ARES / RACES

- What is ARES / RACES?

    - ARES – Amateur Radio Emergency Radio

    - RACES – Radio Amateur Civil Emergency Services

    - Both support local (City) and regional (County) governments and nongovernmental organizations (NGO's) with communications support in times of need, ARES is focused on communications where RACES can be part of an overall emergency service. This depends on the agreements made by the local government, NGO's and the radio group.

ARES / RACES

- What do they do?

  - Generally, they provide a trained and experienced group of radio amateurs to support communications activity requested by a served agency. Nominally the served agency has been burdened with issues that require a rapid deployment of people and equipment to effectively address a problem.

  - Served agencies have restrictions placed on themselves to only accept trained and experienced volunteers to support these activities to avoid making the situation worse.

Effective Emergency Communications

- There has been recent investments in dedicated communications within governmental agency's and NGOs in an emergency. However not all agency's have taken part in this improvement. In order to get a rapid response, there has to be an effective channel of communication between these agencies.

- ARES/RACES can be this channel when communications structures fail.

    – Loss of internet connectivity.

Effective Emergency Communications

- Not all "served agency's" are the same, some have their own internal communications systems, others do not.

- When a regional emergency occurs, the served agency's communications system may break down after the response is in progress or may not work at all. The effective communicator must be able to understand how the served agency communications flow operates and adapt to any changes required to maintain this workflow. This may use existing commercial radios and may use ham radios.

ARES / RACES

- When do radio groups get involved with an issue?

  - ARES / RACES groups can get "Activated" when there is a declaration of an emergency by a local government.

  - In California, there is one exception for an earthquake that causes significant damage, where the ARES / RACES groups will immediately start reporting damage assessments to other members of the group for relay to local government when they are available to ask for this assessment.

  - Local government will use these assessments to quickly determine if an emergency should be declared.

Santa Clara County ARES / RACES

- The population of Santa Clara county is slightly under 2,000,000 people. There are greater than 200 active ARES volunteers in the county or one volunteer for every 10,000 people. In the event of a substantial county wide emergency, we will need more hams than are active in the ARES group.

  - This situation is prevailing throughout California.

https://www.scc-ares-races.org/aresraces.htm

Effective Emergency Communications

- ARES groups are chartered to provide a trained and experienced group of radio communicators to the served agency, these volunteers should be able to understand the communications protocols within the agency and be able to perform passing 3rd party messages between principals within the agency as well as the local government emergency operations center (EOC).

- These messages can take many forms, but most are typically written on a standard form (ICS-213).

- The message can be transmitted and received by a variety of methods, voice (FM) radio, packet radio and microwave radio links (computer mesh networks) are frequently used.

PHONE vs Packet vs Microwave

- When the required information is complex in nature or the intended recipients are large, the information to be transmitted should be put in a message format to preserve the clarity and readability of the information. This then can be transmitted via voice, packet or microwave links based on the situation at hand.

  - There are specific techniques adopted by organizations to deal with phone message communications, most but not all are based on the ARRL NTS manual.

  - Santa Clara County Ares and affiliated city Ares groups use these techniques, and highly promote the use of these techniques in their operations.

Mesh (Microwave) Radio Techniques

- Typical internet networks are closed (nonpublic) fixed location services provided by for profit ISP's using data encryption or cell phone providers using data encryption
- Mesh networks are suited for use in an organization where large amounts of public information need to be shared across a distributed group in an informal manor
  - Can only be operated in a public self organizing network if it is a ham radio type system
  - Can support IP telephone and IP video camera deployments
  - Based on re-purposed (re-programmed) WiFi routers where FCC regulations require public non-encrypted mode of operation for ham radio transmissions that precludes direct connection to internet (will violate ISP agreements and FCC regulation)
  - ARDEN / HSMM are the primary groups supporting Mesh Radio

Effective Emergency Communications

- Use of standard procedures to document the message including the source and destination, priority and expected response are used to concisely and accurately transfer the message.

