



Santa Cruz County ARES Membership Meeting Minutes



Wednesday, September 18, 2024 at 1900;

Zoom: <https://us06web.zoom.us/j/88939432656?pwd=CL1afCp1G5PG6tgK2nF3Yr34yZRYkT.1>

Welcome

Roberta AJ6KN (AJ6KN@slvares.org)

There were 16 attendees

New Member Liaison

Bob KO6XX
(newmember@slvares.org)

- Alex, AJ6QY has stepped down due to changes in his life. Bob, KO6XX has stepped up into the role. The New member resource will be updated by Ed, N6EMA to reflect the change.

AREDN (Amateur Radio Emergency Data Network)

Ed N6EMA (ttvibz@gmail.com)
John KODY Y AREDN Installer

- Ed provided an Introduction (re-introduction) – AREDN has been around for some time and beginning to gain interest in the Bay Area. The San Francisco group have changed to the Bay Area Mesh Network, a 501c3. Primary contact has been with John KODY Y AREDN Installer and Tim, the architect of the network. They were able to obtain a grant in the hopes of being able to extend their reach into Santa Cruz and down to Monterey. It will entail the installation of an extension of the backbone using microwave. End users, such as Hams, will have a small purchase of a radio/router switch (Ubiquiti, ~\$50). The network can support many of the needs required during a disaster. The Bay Area group has been working with some of the First Responder groups, primarily Fire. Have yet to connect with a hospital. – see attached document.
- Ed asked for volunteers to assist with further evaluation (none received during the meeting, but one can email Ed). It was pointed out that use cases for our location would have to be identified and are important. It was suggested further evaluation include a discussion with the EOC to identify if there is interest from their perspective.

Events

Dan N6RJX (Dan@slvares.org)

- Santa Cruz Triathlon, Sunday, September 22nd – 15 volunteers will be assisting. There is a new Race Director this year, Dave Reid, the county's EOC director.
- Halloween Truck or Treat, Friday October 25th at EOC – sign ups later this month

Announcements

Roberta AJ6KN (AJ6KN@slvares.org)

- Pacificon, October 18 – 20 - <https://www.pacificon.org/> San Ramon
- Winter Field Day (Jan 25/26th 2025) planning in the works through Santa Cruz Amateur Radio Club with Craig, N6SBN, Jerry W6OJE and Jim, KN6NCG at the helm. Location is still being determined
- Next Meeting, 10/16/24 – Show and Tell Go Bags/Setups – See info in newsletter
- Technician class will begin September 24th and run for 6 weeks at the EOC
- San Benito Radio club in Hollister group willing to come us to do a testing event, Saturday 11/2 at EOC – hours to be announced. Great local opportunity for upgrade testing.



Santa Cruz County ARES Membership Meeting Minutes



- **Jim, KN6NCG announced that the Parks on the Air (POTA) activity will be routinely scheduled for the first Saturday of each month at the Upper Seacliff Parking lot. The first one will be Saturday, October 5th (~ 2 weeks away)**

What happens at the County and City EOC by ARES

Roberta AJ6KN (AJ6KN@slvares.org)

- An overview in pictures – see attached document.

POTA activation and ‘Play Radio’ day at Seacliff 9/11

Roberta AJ6KN (AJ6KN@slvares.org)

- An overview in pictures of recent play day – see attached document.
- Jim reported that it was well attended. It was successful because there were lots of failures. The failures allowed lots of problem solving on the fly and lots of lessons learned by most that attended.

Reporting Hours Prize Drawing

Roberta AJ6KN (AJ6KN@slvares.org)



- After spinning the wheel 5 – 6 times for a meeting attendee, we have a winner of Stephen, KM6NEP. He will select one of the prizes available at the EOC. Ask him what was selected?

Net Control Recruitment – A full complement of volunteers!

Roberta AJ6KN (AJ6KN@slvares.org)

NET Date	ARES Group	Repeater NET Controller
Thurs, Sept 19	Coastal	Lisa, KN6IAB
Wed, Sept 24	SLV	JoMarie, KM6URE
Thurs, Oct 3	Coastal	Bill, AJ6CQ
Wed, Oct 9	SLV	Ted, AA6Q
Thurs, Oct 17	Coastal	Rob, KM6YHC
Wed, Oct 23	SLV	Allison, KM6RMN

Next meeting October 16, 2024 at 1900 at Emergency Operations Center, 5200 Soquel Ave





AREDN for Santa Cruz County ARES

ARES Monthly Meeting
Sep 18, 2024

Ed Austin, N6EMA

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AREDN DESCRIPTION AND MISSION

THE AREDN® ACRONYM STANDS FOR "AMATEUR RADIO EMERGENCY DATA NETWORK" AND IT PROVIDES A WAY FOR AMATEUR RADIO OPERATORS TO CREATE HIGH-SPEED AD HOC DATA NETWORKS FOR USE IN EMERGENCY AND SERVICE-ORIENTED COMMUNICATIONS.

