
8	working	busy	none	none	water off	none	none	firefight to the south

1 Three days after our Simulated Emergency Test built on the idea of the damage caused by a DNS attack, Facebook and associated social media experienced a 6-hour or longer DNS outage, which removed service over much of the world, locked employees out of their workplaces, and had an estimated economic impact on their revenue of \$1Billion.

9	working	busy	none	none	water off	none	none	calm here

EXERCISE DOCUMENTS

Document	URL
Exercise Plan	https://qsl.net/nf4rc/2021/2021SETExercise.pdf
ICS-205	https://qsl.net/nf4rc/2021/AlachuaAres-ICS-205-SET2021.pdf



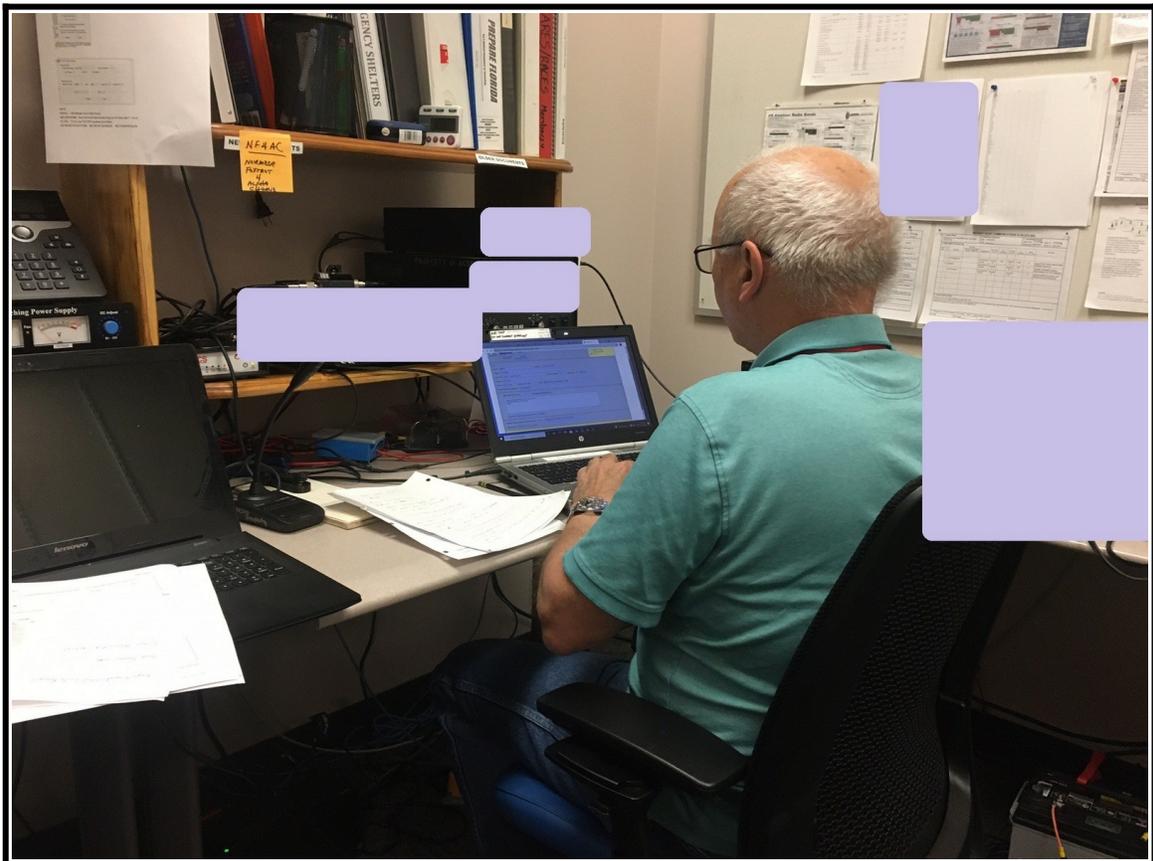
Inverter positioned on vehicle battery, with extension cord to radio equipment

CHAPTER 2: TASKS

Participants in the Exercise were asked to join a command net on the specified frequency of a powerful local repeater at the beginning of the Exercise, and be ready, 30 minutes later, for the simulation of the repeater failure, power failure, and to begin to operate from the required vehicle battery or solar power system, and to send in

- a) Shares SPOT-REP 2 formatted information by any means possible to the EOC
- b) Simulated survivor message outbound to someone out of the area. (Copy requested to a proxy address for record keeping)

The EOC was asked to accept incoming SPOTREP messages, and aggregate and send a report to a proxy address for the State EOC.



Leland Gallup AA3YB at the HF operating position of the Alachua County EOC.

CHAPTER 3: EXERCISE SCHEDULE

Due Date	Personnel	Activity
PRIOR TO EXERCISE	Leadership of groups	<p>If you are a leader of a group that will carry out this exercise, please register your group at the google forms link below:</p> <p>https://docs.google.com/forms/d/e/1FAIpQLScQ3FYcZrVRTBeCVmsIHFF52X1DCPIZvqhM4gjcaDhZk3s3FQ/viewform?vc=0&c=0&w=1&flr=0&usp=mail_form_link</p> <p>Begin creating your COMMUNICATIONS PLAN for your team to use during the exercise when repeaters aren't working and multiple simplex nets might be needed to span your county, or some relay scheme.</p> <p>Create ICS-205 to provide frequency guidance for multiple possible radio techniques.</p>
October 2, 2021 9AM Local Time	Participating Groups	Meet on the air at the designated frequency(ies) provided by your leadership and carry out any last minute announcements or adjustments.
9:30 AM Local Time	Participating Groups.	<p>All normal infrastructure and electrical power are presumed to be lost and peripheral units must resort to a novel form of electrical supply as discussed above.</p> <p>Begin to forward the peripheral structured spot reps and simulated survivor messages.</p>
10:30 AM Local Time	Participating Groups..	If not already accomplished, Central College groups should file their reports to ACTYSET@WINLINK.ORG now.
11 AM Local Time	Participating Groups	Exercise completion. Proceed to the Hot Wash debriefing set up by your local group.

