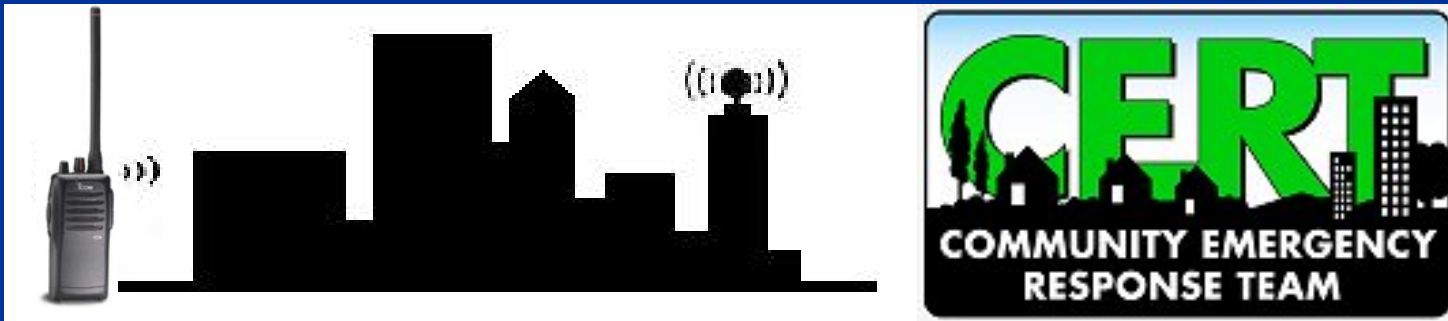


# 2-Way Radio Fundamentals

## Part II



## Communications Plans and Operating Procedures for Complex Incidents

# Objectives:

***After completing this unit  
you will be able to:***

- **Develop a plan for CERT communications**
- **Understand why multi-channel operations are needed for more complex incidents**
- **Use correct radio operating procedures**
  - **Procedural words, and standard ITU phonetics**
- **Operate your portable radio more effectively during an emergency!**

# *Alerting Considerations*

- **Discuss with team members communication methods to be used for alerts and activation**
  - Some teams may agree to purchase cellular phones with two-way communication capabilities if available in your area
  - Other teams may decide that a combined land-line, digital paging and cell phone text email system will work best
- **Whatever method is selected, it should be:**
  - Efficient and organized
  - Available to all CERT members

# *Setting Up Communications*

## Use two-way radios for:

- Intra-team, among team members
- Inter-team coordination between teams
- Each team is assigned its own “working” channel or frequency for its operations.

# ***CERT Radio Communications During a Response***

**Identify who needs to communicate, with whom:**

- **Intra-team during search & rescue operations**
- **Inter-team to communicate logistics, request assistance, and provide status reports**
- **Group Leaders to CERT Team Leader**
- **Team Leaders to the Incident Command Post**
- **IC and Team Leaders with Public Safety.**

# *Setting Up Communications*

- Section chiefs:
  - Operations
  - Logistics
  - Planning
  - Administration

**Each section should be assigned a separate radio channel to communicate with each other and with the Team Leader**

# *Setting Up Communications*

- IC and Team Leader (s)
  - CERT communications with first responders should be assigned on a separate channel or frequency.

# *Intra-team search & rescue ops*

## Radio use on searches requires caution

- One search team member maintains contact
- Relay resource requests or status reports from a safe, stationary position
- Maintain situational awareness
- Safety first – STOP, THINK, OBSERVE, PLAN.

# *Unit Identification*

- Unit IDs are used to establish initial contact and again when the communication is ended.
- Fixed Stations - Identify by their geographic NAME and FUNCTION, i.e. “FAIR OAKS COMMAND”
- Portable or mobile units - Identify by an easily recognized, unique identifier describing their assignment, i.e. “SEARCH TEAM ONE”

## “Unit IDs”

### Identify yourself by your:

- LOCATION and ASSIGNMENT such as:  
“Stairwell Ten,” or “Evac Chair”
- Unit IDs enable “Control” to manage tasks or personnel without regard to WHO is using the radio, so events can be logged more easily
  - Use your Unit ID **CONSISTENTLY**
  - Contact “Control” or others by **THEIRS**
  - Listen for **YOURS**

# What is a “Directed” or “Controlled Net?”

- **Some one “takes command” to control / manage what is going on**
  - Radio users must call “Control” to get permission before calling anyone else
- **Use a Controlled Net when more than four people are using one channel at the same time.**

# Control of Communications

In communication between a portable or mobile unit and a fixed location (such as a command post) the FIXED station controls communication in all matters relating to:

- Priority and timing of radio transmission
- The choice of working radio channel
- The duration and suspension of work

Except in case of distress, life-safety or urgency communications.

# *Multiple Station Calls*

If the command post or other facility needs to contact more than one unit simultaneously, the unit ID's of all stations to be contacted may be listed in any convenient sequence followed by the prowords "THIS IS" and the facility ID.