- Most hams use VHF/UHF FM (voice) stations, and this requires use of phonetics and pro-words in a predictable format to be successful communicators.

  - This takes practice to perform well.

Packet Radio Messages

- Packet is used to communicate to a BBS type mailbox system to send at retrieve messages that are too long or complicated to pass via voice nets.

    - Approximately 15 times faster than voice communications

- Used extensively at Santa Clara county level ARES where web-based messaging is used – no significant difference in web-based communication or packet radio communication for the served agency.

    - Message form for packet message is the same as the form used in the web application.

Packet Radio Messages

- Provide served agency with printed forms for thier records.

- Equipment required:

  - Antenna, radio (VHF/UHF) 25W minimum, power supply, TNC (Kantronics KPC3+) computer – USB, windows 10, mouse, printer, ink, paper

  - Typically, Outpost program is used.

    - https://www.outpostpm.org/index.php?content=downloads

HAM RADIO COMMUNICATION

- Unstructured voice communication generally takes the form of casual conversation that may be a lengthy rambling exchange with limited coherent purpose

  - A lot of VHF/UHF repeater operation follows this informal format

- •Structured voice communication can be a brief precise informative conversation with a clear purpose and will result in an action that will be beneficial to one or more people

  - Participating in radio networks or Nets provides experience in how to operate the radio with a clear purpose to get the participants in the net to provide brief precise information to reach a common objective.

  - This results in an overall improvement in the radio community in the "Art of Radio Communications".

VOICE COMMUNICATIONS

- Use of nonstandard phonetics, can result in confusion and undesirable delays or unintended consequences

- Think prior to talking

- Know what to say and how to say it before you start talking

THE ART OF COMMUNICATION

- Who uses Radio Nets?

    - Ares / Races, Red Cross, Mars, NGO's, Corporations

    - Large groups that deal with changing situations

- Why do they use Radio Nets?

    - Effective way to communicate to a large distributed group and get feedback rapidly

- When do groups use Radio Nets?

    - Can be used either in a regularly scheduled event or can be used in a continuous operating mode depending the situation in hand.

- Where do groups use Radio Nets?

    - Local nets (typically <20 miles) exist on VHF/UHF/Microwave bands

    - Regional Nets (typically <200 miles) exist on upper HF bands

    - International Nets (typically < 2000 miles) exist on lower HF bands

THE ART OF COMMUNICATION

- What are Radio Nets? / How do you run a Radio Net?

    - Most radio nets are regularly scheduled events where members must ask permission to talk on the net

        - this is a directed net.

    - The directed net format allows the net control operator to act as the traffic cop and direct that all participants of the net follow previously defined procedures to improve the efficiency and accuracy of the information presented on the net.

    - Non-directed nets are more like informal conversations and are generally a lot harder to understand with marginal radio propagation as frequent doubles can occur.

THE ART OF COMMUNICATION

- Directed net procedures

  - All stations must ask permission to talk on the net from the control operator

  - All stations must follow instructions given by the net control operator

  - All stations are encouraged to briefly use simple language to accurately convey only the required information and then give there FCC call sign at the end of the transmission to let the net control operator know that the transmission is complete and to follow FFC rules.

  - The exact format used in the net is defined by the net control operator and can be modified to fit the situation at hand.

PHONE MESSAGE TECHNIQUES

- Use previously accepted message form format (ICS-213) to compose the message

    - This avoids confusion in addressing the message (both originator and recipient) and helps with formatting the message into a form that is readily communicated and understood by both originator and recipient.

    - Transmit words in groups of no more than 5 words to allow sufficient time for the recipient to transcribe the word groups on to a message form.

    - Use pro-words to improve readability and reduce errors.