CHAPTER 4: RESULTS

COMMUNICATIONS PLANNING

Local Alachua County Emergency Coordinator Jeff Capehart W4UFL led two, 1-hour zoom sessions, on the two consecutive Mondays prior to the Saturday Exercise. In the process, an ICS-205 was constructed after multiple different communications issues were reviewed and discussed:

- Limited personnel able to fit into the EOC radio room (3 max)
- Need for a scribe to be at the EOC
- Lack of necessity for EOC to be the funnel point for non-governmental outbound Survivor Messages
- Importance of aggregation of peripheral data at the EOC
- Lack of ability for normal simplex VHF to span the width of Alachua County, particularly with the EOC at a significantly lower elevation than 13th St. NW
- Need for unattended peer-to-peer error-corrected techniques such as AX.25 or VARA and Winlink
- Requirement to follow FCC Regulations in Part 95.
- Importance of making frequency assignments well known to participants
- Usefulness of separating voice and data frequencies on VHF to avoid interference between antenna systems at the EOC

INCIDENT RADIO COMMUNICATIONS PLAN ICS-205				Incident Name Alachua County Simulated Emergency Test 2021			Date/Time Prepared 09/27/21		Operational Period Date/Time 10/02/2021 0830-1100 Local		
L i n e	Ch #	Z o n e	Function	Channel Name/ TG Name	Assignment	RX FREQ. N / W / SSB	RX Tone/ NAC	TX Freq N or W	Tx Tone/ NAC	Mode A, D or M	Remarks
1	1		SafetyNet	1-K4GNV82Repeater	Amateur	146.8200 W	123	146.2200 W	123	A	StartEx/EndEx/Safety net
2			Tactical	2M Simplex Triple Nickel	Amateur	147.5550 W	None	147.5550 W	None	A	Primary Simplex VHF Net
3	7		Tactical	7-2M Simplex	Amateur	146.5500 W	None	146.5500 W	None	A	Simplex VHF Message Relay
4			WINLINK	PACKET010	Amateur	145.0100 W	None	145.0100 W	None	D	VHF Digital – WINLINK P2P
5			WINLINK	80M LOCAL Digital	Amateur	3555 USB	None	3555 USB	None	D	HF WINLINK – Local NF4AC
6			HF VOICE	80M LOCAL NVIS	Amateur	3970 LSB	None	3970 LSB	None	A	HF Voice Net +/- 5khz
7				Select Channel	Amateur	Mobile Rx	Rx Tone	Mobile Tx	Tx Tone	A / D	
8				Select Channel	Amateur	Mobile Rx	Rx Tone	Mobile Tx	Tx Tone	A / D	
9				Select Channel	Anyone	Mobile Rx	Rx Tone	Mobile Tx	Tx Tone	A / D	
10				Select Channel	Amateur	Mobile Rx	Rx Tone	Mobile Tx	Tx Tone	A / D	
11				Select Channel	Amateur	Mobile Rx	Rx Tone	Mobile Tx	Tx Tone	A / D	
12				Select Channel	Amateur	Mobile Rx	Rx Tone	Mobile Tx	Tx Tone	A / D	
13				Select Channel		Mobile Rx	Rx Tone	Mobile Tx	Tx Tone	A / D	
14				Select Channel		Mobile Rx	Rx Tone	Mobile Tx	Tx Tone	A / D	
15				Select Channel		Mobile Rx	Rx Tone	Mobile Tx	Tx Tone	A / D	
16				Select Channel		Mobile Rx	Rx Tone	Mobile Tx	Tx Tone	A / D	
17				Select Channel		Mobile Rx	Rx Tone	Mobile Tx	Tx Tone	A / D	
18				Select Channel		Mobile Rx	Rx Tone	Mobile Tx	Tx Tone	A / D	
19				Select Channel		Mobile Rx	Rx Tone	Mobile Tx	Tx Tone	A / D	
20				Select Channel		Mobile Rx	Rx Tone	Mobile Tx	Tx Tone	A / D	
Prepared By (Communications Unit) Alachua County ARES, Jeff Capehart, EC					Incident Location GAINESVILLE, FL County ALACHUA State FL Latitude N Longitude W						

Resulting ICS-205: <https://qsl.net/nf4rc/2021/AlachuaAres-ICS-205-SET2021.pdf>

Registered Participants

1. AA3YB Leland Gallup
2. KX4Z Gordon Gibby
3. KI4KEA Jim Bledsoe
4. NH2KW Brett Wallace
5. K4ZSW Earl
6. KG4VWI Susan Halbert
7. AC4QS Vann
8. K9RFT Reid Tillery
9. KK4INZ Craig Fugate
10. KN4ZUJ Ron Lewis
11. KO4JWC Emily Wallace
12. K9PDL Susan Tipton
13. W4UFL Jeff Capehart
14. W4JIR David Huckstep
15. KO4IDO Amy Woods

These 15 participants represent 36.5% of the registered 41 members of Alachua County ARES(R).