MISSION - THE PRIMARY GOAL OF THE AREDN® PROJECT IS TO EMPOWER LICENSED AMATEUR RADIO OPERATORS TO QUICKLY AND EASILY DEPLOY HIGH-SPEED DATA NETWORKS WHEN AND WHERE THEY ARE NEEDED.


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INTRODUCTION

- What are mesh networks?
 - An RF data network utilizing microwave radios and ham frequencies
 - Purpose: facilitate IP applications and data services over scalable RF networks.
- What is a "mesh?"
 - A network with multiple possible paths between points
 - The Internet core is a large mesh
- What is "AREDN?"
 - An Amateur Radio Emergency Data Network (AREDN™) is a high speed data network built with Amateur Radio Operators and Emergency Communications Infrastructure in mind.
 - AREDN™ uses commercial off-the-shelf (COTS) hardware originally intended to be used for unlicensed WIFI and re-purposes it to fits the needs of Amateur Radio Operators. By using such common gear we are able to benefit from affordable pricing and easy availability of reliable communications gear.
 - By itself AREDN™ is only a networking technology - it provides the basis to move traffic around. It can be thought of as similar to a radio or a repeater, where the infrastructure is an AREDN™ node and the content that flows across it is one that the local users decide.
 - The AREDN OS stack is based on OpenWRT and developed and supported by HAM Radio volunteers.

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OPERATING FREQUENCIES

AREDN Offers 2 Non-Shared Channels on 2.4 GHz

Channel	2	3	4	5	6
Status	Ham Band	Ham Band	Shared Ham and ISM/WiFi Band	Shared Ham and ISM/WiFi Band	Shared Ham and ISM/WiFi Band
Freq	2,377	2,407	2,407	2,412	2,417

24 Non-Shared Channels on 3.4 GHz

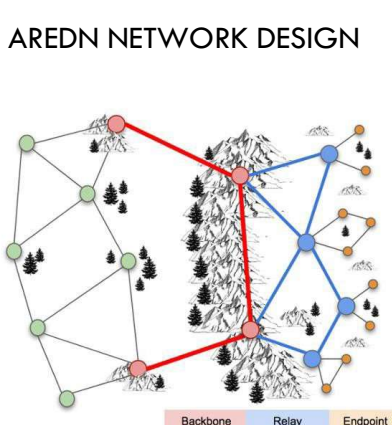
Channel	76	77	78	79	80	81	82	83	84	85	86	87
Status	Ham Band											
Freq	3,390	3,395	3,399	3,395	3,400	3,405	3,410	3,415	3,420	3,425	3,430	3,435


54 Channels, 14 unshared on 5.8 GHz

Channel	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148
Status	Ham Band shared with U-NII-2C/w/Unlicensed																	
Freq	5,655	5,660	5,665	5,670	5,675	5,680	5,685	5,690	5,695	5,700	5,705	5,710	5,715	5,720	5,725	5,730	5,735	5,740
Status	Ham Band shared with U-NII-3w/Unlicensed																	
Freq	5,745	5,750	5,755	5,760	5,765	5,770	5,775	5,780	5,785	5,790	5,795	5,800	5,805	5,810	5,815	5,820	5,825	5,830
Status	Ham Band																	
Freq	5,835	5,840	5,845	5,850	5,855	5,860	5,865	5,870	5,875	5,880	5,885	5,890	5,895	5,900	5,905	5,910	5,915	5,920

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AREDN NETWORK DESIGN





Backbone Links
 Typically backbone or "backhaul" links are permanent installations on mountain peaks, tall buildings, or high towers. They are usually point-to-point links with large high-gain antenna systems running on reliable power sources. In some cases these links are designed with redundant routes which help ensure path protection. Backbone links can operate over distances between 10 to 30+ miles.