    - https://www.scc-ares-races.org/training/courses/Msg_Passing/SCCo_Message_Passing_v210717_1up.pdf

MORSE CODE AND ITU TELEPHONY PHONETICS

Using internationally accepted phonics and Morse code makes CW and phone transmissions less prone to errors and more readable
- Using pro-words in phone transmissions can also greatly enhance readability and reduce errors
- Control pro-words define beginning and ending of a message or control the flow of speaking during transmissions
- Clarification pro-words clarify or emphasize what was just said and are spoken after the word group needing clarification
- Qualification pro-words define a quality within a word group and are spoken within the word group
- Introductory pro-words alert the recipient of what is coming next and are spoken prior to the word group

CHARACTER	MORSE CODE	TELEPHONY	PHONIC (PRONUNCIATION)
A	• —	Alfa	(AL-FAH)
B	— • • •	Bravo	(BRAH-VOH)
C	— • — •	Charlie	(CHAR-LEE) or (SHAR-LEE)
D	— • •	Delta	(DELL-TAH)
E	•	Echo	(ECK-OH)
F	• • — •	Foxtrot	(FOKS-TROT)
G	— — •	Golf	(GOLF)
H	• • • •	Hotel	(HOH-TEL)
I	• •	India	(IN-DEE-AH)
J	• — — —	Juliett	(JEW-LEE-ETT)
K	— • —	Kilo	(KEY-LOH)
L	• — • •	Lima	(LEE-MAH)
M	— —	Mike	(MIKE)
N	— •	November	(NO-VEM-BER)
O	— — —	Oscar	(OSS-CAH)
P	• — — •	Papa	(PAH-PAH)
Q	— — • —	Quebec	(KEH-BECK)
R	• — •	Romeo	(ROW-ME-OH)
S	• • •	Sierra	(SEE-AIR-RAH)
T	—	Tango	(TANG-GO)
U	• • —	Uniform	(YOU-NEE-FORM) or (OO-NEE-FORM)
V	• • • —	Victor	(VIK-TAH)
W	• — —	Whiskey	(WISS-KEY)
X	— • • —	Xray	(ECKS-RAY)
Y	— • — —	Yankee	(YANG-KEY)
Z	— — • •	Zulu	(ZOO-LOO)
1	• — — — —	One	(WUN)
2	• • — — —	Two	(TOO)
3	• • • — —	Three	(TREE)
4	• • • • —	Four	(FOW-ER)
5	• • • • •	Five	(FIFE)
6	— • • • •	Six	(SIX)
7	— — • • •	Seven	(SEV-EN)
8	— — — • •	Eight	(AIT)
9	— — — — •	Nine	(NIN-ER)
0	— — — — —	Zero	(ZEE-RO)

PHONE MESSAGE TECHNIQUE - EXAMPLES

- Information: I need two radios.

- Spoken: I need two I spell tango whiskey oscar radios.

- Information: Don't enter the building.

- Spoken: Don't I say again Don't enter the building.

- Information: Go to city hall.

- Spoken: Go to ??? ????.

- Response: Say Again all after to

- Spoken: city hall.

PHONE MESSAGE TECHNIQUE - EXAMPLES

- Information: Contact w6xrl4@gmail.com or w6xrl4@w7xsc.#nca.ca.usaSpoken: Contact email address whiskey six x-ray romeo lima four at-sign gulf mike alpha India lima dot charlie Oscar mike or packet address whiskey six x-ray romeo lima four at-sign whiskey seven x-ray sierra charlie dot pound-sign November charlie alpha dot charlie alpha dot uniform sierra alpha

PHONE MESSAGE TECHNIQUE - EXAMPLES

- Information: $500.00 should cover the cost, according to http://x.com/Widget

- Spoken: dollar-sign figures five zero zero decimal zero zero should cover the cost comma according to internet-address hotel tango tango colon slash slash x-ray dot charlie oscar mike slash uppercase whiskey lowercase India delta gulf echo tango

PHONE MESSAGE TECHNIQUE - EXAMPLES

- Information: Bring one 30Amphour LiFePo4 battery to city hall.

- Spoken: Bring one mixed group three zero alpha mike papa hotel oscar uniform romeo mixed group lima India foxtrot echo papa oscar four battery to city hall