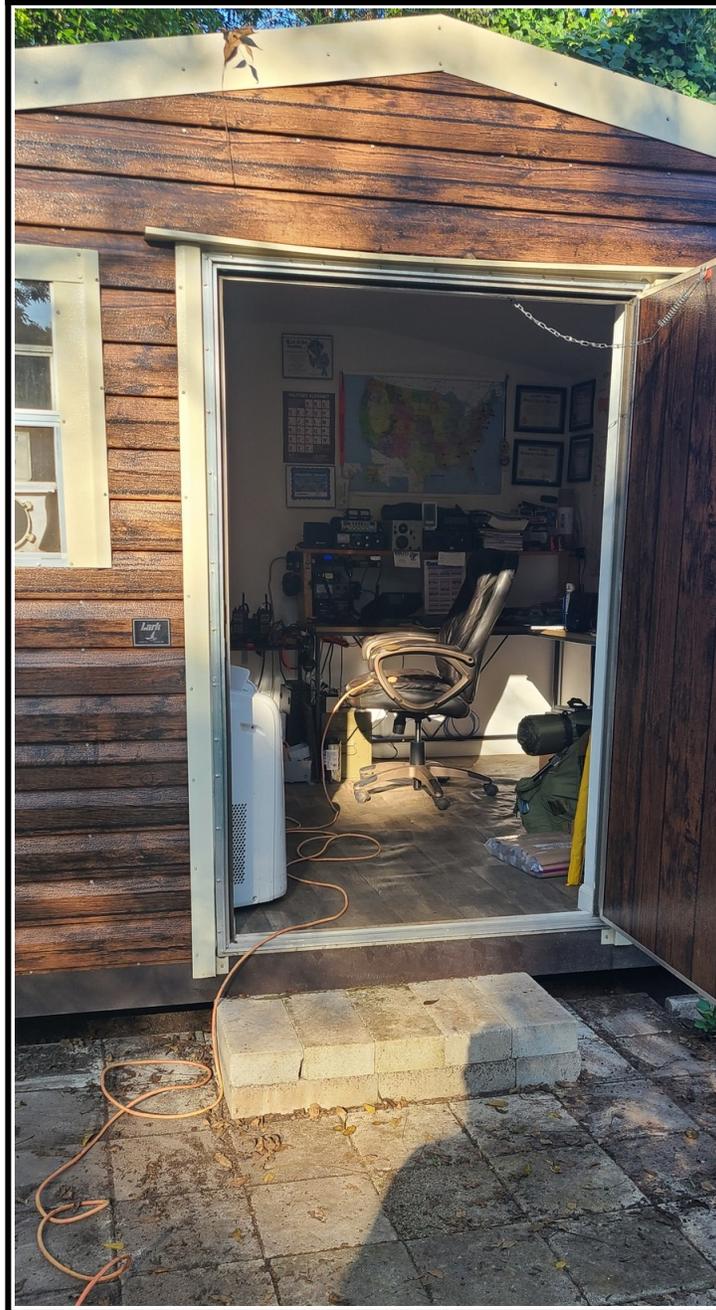
NET CONTROL SERVICES	
BAND	NET CONTROL STATION
VHF VOICE	Jeff Capehart W4UFL
HF VOICE	Reid Tillery K9RFT

SAFETY

The Exercise was carried out without any known injuries or serious events.

POWER SOLUTIONS

- Ron Lewis, KN4ZUJ, reported using an inverter placed at his truck and an extension cord into his house to provide communications.



Ron Lewis' power running into structure.

- Craig Fugate KK4INZ reported significant RFI -has near his sine wave inverter and apparently used a modified sine wave inverter positioned at a vehicle and then a long extension cord to move power into his structure to make successful HF / VHF connections.
- David Huckstep W4JIR reported setting up an ad-hoc solar panel system successfully.
- Amy Wood KO4IDO reported setting up an ad-hoc solar panel system successfully. Her solar panel system is very impressive (see photo).



Amy Woods' Solar Panel System.

That makes three stations using some form of solar power during the 2021 S.E.T.

- Three members reported setting up a solar panel system, but not getting sufficient sunlight on the day before the exercise to make meaningful charging occur. They still had sufficient residual charge on the batteries to provide power for their radios.

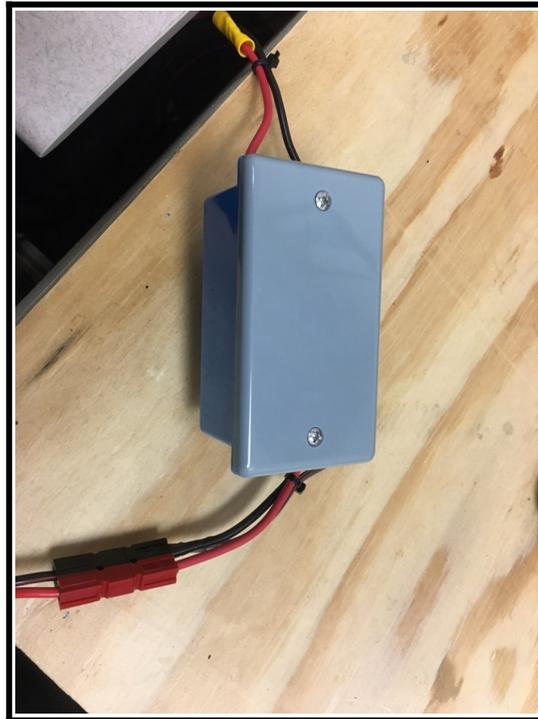


NH2KW and KO4JWC's battery backup system capable of solar charging with measurement of input and output, power flows and battery status. Note the zero input.

At the Emergency Operations Center, Leland and Gordon arrived two hours prior to the start of the Exercise to work on power supply improvements and get ready. Two major improvements to backup wiring were accomplished, and other simple solutions employed:

- MOSFET-based polarity protection was added to the wiring of the left voice VHF/UHF transceiver. The ring terminals of the power wiring were then connected to a charged LIFEPO4 battery and successful voice operation on the VHF net was maintained for the entire Exercise. (see: <https://qsl.net/nf4rc/2021/PolarityProtectorPartOne.pdf> and <https://qsl.net/nf4rc/2021/ConstructionManual.pdf>)
- MOSFET-based polarity protection was added to the primary ICOM VHF data transceiver, and the wiring to the AC power supply was interrupted to provide standard POWERPOLE connectors both from the AC power supply and going to the polarity-protected radio. This radio was then powered by a 12-volt AGM storage battery successfully for the entire Exercise.
- The existing wiring for the HF transceiver (power pole to a battery switcher box that adds some voltage loss) was simply rerouted to an output from a LIFEPO4 battery and successful high-intensity HF operations were maintained for the entire Exercise.

- A toroid-common-mode RFI-filtered modified sine wave inverter (300-W Bestek design) was utilized from a LIFEP04 battery to provide sufficient AC power to operate two HP Elite book laptops present at the EOC via their chargers, throughout the entire exercise. There was no noticeable RFI noise on the HF or VHF radios as a result of this power. The LIFEP04 battery was chosen specifically because it would be likely to provide well above 12 volts to keep the inverter functioning throughout.



Polarity Protector added to EOC existing transceiver.