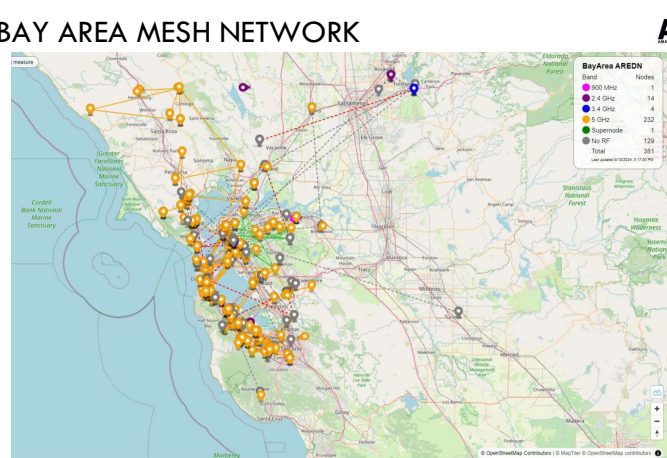
Relay Links
 Relay links bridge the gaps between endpoint nodes. Their primary purpose is to pass network data, but there may be cases where they also serve as mesh access nodes for users. Sometimes these links are called "mid-mile", "distribution", or "intermediate" nodes. They are usually installed on medium-height towers or buildings in order to achieve high signal quality with good line of sight to other relay nodes. Depending on conditions, intermediate links may operate over distances between 3 to 10+ miles.


Endpoints
 Endpoint links are used to connect destination nodes to the mesh network. Sometimes these links are called "last mile", "tactical", or "terminal" nodes. Usually these nodes serve either as the originator or the final destination for network traffic. Depending on local conditions, endpoint links typically operate over distances of 3 miles or less.

Backbone
Relay
Endpoint

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BAY AREA MESH NETWORK

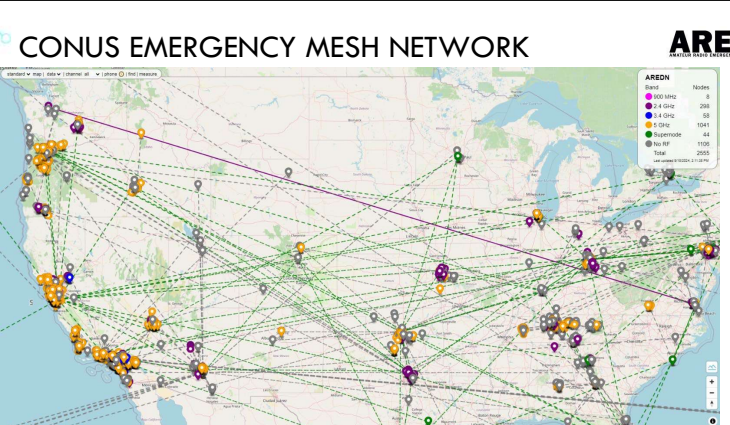





Band	Nodes
100 MHz	1
2.4 GHz	14
4 GHz	4
5 GHz	232
Supermode	1
Hot Spot	153
Total	381

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CONUS EMERGENCY MESH NETWORK






Band	Nodes
100 MHz	6
2.4 GHz	268
4 GHz	58
5 GHz	1043
Supermode	44
Hot Spot	1138
Hot	3555

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SERVICES ON THE MESH



AREDN example add-on Services

- Chat Services (Mesh/Ham)
- Email Programs
- File Sharing Programs
- VOIP Audio/Video Conferencing & Gateways
- Video Streaming and Surveillance
- Computer Aided Dispatch
- Other (Weather, NTP, GPS Tracking, ...)


Test environment add-on Services

- Email Programs
 - Dovecot (IP based email server)
 - Winlink including Internet and Radio Gwy)
- File Sharing Programs
- VOIP Audio/Video Conferencing (FreeSwitch)
 - VOIP fixed phones
 - VOIP softphones (Linphone, Jitsi)
- Video Streaming and Surveillance
 - POE Video via browser and vendor app.