COMMUNICATIONS RESULTS

MAJOR AMATEUR RADIO COMMUNICATIONS STRUCTURES DURING S.E.T.		
VHF VOICE NET	Net Control: EC Jeff Capehart	Assisted in transferring 7 voice messages
HF VOICE NET	Net Control: Reid K9RFT alternating with Craig KK4INZ	Assisted in transferring 6 voice messages by report.
HF EOC Peer to Peer Winlink VARA	(no operator necessary)	Received 4 incoming structured SHARES Spot Reports Transmitted outbound 3 peer to peer to assist incoming stations with recognition of proper connection
HF EOC Client WINLINK	Operated by Gordon Gibby alternating with Leland Gallup	Moved 4 outbound messages to distant RMS (including report to State Proxy).
VHF EOC Peer to Peer AX.25 Winlink	(no operator necessary)	Received 1 incoming structured SHARES Spot Report

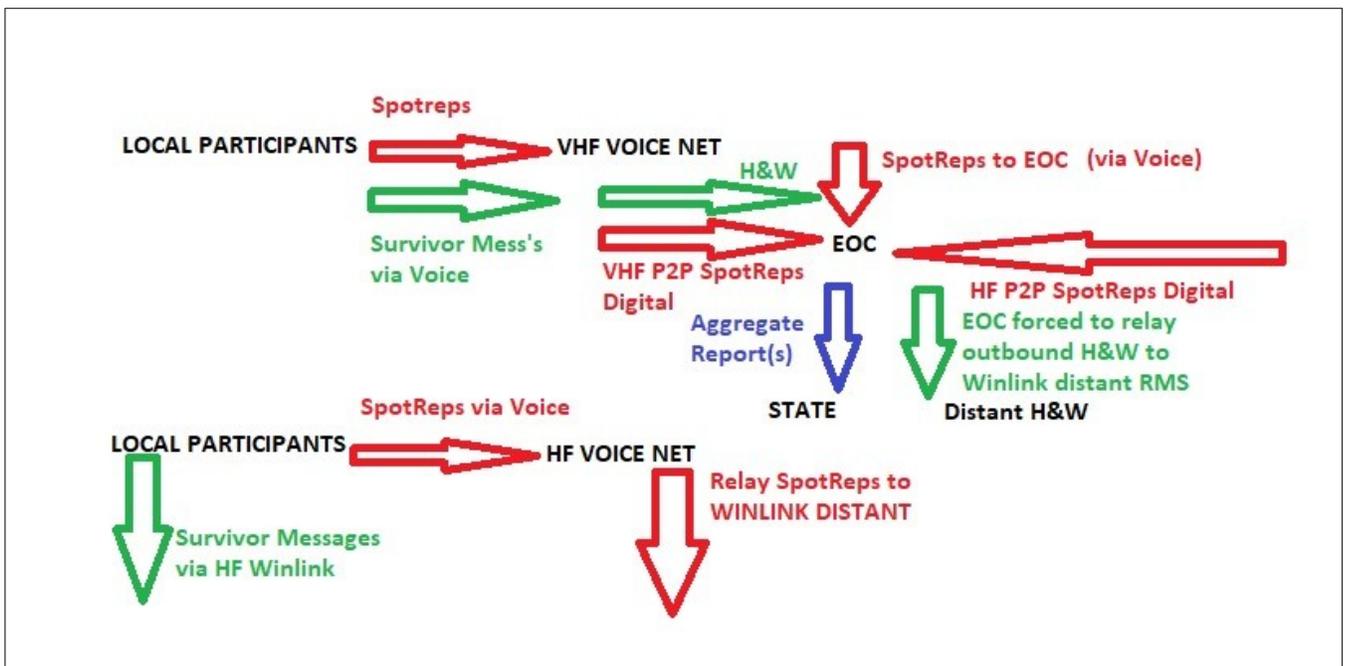
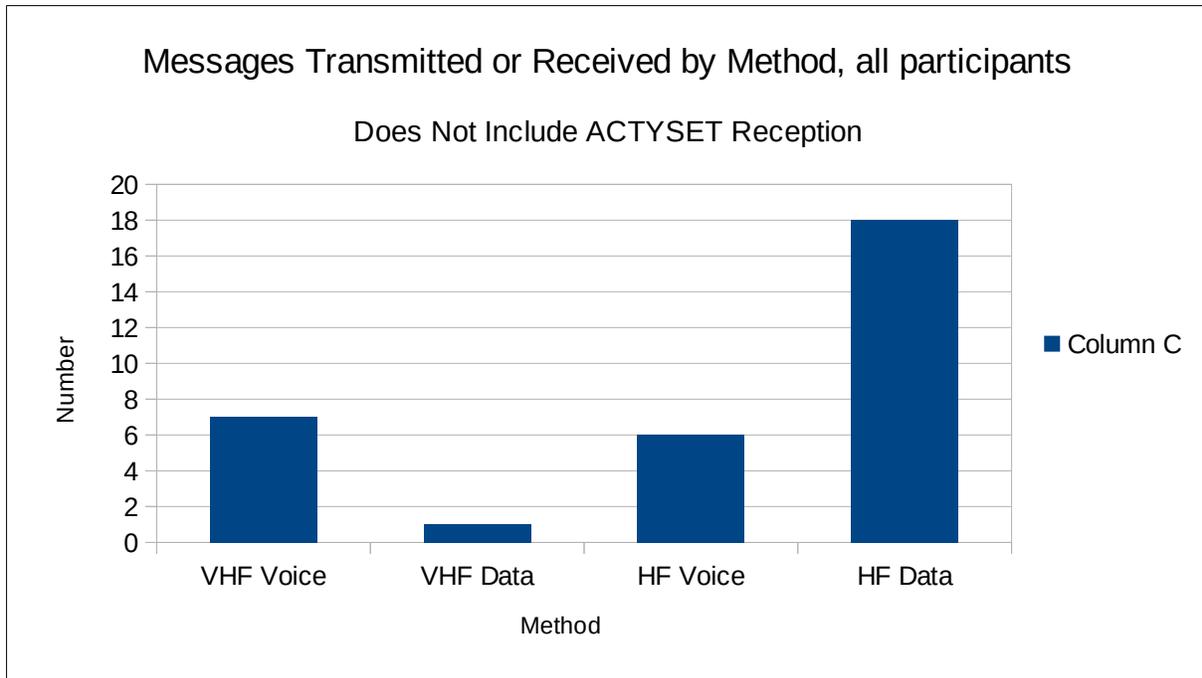


ILLUSTRATION OF ALL MESSAGE FLOW PATHS DURING ALACHUA COUNTY 2021 S.E.T.²

2 At one point near the beginning of the Exercise, EOC dedicated an older transceiver to monitoring the HF Voice Frequency, disconnecting the main radio from an antenna but leaving it on the assign peer-to-peer radio. Operator left the room briefly and when returned, found the main radio attempting to answer a peer-to-peer call, transmitting half power into no antenna and creating a loud SHRIEK when doing so. From that point on, EOC utilized only one HF transceiver and left it on the HF peer-to-peer frequency.