Any service that can be connected to a router can work

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ONE VENDOR (UBIQUITI) SUBSET OF SUPPORTED PLATFORM'S MATRIX

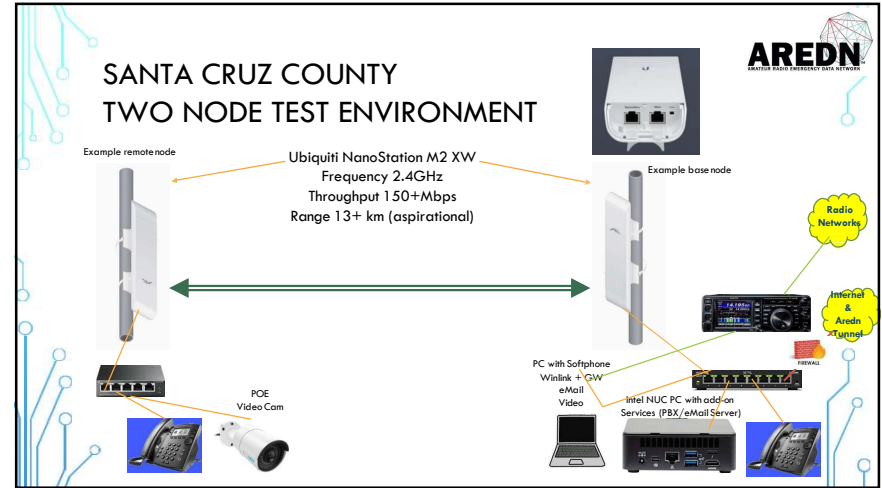



AREDN
AMATEUR RADIO EMERGENCY DATA NETWORK

Current As of AREDN™ 3.22.1.0 (updated on 01/16/2022)

Manufacturer/Model	Band			
	900Mhz	2.4Ghz	3Ghz (S)	5.8Ghz
Ubiquiti Networks (www.ubnt.com)				
AirGrid (XM revision/old)				M5
AirGrid (XW)				AG-HP-SGX
AirRouter		M2		
AirRouter HP		M2		
Bullet		M2		M5
Bullet Titanium		M2		M5
Bullet (XW)		M2		
LiteBeam				M5
NanoBeam (XW)		NBE-M2-13		NBE-M5-16/19
NanoBridge		2G18	M3	5G22/5G25
NanoStation Loco (XM)	M9			M5
NanoStation Loco (XW)		M2		M5
NanoStation (XM) Airmax		M2	M3	M5
NanoStation (XW) Airmax		M2		M5
PicoStation		M2		M5
PowerBeam (S)		PBE-M2-400		PBE-M5-300 400 400ISO
PowerBeam				PBE-M5-620
PowerBridge				M5
Rocket (XM)		M2	M3 (R)	
Rocket (XW)	MP00	M2		M5
Rocket Titanium (TI)		M2		M5
Rocket Titanium (XW) (4)				M5

GREEN - "MAJEST" AREDN Status
ORANGE - "MAJEST" AREDN Status, but NOT recommended for new deployments. (Low memory or non-MMIO device)
PINK - "COMMUNITY" Supported by the community only (not the AREDN project), in the AREDN forums.
YELLOW - "RESEARCHING" Under researching.





AREDN
AMATEUR RADIO EMERGENCY DATA NETWORK

POSSIBLE SANTA CRUZ SERVICES DURING EMERGENCIES AND COMMUNITY EVENTS


Hybrid model that operates with/without services – e.g. Internet and online services, POTS, Power

Communications

- PBX Phone and Video services
- eMail
- Data/File sharing
- Chat/Messaging services
- Broadcast services
- Emergency site wifi service
- Onboarding
- Integration to critical services (Internet (Cable/Satellite), PBXs (Hospital/Fire/Law/FEMA,...))

Video Services

- Event Pant, Tilt, Zoom (PTZ) cameras
- Streaming and Surveillance
- Triage assessment cameras
- Location cameras
- Long range fire detection/alert cameras



AREDN
AMATEUR RADIO EMERGENCY DATA NETWORK

EXPANDING THE BAY AREA MESH NETWORK TO SANTA CRUZ AND MONTEREY BAY



- The Bay Area Mesh group have expertise, resources, and equipment available
- Santa Cruz County ARES needs a small team to collaborate with the Bay Area Mesh and our ARES leadership to develop an implementation approach and plan
- Anyone interested in helping bringing AREDN to Santa Cruz?



REFERENCES

- San Francisco Wireless Emergency Mesh (SFWEM), dba Bay Area Mesh (BAM)
<https://www.sfwem.net/>
- Amateur Radio Emergency Data Network
<https://www.arednmesh.org/>

9/18/2024



 **Ham Radio at Santa Cruz
Emergency Operations Centers** 

Santa Cruz Emergency Operations Centers

County EOC:
Sheriff's Administration Building, 2nd Floor
Chanticleer & Soquel Ave.



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 **Ham Radio at Santa Cruz
Emergency Operations Centers** 

Santa Cruz City EOC





County 911 Center
Upper DeLaveaga Park

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9/18/2024



 **Ham Radio at Santa Cruz
Emergency Operations Centers** 

Santa Cruz County EOC



Main Workroom

3

 **Ham Radio at Santa Cruz
Emergency Operations Centers** 

Santa Cruz County EOC





Backup Generator

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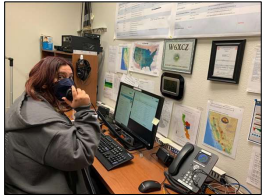
9/18/2024

 **Ham Radio at Santa Cruz
Emergency Operations Centers** 

**Santa Cruz County EOC
W6XCZ**



Dedicated Radio Room

- 1 HF operating position
Yaesu 857, PACTOR modem
- 2 VHF operating positions
Kenwood TM-D710G
- 2 PC logging positions



Karen, KM6SV at work.

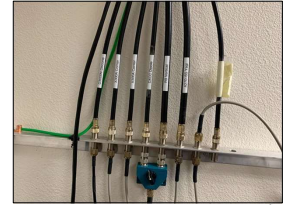
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 **Ham Radio at Santa Cruz
Emergency Operations Centers** 

**Santa Cruz County EOC
W6XCZ**

Antennas:

- 2 Diamond X300A 2m-70cm Ground Plane
- Diamond D3000N Wideband VHF-UHF Discone
- Alpha Delta DXCC Multiband Dipole
- Cushcraft R9 Multiband Vertical





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9/18/2024

 **Ham Radio at Santa Cruz
Emergency Operations Centers** 

**Santa Cruz County EOC
W6XCZ**





Yaesu 857



Kenwood TM-D710G

Ham Radios at County EOC

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 **Ham Radio at Santa Cruz
Emergency Operations Centers** 

**Santa Cruz County EOC
W6XCZ**





Beefy Astron 50-Amp Linear Supply

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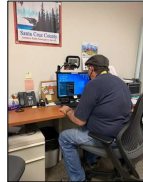
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9/18/2024

 **Ham Radio at Santa Cruz
Emergency Operations Centers** 



**Santa Cruz County EOC
W6XCZ**

County DSW Data Base
ARES, CERT, Equine Evac, Medical Reserve, WEACT
Maintained by Gary K6PDL, Mark KN6DBW and
Roberta AJ6KN



Gary, K6PDL at work.

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 **Ham Radio at Santa Cruz
Emergency Operations Centers** 

**Santa Cruz City EOC
W6TUW**





Main Workroom

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9/18/2024

 **Ham Radio at Santa Cruz
Emergency Operations Centers** 





Stephen, KM6NEP
Left

and

John, N6QX
Right

Hard at work

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 **Ham Radio at Santa Cruz
Emergency Operations Centers** 

Meredith,
Emergency Services
Manager, EOC Director



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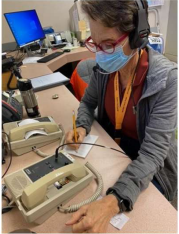
9/18/2024

**Ham Radio at Santa Cruz
Emergency Operations Centers**

**Santa Cruz City EOC
W6TUW**

Dedicated Radio Room

- 1 HF operating position
- 2 VHF operating positions
- PC logging positions
- VHF & HF Winlink stations




Roberta, AJ6KN at work

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**Ham Radio at Santa Cruz
Emergency Operations Centers**

**Santa Cruz City EOC
W6TUW**

Weekly Cal OES HF net
40-meter check-in



WB6RWU at work


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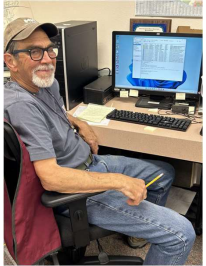
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9/18/2024

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Emergency Operations Centers**



Left: Cap, KE6AFE
supervising . . .



Right: Ron, K6EXT
doing Winlink

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**Ham Radio at Santa Cruz
Emergency Operations Centers**

EOC Radio Operations







16

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9/18/2024

**Ham Radio at Santa Cruz
Emergency Operations Centers**








Weekly HF SSB Nets
 10:00 AM Wednesdays, 7.192 MHz
 (in person City/County EOCs)
 8:00 PM Mondays, 3.992 MHz
 (Stephen, KM6NEP operates from home)

Weekly emails
 40-meter PACTOR
 2-meter WinLink

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Emergency Operations Centers**



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9/18/2024

**Ham Radio at Santa Cruz
Emergency Operations Centers**

ARES provides last-resort backup communications.

For most emergencies local communication is the challenge.
 2-meters and 70-cm.

But if needed, we're ready at both EOCs with statewide and nationwide HF communications.