SIGNIFICANT DEMONSTRATED STRENGTHS IN 2021 ALACHUA COUNTY S.E.T.		
SKILLS	ASSETS	STRATEGIES
EOC operators Gordon, Leland, Jim demonstrated voice and data skills, accepting voice and peer to peer traffic over multiple systems and moving aggregated or relayed traffic smoothly via distant HF RMS sites.	EOC added two additional polarity protector modules, so that now three different transceivers are polarity protected at all times.	First time relatively unattended VHF and HF Winlink error-free peer-to-peer reception of incoming messages has been tested--it was successful!
VHF voice transmissions skills were demonstrated by multiple stations including Earl K4ZSW	Three peripheral stations demonstrated SOLAR POWER assets --David W4JIR, Ron KN4ZUJ, and Amy KO4IDO	Simultaneous HF and VHF simplex voice nets deployed successfully.
HF Voice reception and relay to HF WINLINK were demonstrated by participants in the HF Voice Net, including Reid K9RFT and Craig, KK4INZ.	Multiple peripheral stations attacked and conquered various strategies for obtaining novel power sources, including inverter solutions with techniques to avoid RFI Hash, by Ron KN4ZUJ, and Craig KK4INZ	
Multiple peripheral stations demonstrated distant WINLINK RMS capabilities to move traffic, including: <ul style="list-style-type: none"> • Amy KO4IDO • Craig KK4INZ • Reid K9RFT • David W4JIR • Emily KO4JWC • Susan KG4VW 		

DOCUMENTED INCOMING NEIGHBORHOOD SPOT REPORTS:

EOC INCOMING TRAFFIC SPOT REPORTS FROM NEIGHBORHOODS					
No.	Approx Time Received (Local)	Band	Technique	Originator	Comment
1	0950	HF	Winlink PTP	KK4INZ	structured
2	0959	VHF	VOICE VHF Simplex Net	K4ZSW	immediate report of imminent need
3	1002	HF	Winlink PTP VARA	AC4QS	structured
4	1002	VHF	Winlink PTP (AX.25)	KG4VWI	structured
5	1010	VHF	VOICE VHF Simplex Net	K9PDL	structured
6	1020	HF	Winlink PTP VARA	W4JIR	structured
7	1020	HF	Winlink PTP VARA	KO4IDO	structured
8	Unknown	VHF	Voice VHF	K4ZSW	Presumed incoming voice spot rep later relayed by WINLINK for copy to ACTYSET?
9	1201	HF	Winlink outbound VARA	NF4AC (relaying K4ZSW)	Appears to be a voice-received spot message relayed outbound by NF4AC

OUTBOUND MESSAGES FROM EOC OVER HF				
No.	Time	To RMS	Comment	
1	0921	W1EO 10144.5 VARA	Outbound Survivor Msg from KX4Z stationed at EOC	
2	1030	XE1CRV		Probably the state report
3		N2GWK	Message relaying outbound by Leland	Approx 3 messages transferred
4		KK4INZ	Outbound P2P to help station understand PTP	
5		W4JIR	Outbound P2P to help station understand PTP	
6		KG4VWI	Outbound P2P to help station understand PTP	

MESSAGES REACHING THE STATE PROXY ADDRESS ACTYSET@WINLINK.ORG			
No.	ORIGINATOR	CONTENT	COMMENT
1	KO4IDO	Simulated Survivor Message Outbound	
2	KK4INZ	Simulated Survivor Message Outbound	Included all of the message explanatory text.
3	K9RFT	Simulated Survivor Message Outbound	
4	W4JIR	Simulated Survivor Message Outbound	
5	NF4AC	Aggregate Message to State	Rough aggregation of all incoming reports
6	K4ZSW	SHARES SPOTREP 2 TEMPLATE	Spot report from neighborhood
7	NF4AC	ARRL Radiogram Format Survivor Message Outbound from W4UFL / Susan Tipton	Received on voice simplex net, and sent out on WINLINK for final delivery
8	NF4AC	ARRL Radiogram format Survivor Message Outbound from W4UFL / Susan Tipton	Received on Voice on simplex net and sent out on WINLINK for final delivery
9	NF4AC	ARRL Radiogram format Survivor Message Outbound from W4UFL / Susan Tipton	Received on Voice on Simplex net and sent out on WINLINK by EOC for final delivery
10	K9RFT	Columbia County EOC Agency Report to the State Proxy	Received on voice by K9RFT and relayed by WINLINK
11	K04JWC	ICS-309 filled in form	

		from Emily for exercise documentation	
12	KO4JWC	ICS-214 filled in form from Emily for Exercise Documentation	
13	NH2KW	ICS-309 filled in form from Brett for Exercise Documentation	
14	NH2KW	ICS-214 filled in form from Brett for Exercise Documentation	
15	KG4VWI	ICS-214 filled in form from Susan for Exercise documentation	
16	KG4VWI	ICS-309 filled in form from Susan for Exercise Documentation	
17	KK4INZ	PDF ICS-309 from Craig Fugate	25 kilobytes

Although the plan had been for the HF EOC station to monitor and participate in the HF Voice net, and move to the Data frequency when necessary to receive traffic, this never happened, because almost immediately peripheral stations began to attempt data peer to peer connections to the HF EOC station which responded.

The first multiple attempts by peripheral stations were unsuccessful - no traffic transferred although connection was made. Stations were reminded that the message itself had to be marked as a "peer to peer" when it was created - with this reminder (delivered by email and voice), traffic began to successfully flow.

CHAPTER 5: EXERCISE CATEGORIZATION

Exercise Name	2021 Simulated Emergency Test Exercise
Exercise Dates	Saturday October 2, 2021 (9AM - 12 Noon Eastern)
Scope	Alachua County volunteers and those of any other County or group who wish to use this type of exercise.
Mission Area(s)	RESPONSE
Core Capabilities	MASS CARE SERVICES OPERATIONAL COMMUNICATIONS
Objectives	1.0 Communications Planning (Simplex Nets), ICS-205) 2.0 Antenna Deployment 3.0 Emergency Power -- Particular emphasis on ability to make wiring adjustments to accommodate novel power sources. 4.0 Peripheral Communications 4.1 Command Net 4.2 Formal Status Report 4.3 Survivor Messages 5.0 Central Communications 5.1 Aggregating Information 5.2 Submitting Aggregate Information
Threat or Hazard	Perceived state or non-state actor software deployment significantly damaging communications and power infrastructure. Complicated by various power failures at the participant's location.