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SCCAres and ARC at Seacliff State Park

9/11/24



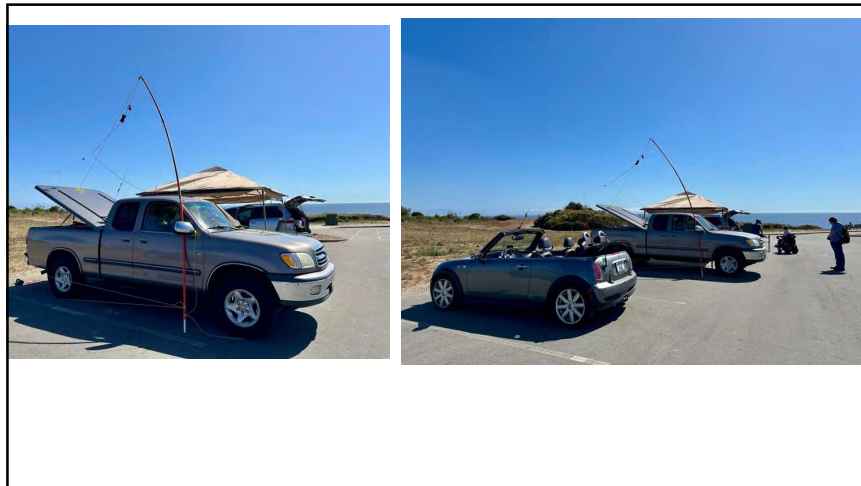
CDF 3535 Memorial stair run took place at the park as firefighters came to climb the 2071 stairs equivalent of 110 stories at the World Trade Center in remembrance of the firefighters who perished on that tragic day. This is one group who participated . . .

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All lined up to "play radio"

2



3

INCIDENT OBJECTIVES (ICS 202)

<p>1. Incident Name: Seacliff Park POTA</p> <p>2. Operational Period: Date From: 9/11/24 Date To: 9/11/24 Time From: 12:00 Time To: 18:00 PDT</p> <p>3. Objective(s): -Set up and operate Amateur Radio Stations in Seacliff State Park, Aptos, CA -Activate the park under Parks on the Air® (POTA) guidelines -Practice digital communications using Winlink, APRS, JSBcall, FT8 and others -Encourage amateur radio operators to develop their skills, fostering community, and demonstrating the hobby to the public -Have fun playing radio</p> <p>We will operate under the call sign K6BJ We will attempt to activate Seacliff State Beach, US-3566 We will operate 9/11/24 20:00 UTC till 23:00 UTC</p>	<p>General Situational Awareness: Clear must be made when raising antennas: Do not raise antennas alone Other: Not used</p> <p><input type="checkbox"/> 208B High dielectric and plastic The equipment field is a sensitive habitat. Do not disturb it.</p> <p>5. Site Safety Plan Required? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p> <p>Approved Site Safety Plans Located at:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td><input type="checkbox"/> ICS 203</td> <td><input type="checkbox"/> ICS 207</td> <td>Other Attachments:</td> </tr> <tr> <td><input type="checkbox"/> ICS 204</td> <td><input type="checkbox"/> ICS 208</td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/> ICS 205</td> <td><input checked="" type="checkbox"/> MapChart</td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/> ICS 206A</td> <td><input type="checkbox"/> Weather Forecast/Tides/Currents</td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/> ICS 206</td> <td></td> <td><input type="checkbox"/></td> </tr> </table> <p>7. Prepared by: Name: Jim Waan KN6NCG/Position/Title: IC: _____ Signature: J6W</p> <p>8. Approved by Incident Commander: Name: _____ Signature: _____</p> <p>ICS 202 IAP Page 102 Date/Time: 9/04.11.20 rev. 9/04.10.11</p>	<input type="checkbox"/> ICS 203	<input type="checkbox"/> ICS 207	Other Attachments:	<input type="checkbox"/> ICS 204	<input type="checkbox"/> ICS 208	<input type="checkbox"/>	<input type="checkbox"/> ICS 205	<input checked="" type="checkbox"/> MapChart	<input type="checkbox"/>	<input type="checkbox"/> ICS 206A	<input type="checkbox"/> Weather Forecast/Tides/Currents	<input type="checkbox"/>	<input type="checkbox"/> ICS 206		<input type="checkbox"/>
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4. Operational Period Command Emphases:
 -Operators will set up their stations at the east side of the upper parking lot. There will be ongoing events in the parking lot. These events take priority and all necessary accommodations be made.
 -If hams expect to be operating on bands also used by fellow hams, please coordinate so that interference is minimized. Proximity and orientation of antennas may be helpful. Sharing bands is encouraged.
 -POTA activation is a goal, but not the sole purpose. Assuring we can deploy stations in the field will be useful in case of future emergency incidents.
 -All vehicles entering the park must have a valid park pass or pay a day use fee (\$10)
 -In the morning the CDF 3535 Memorial Stair Run to honor the sacrifices made by first responders, particularly in the context of the 9/11 tragedy, will take place. Please come early and cheer them on.

Ares Map

Kudos to Jim, KN6NCG, for preparation of the ICS 202 and Map!

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Banner @ Jim's setup - Jim, KN6NCG and Chris, KG6DOZ

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Jim, KN6NCG's setup



6



Jim, KN6NCG



7



Moses, Jim, Mark, Kathy, Pam and John

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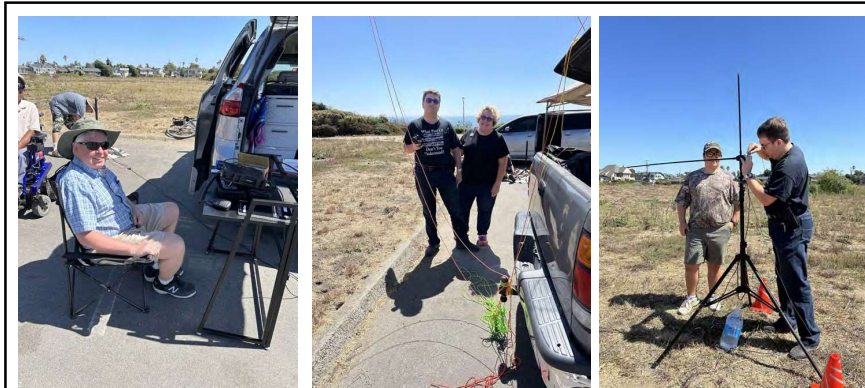
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Rich, WN6A & George, W3AB

Loma Prieta Gang:
Pam, KD6KDF; John, KN6PAD ; Kathy, KD6SEI

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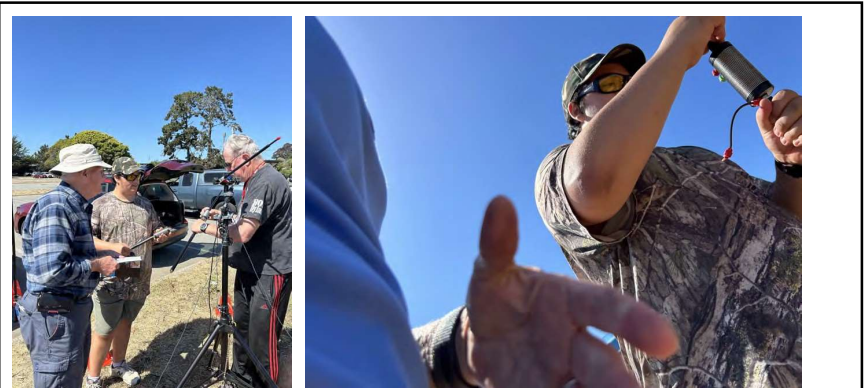


John, KJ6WKT

Kasey, KC6MRU & mom

Moses, KN6TXF & Kasey

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Gerry, W6OJE; Moses; George

Moses examining Buddipole coil

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Andrew, KM6YDJ; George, Moses, Gerry, Pam

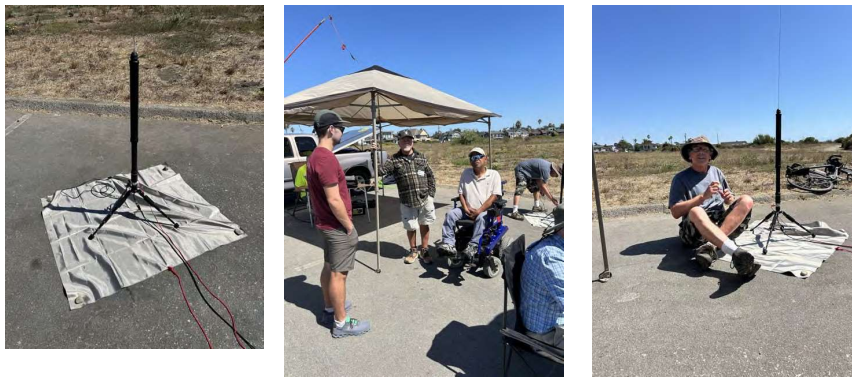
Gerry's meter - there's a story . . .

13



Roberta; John, AC6SL; Gerry with Buddipole

14



Ben's Faraday ground cloth; Mark, Jim, Ben, KN6NDM

Andrew, KM6YDH

15



Lisa's Tesla Truck ready for radio action!