Scenario

An unknown hacker or group of hackers have unleashed software that damages both DNS and router systems so significantly that most Internet or public switched telephone systems are down. In addition, electrical power systems and cell phone systems are failing. Local Emergency Operations Centers have called for amateur radio badged volunteers to staff backup communications and establish some form of radio communications to the State EOC and take structured reports from dispersed volunteers as to status.

The disaster has been in progress for some significant length of time, and energy resources are rapidly dwindling without resupply. Participants are called on to successfully deploy unusual radio assets to take advantage of unusual sources of electrical power beyond the usual generator, or pre-wired vehicular mobile radio.

Sponsor

Alachua County ARES ® / North Florida Amateur Radio Club

Participating Organizations

Point of Contact

Gordon L. Gibby MD, KX4Z, NCS521
docvacuumtubes@gmail.com

CHAPTER 6: ANALYSIS OF CORE CAPABILITIES

Aligning exercise objectives and core capabilities provides a consistent taxonomy for evaluation that transcends individual exercises to support preparedness reporting and trend analysis. Table 1 includes the exercise objectives, aligned core capabilities, and performance ratings for each core capability as observed during the exercise and determined by the evaluation team.

Objective	Core Capability	Performed without Challenges (P)	Performed with Some Challenges (S)	Performed with Major Challenges (M)	Unable to be Performed (U)
1.0 Communications Planning	Operational Communications		S		
2.0 Antenna Deployments	Operational Communications Mass Care Services	<i>(Not Adequately Tested)</i>			
3.0 Emergency Power	Operational Communications Mass Care Services		S		
4.1 Peripheral Communications -- Voice contact to command net	Operational Communications Mass Care Services	P			
4.2 Peripheral station formal status report	Operational Communications Mass Care Services	P			
4.3 Peripheral station survivor written messages	Operational Communications Mass Care Services	P			
5.0 Central Communications 5.1 Aggregation 5.2 Submission	Operational Communications Mass Care Services	P			

Table 1. Summary of Core Capability Performance

Ratings Definitions:

Performed without Challenges (P): The targets and critical tasks associated with the core capability were completed in a manner that achieved the objective(s) and did not negatively impact the performance of other activities. Performance of this activity did not contribute to additional health and/or safety risks for the public or for emergency workers, and it was conducted in accordance with applicable plans, policies, procedures, regulations, and laws.

Performed with Some Challenges (S): The targets and critical tasks associated with the core capability were completed in a manner that achieved the objective(s) and did not negatively impact the performance of other activities. Performance of this activity did not contribute to additional health and/or safety risks for the public or for emergency workers, and it was conducted in accordance with applicable plans, policies, procedures, regulations, and laws. However, opportunities to enhance effectiveness and/or efficiency were identified.

Performed with Major Challenges (M): The targets and critical tasks associated with the core capability were completed in a manner that achieved the objective(s), but some or all of the following were observed: demonstrated performance had a negative impact on the performance of other activities; contributed to additional health and/or safety risks for the public or for emergency workers; and/or was not conducted in accordance with applicable plans, policies, procedures, regulations, and laws.

Unable to be Performed (U): The targets and critical tasks associated with the core capability were not performed in a manner that achieved the objective(s).

The following sections provide an overview of the performance related to each exercise objective and associated core capability, highlighting strengths and areas for improvement.

Objective 1.0: Communications Planning

The strengths and areas for improvement for each core capability aligned to this objective are described in this section.

Core Capability: Operational Communications / Mass Care Services

Strengths

The successful capability level can be attributed to the following strengths:

Strength 1: Previous experience of many of the participants with ICS-based exercises.

Strength 2: Diversity of skill sets among the participants, so that limitations of any one planner could be filled in with others' knowledge.

Area for Improvement: Better understanding of HF bands and systems by all ARES Field Service officials.

Reference:

Analysis: This exercise involved a greater degree of ARES Field Service operational personnel doing the communications planning than in many of our previous Exercises, and it represented a more real-world environment where communications needed to be planned on a deadline. Many "communications plans" are long on perfunctory protocol and short on actual description of frequencies, protocols, techniques for moving traffic, particularly if most infrastructure is damaged or unusable. This Exercise provided a great opportunity for significant growth in communications planning and the local leadership grew significantly as a result.

Objective 2.0: Antenna Deployments

The strengths and areas for improvement for each core capability aligned to this objective are described in this section.

Core Capability: Operational Communications / Mass Care Services

Strengths

Due to the limitations of the Exercise Design and the saturation of available participants, this Object was not tested during this Exercise.

Areas for Improvement

Reference:

Analysis: Future Exercises may provide additional chances to test this Objective.

Objective 3.0: Emergency Power

The strengths and areas for improvement for each core capability aligned to this objective are described in this section.

Core Capability: Operational Communications / Mass Care Services

Strengths

The successful capability level can be attributed to the following strengths:

Strength 1: Previous experience of many of the participants with ICS-based exercises that required emergency power, as well as Field Day efforts that already developed solar and inverter radio assets.

Strength 2: Solar power training that has been delivered to this and related local clubs, and a written solar power module for local training. Three (3) peripheral stations acquired or deployed solar power assets.

Area for Improvement 1: Wider adoption of RFI-filtered inverter technology.

Area for Improvement 2: Wider procurement of robust solar power systems.

Reference:

<https://qsl.net/nf4rc/2019/InverterGeneratorSolutions.pdf>

Analysis: Our group has worked on power delivery systems in multiple previous LabNLunch and other venues. Field Day has provided the driving force for development of inverter filtering technology and multiple local experiments have found solutions. Our group has been able to provide knowledgeable speakers on these topics for state- and local-level training.

Objective 4.0: Peripheral Communications

The strengths and areas for improvement for each core capability aligned to this objective are described in this section.