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Reed,
N1WC;
Ned,
N6ZOZ;
Andrew,
KM6YDH



17



Buddipole setup with Yaesu 100D - Roberta and many helpers

18



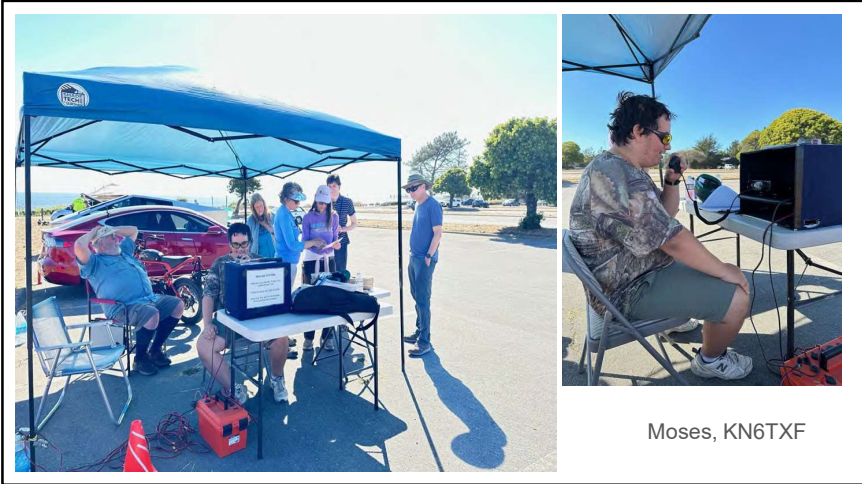
Roberta, AJ6KN; Dave, WB6DWP; Moses, his dad, Justin, KN6TXE & Pam

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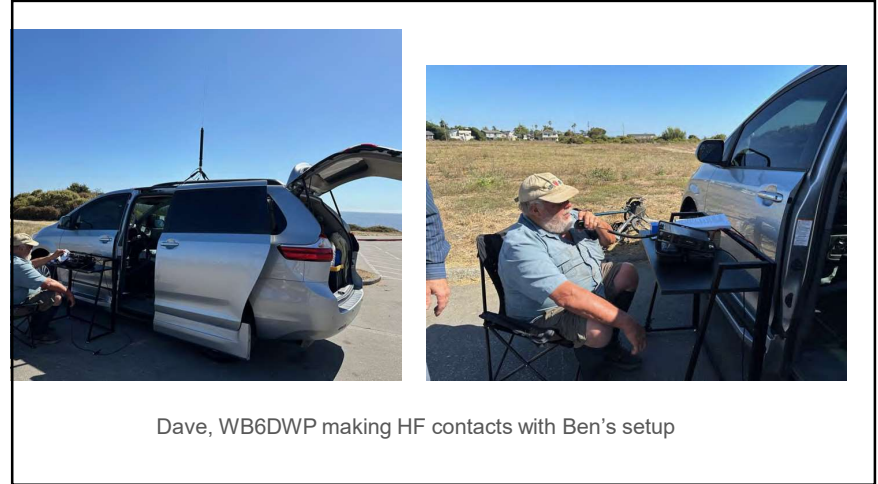


Hangin' out

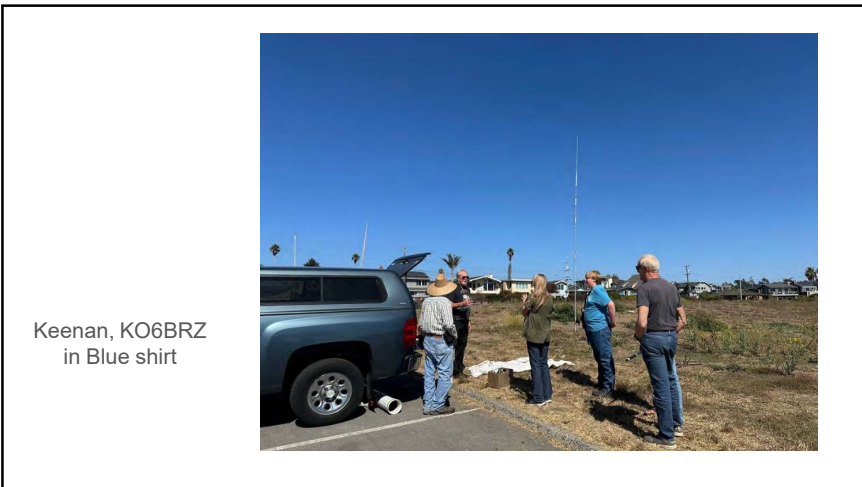
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A great time was had by all
Thanks for watching!
Roberta, AJ6KN

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