Core Capability: Operational Communications / Mass Care Services

Strengths We had 14 total participants on radios (and one out of town joined for the HotWash) -- 3 of whom were at the EOC and checked into the voice simplex VHF net; 11 others generally had contact on the voice net, either VHF or HF. One participant had antenna difficulties but was able to connect to a replacement antenna to solve the problem. The successful capability level can be attributed to the following strengths:

Strength 1: Previous experience of many of the participants with simplex operations, many of who have dual experience on VHF and HF.

Strength 2: Recently joined participants have shown significant interest in the HF simplex operations, which resulted in a strong Net Control Station for the HF net as well as for the VHF net where the EC provided leadership.

Strength 3: We showed surprising strength in data communications, particularly on HF from the peripheral participants. Our group's continual training on this skill, as well as recent training done by Reid Tillery has developed significant strength in this area.

Area for Improvement: Weakness on the part of the VHF net in not having more immediate and simultaneously net control connection to the HF net. Having each net control station if possible monitoring the other net might help with integration.

Analysis: The wide leadership of DATA communications in an infrastructure-poor environment was clear in this exercise. Our county is LARGE relative to typical home simplex VHF ranges. More gains in this area would certainly improve capacity, without losing abilities when normal infrastructure is present (and the need for emergency communication commensurately less).

Objective 5.0: Central Communications

The strengths and areas for improvement for each core capability aligned to this objective are described in this section.

Core Capability: Operational Communications / Mass Care Services

Strengths

The successful capability level can be attributed to the following strengths:

Strength 1: Solid HF and VHF data and voice stations have been created at the EOC with very workable antennas, after several years of effort to deal with noise coming from the equipment within the building, affecting frequencies from AM Broadcast through about 20 MHz.

Strength 2: Solid training and expertise among key leaders in the group, who have great facility with voice communications, formal traffic, ARQ and broadcast techniques of multiple types.

Area for Improvement: Need for a plan to provide more than one HF transceiver connecting to an antenna at a time. The obstacle is that there is only one HF coax currently, but there are additional VHF/UHF coaxes going to the Tower area.

References:

<https://qsl.net/nf4ac/2021/AARJan262021AntennaWork.pdf>

<https://qsl.net/nf4ac/2019/OakTreeAntennaData.pdf>

<https://qsl.net/nf4ac/2019/May18Investigations.pdf>

Analysis: An enormous amount of work went into creating a solid radio station across bands from 2-500 MHz at the EOC, including both Amateur and SHARES DHS licensure.

CHAPTER 7: REVIEW OF PREVIOUS YEAR EXERCISE

in 2020, the North Florida Section held a section-wide Exercise. This was held in a time of considerable concern about COVID-19, prior to the wide availability of a vaccine. Scheduled, for Saturday October 3, 2020, the Exercise Plan for that event can be viewed here: <https://arrl-nfl.org/wp-content/uploads/2020/09/ARRL-2020-SET-ExPlan-10-2-20-1.pdf> The Incident Action Plan written for the same event can be viewed here: <https://arrl-nfl.org/wp-content/uploads/2020/09/ARRL-October-SET-2020-IAP-10-2-20.pdf>

The 2020 North Florida Section SET was designed to be implemented by local Emergency Coordinators, providing county-specific adjustments and injects. The basic tasks of the Exercise were:

- Proceed to assigned location. (Determined by county leadership.)
- 0745 - Northern Florida HF Net starts
- 0800 - move the backup power
- 0800 - Local ARES POC: Check into the NFL HF Net
- 0815 - Each County: Select supply request from an appendix and send a request to the State EOC for a POD, via Winlink (any mode, any frequency) or HF Voice
- 0830 - Counties: Attempt communication with all participating county EOC's over SARNET
- 0850 - Counties: Move local operations to backup repeater or simplex
- 0920 - Counties: Move county to 40m 7.242 and contact participating county EOC's, obtaining operator call sign, station call sign and county name.
- 1000 - Counties -- Add an inject
- 1030 - Counties -- Send report to the SEC with specific information, including number of participants, via HF Voice, Winlink or Winlink P2P (using SARNET or HF Voice to coordinate p2p frequency / time)
- 1100 - Everyone: Hotwash or after action meeting.

Reviewing Minutes from Nov 2020 meeting: (https://qsl.net/nf4rc/2020/NFARC_Minutes_Nov_2020.pdf) 4 Counties participated, Alachua by far the most active, providing 8 out of 12 responses on the Section feedback. Alachua prepared a 205 and 205A for that Exercise. Home VHF stations were improving, nimble response to repeater "outages" and simplex requirements. At that time, Susan recommended testing the actual go-boxes at the shelters. (This was subsequently done, primarily by Col. Huckstep in the summer of 2021).

Jeff located the "feedback" form from the 2020 Exercise.-- Big help and useful comparison to the comments and experiences of our 2021 Alachua County Exercise.

Comments from section participants included:

- *Having a good antenna was a common weakness but even with a low outside*
-

antenna, I was able to hear more than half of our stations on simplex VHF.

- *More participants need to have HF capability. More participants need to have WINLINK capability*
- *Documentation needs improvement. doing multiple 309's some computer generated and some handwritten, is difficult; need rigorous following of net control, tactical call sign and exercise/drill announcements.*
- *As usual, all information was sent to EC's at last minute*
- *Need to improve group command and control.*
- *HF Net -- the NCS did not appear to know what he was supposed to do. They may have moved to 3955. Really depends on band conditions, so check 7242. Especially if other people are talking but not about the exercise! Around 10 or 10:30 everyone disappeared (80M is the issue; unusable 12-4 PM)*
- *What can you use if 80M and 40M are no good?*
- *Anyone being an ARES net control needs to be working with ARES during exercises.*
- *There are some ECs that are rarely heard from. Need to communicate often!*
- *Fill in NCS may know the net procedures, but then lack the ARES procedures.*
- *Exercises are so important. We think we are prepared and that stuff won't go down. Critical systems did fail because they weren't tested for reliability because no one expected to lose it all.*
- *The more active counties are the ones with more people.*
- *People want to do stuff. 43 counties. 36 have EC.*

Comparison to our 2021 Exercise::

- **We had fairly effective net controls in 2021 Alachua and effectively used both VHF and HF.**
 - **We needed more HF people to handle traffic outbound, so the EOC was not over-utilized.**
-

- **Our NCS seemed to be well versed and useful in 2021**
- **Our procedures were developed in only 2 weeks-- and locally developed this year!**
- **A lot more understanding of a county-wide volunteer network moving traffic both outbound and for local integration was demonstrated after the extensive local planning sessions headed by Jeff Capehart EC.**

CHAPTER 8: IMPROVEMENT PLAN

No.	Core Capability	Area For Improvement	Corrective Action	Outcome (FILL IN AS REPORTED)
1	Operational communications / Mass Care Services	Communications Planning - Details slow to develop and be presented on ICS-205	<p>Utilize this ICS-205 as a starting point for better future communications planning.</p> <p>Better acquaint more members with the unique operational and physical constraints of the EOC environment--with limited equipment and limited personnel, they CANNOT attend to many, many different protocols -- there must be a limited number and a PRIMARY, SECONDARY, TERTIARY or other priority order designations so they aren't trying to do multiple techniques simulatneously with one radio and one person.....won't work..</p> <p>Put out ICS-205 earlier in the cycle of planning.</p>	

2	Operational communications / Mass Care Services	EOC great difficulty monitoring two HF frequencies	Develop plan to re-route VHF/UHF coax if needed to additional HF antenna.	
3	Operational communications / Mass Care Services	Limited range of VHF data	Provide information to participants how each station could be an ad-hoc digipeater ³	
4	Operational communications / Mass Care Services	Limited penetration of participants ion from registered ARES ® members.	Better outreach to encourage more commitment and skill development	
5	Operational communications / Mass Care Services	Better forms availability at the EOC -- spot rep, ICS and radiogram forms -- we took incoming voice traffic on blank paper.	Print off or purchase applicable documents in sufficient quantity	
6	Operational communications / Mass Care Services	Lack of individual understanding of possibility of digipeater capabilities	Teach how to use individual stations as backup digipeaters	

3 This information had not previously been disseminated, but the SOUNDMODEM software includes within its configuration, the ability to allow EACH participating station to be a digipeater. Stations might be encouraged to use an SSID for their digipeater, such as AA3YB-3.

7	Operational communications / Mass Care Services	Difficulty coordinating outbound VOICE traffic with EOC -- not as easy to keep records as with data, where cc: to EOC works.	Perhaps net control stations keep track?	
8	Operational communications / Mass Care Services	Too much ambient noise at EOC. Greater need for headphone usage and keeping PIO activities separate from operational activities	More use of headphones and better discussion of visitors coming.	
9	Operational communications / Mass Care Services	What to do if people can't even travel to the EOC?	Develop protocol for providing emergency net anyway, and seeking any available connection to the EOC -- possibly leveraging our new ham on staff there and a pre-set radio.	
10	Operational communications / Mass Care Services	Improving routing of traffic to HF capable stations outside of the EOC to avoid overloading EOC. NOT A GOOD IDEA to use to the EOC as the transfer from voice to outgoing HF Data for health and welfare.	Developing more HF capabilities and cross band connections between VHF-only stations and HF capable and trained operators.	
11	Operational	Possibility of "low-	Proponents to organize	

	communications / Mass Care Services	tech" MT63 manual relays	a trial cross county as demo	
12	Operational communications / Mass Care Services	Initial efforts at peer to peer transfers were unsuccessful largely due to messages having been created as normal winlink (RMS) messages rather than peer to peer.	Additional training to local ARES(R) group on the details of the use of the Winlink system for peer to peer traffic.	
13	Operational communications / Mass Care Services	Paucity of VHF voice relays in difficult simplex distant communications.	Possibility of deploying to higher locations?	
14	Operational communications / Mass Care Services	Lack of available VHF data digipeating or relay stations.	Consider educational efforts on how individual stations can enable digipeating via soundmodem.com options.	
15	Operational communications / Mass Care Services	Properly handling multitude of possible techniques	Provide PRIORITY ORDERED list of frequencies, techniques, and plan to coordinate use of alternative techniques that require special attention (such as manual data relaying with broadcast techniques).	

CHAPTER 9: HOTWASH TRANSCRIPT

Immediately following the Alachua County 2021 SET, a hotwash zoom session was held and open to all. This is the transcript helpfully provided by Jim Bledsoe, KI4KEA.

KK4INZ: He tried to use an inverter but eventually just went to his truck battery. He found Winlink easy but simplex was a mix. He could hear the EOC clearly. He had no problems sending or receiving traffic.

KX4Z: NVIS net was not watched by the EOC as they were very busy. However, it was noticed that messages were sent but slowed as the sun affected conditions.

K4ZSW: Had issue with noise and power. He swapped out both power and his antenna and had great improvements. Once he completed this his issues disappeared.

David: His solar system continued to charge without any problems He moved radios around and adjusted radios to make things work with at one point transmitting from his laundry room due to power issues. He had frequency issues but recovered and did send messages peer-to-peer.

AC4QS: He ran DC from his battery to his power poll connectors. He had noise issues with inverters. He did send two NVIS messages and had mixed results on simplex.

K9RFT: Had a previously solar charged battery to run his radio and things went well. He was able to backup up W4UFL (net control). He managed to get a message from Columbia County and was able to make 20 meter contacts. He was able to relay a number of messages and can hear the EOC very clearly.

He made suggestions we attempt HF and VHF (simplex) from higher grounds suggesting the possibility of a parking garage during the next simulation. He also advised it would be a good idea to alert the authorities before such actions take place.

NH2KW: There were two stations at this location (Emily is the second) and both were working on battery and able to relay data. Emily sent an RMS message but Bret was unable to make peer-to-peer or RMS. He also had about 5 visitors show up at his QTH.

KX4Z: Reported that the EOC was filled to capacity with three ARES members and about seven visitors who enjoyed learning about what we were doing. PIO efforts kept them interested. These were students from the Lofton Center. This location had considerable issues at first with mechanical, and electrical issues and the long run of coax.

KG4VWI: Susan reported she was able to move data via simplex but did not find an HF contact at first. She managed to finally get one.

KO4LBS: Was participating via phone from a conference and was interested in what we were doing.

KO4IDO: Was able to make contact and commented about how easily these systems can be overwhelmed in an emergency.

Comments were made about how useful and easy voice is compared to other methods of communication. Additional comments were made about the placement of microphones and the quality of the microphones in use.

Another suggestion made was to have more than one radio run at the EOC to cut down on swamping one operator.

(Many thanks to Jim Bledsoe KI4KEA who took notes and transcribed this record.)