# ***Multiple Station Call - Example***

**“CERT TEAM LEADER, SEARCH THREE,  
EVAC THREE, THIS IS FAIR OAKS COMMAND.  
CONTACT MEDIC 423 ON CHANNEL SEVEN,  
TO COORDINATE VICTIM EXTRACTION, OVER.”**

# Why A Controlled Net?

It enables the person in charge to:

- **PRIORITIZE** resource requests
- **QUICKLY** handle multiple situations
- **LOG** what happens

# Participating in a Controlled “Net”

- **Respond ONLY to “Control”**
  - Get permission before contacting anyone
- **Answer PROMPTLY**
  - Monitor the radio continuously
  - Answer immediately if you are called
- **Don’t leave the “air” without checking out!**
  - Otherwise, “Control” wastes time trying to call or locate you when you are “not there.”

# **RADIO OPERATING PRACTICE**

(continued)

- **WAIT** a few seconds before “pushing to “talk” and between phrases so others can break in
- **It’s OK to interrupt, IF you have urgent info**
  - That's why you leave gaps between transmissions
- **When necessary to interrupt, speak only long enough to “IDENTIFY AND SAY WHY”**

**Example: “Stairwell Ten URGENT!”**

# **RADIO OPERATING PRACTICE**

(continued)

- **Use PLAIN LANGUAGE ONLY**
  - **No 10-codes or jargon !**
  - **Avoid technical terminology unless it is OPERATIONALLY NECESSARY!**
- **USE short simple phrases**
  - **Short transmissions help the listener**

# Radio Checks

**When your radio requires a reliability check, follow this procedure:**

- 1. Call another unit, identify yourself and request a radio check.**
- 2. The radio check consists of :**  
**“<ID of Unit being called>, THIS IS <your unit ID>  
TESTING 1,2,3,4 HOW COPY? OVER.”**
- 3. On GMRS or amateur radio you must identify by your license call sign during test transmissions.**
- 4. Radio checks should not last more than 10 seconds.**

# Radio Checks

When replying to a radio check, plain language should be used:

- LOUD AND CLEAR** means, **Excellent** copy with no noise
- GOOD READABLE** means, **Good** copy, with slight noise
- FAIR READABLE** means, **Fair** copy, OCCASIONAL FILLS are needed
- WEAK READABLE** means, **Weak** copy, FREQUENT FILLS are needed
- WEAK UNREADABLE** means, **Unable to copy**, a RELAY is REQUIRED.

“< ID of Unit being called >

**THIS IS < your unit ID > “I copy...”**

**< plain language report > Out.”**

# ***RADIO OPERATING PRACTICE***

(continued)

## *Use the “Echo Technique”*

- **CLARIFY (if needed)**
  - **REPEAT Critical Information**
  - **CONFIRM correct**

# *Failure of Communication*

- When contact with the command post fails on an assigned frequency, a mobile or portable unit should try to establish contact on another working frequency appropriate to the area of operations. (Follow the communication plan)
- When normal communication cannot be established between a fixed location to a mobile or portable unit, the fixed station should try to relay the message via any other unit copying, which may be able to establish communication.

# WHO is “Control?”

It could be ANYONE, even you!



# “CONTROL’S” JOB IS TO:

- **MAINTAIN radio discipline by:**
  - Setting the example
  - Prioritizing messages and requests
  - Handling all radio traffic efficiently
- **TRACK what’s going on...**
  - Write down everything that happens...
- **REPORT to the Team Leader or Incident Commander**

# You MUST write things down!

- Because you can't remember everything in your head
- Especially *when it gets busy!*
- Nor can you effectively brief the Incident Commander from memory
- Or accurately reconstruct what happened some time days later...

## *Maintain a Log in chronological order...*

- **Who has a problem or information**
- **Situation update / tasks assigned**
  - Problem identification and location
  - Status of building search and evacuation
  - Resources needed, available, assigned, out of service or in transition
  - Personnel safety / accountability
    - Brief Team Leader and Incident Commander
    - Becomes part of the incident record.

# *Radio Operator's LOG*

- **WRITE** down names of responders or officials for whom you send messages
- **Make a log line entry for each item**
  - **This is absolutely necessary**
    - In case person wanders off before you get a reply or you need to get more information
  - **Helps eliminate duplicate requests for the same resources or information**



# Remember ASAP

*Whenever handling radio messages or contacts:*

- **ACCURATE:** Precise, clear.
  - Repeat back critical information
  - Confirm contents and authenticate the source.
- **SPEEDY:** Information quickly copied and delivered
- **APPROPRIATE DISTRIBUTION:**
  - Get the information to the right person(s)
- **PERMANENTLY RECORDED:**
  - Log messages as directed by the served agency.

# *FRS Channel Assignments for Large Incidents*

- **FRS1** Neighborhood Watch to Responders
- **FRS2** CERT Team Leaders to Command Post
- **FRS3** CERT Planning Section
- **FRS4** CERT Logistics Section
- **FRS5** CERT Admin Section
- **FRS6** CERT Team Leader to Public Safety Responders
- **FRS7** Safety Officer – Rapid Intervention Team
- **FRS8** CERT Inter-Team Primary Working Channel
- **FRS9- 14** CERT Intra-team working channels 500mw Max.

Use of the "Interstitial Simplex" Channels 1 through 7 with transmitter output greater than 500mw requires GMRS license and Part 95 Type Accepted radio such as the ICOM F21GM.

# Training Example Communications Plan

## Training Example CERT Communications Plan

<b>Communications Plan – ICS 205</b>	1. Incident Name	2. Date / Time Prepared	3. Operational Period Date / Time
--------------------------------------	------------------	-------------------------	-----------------------------------

### 4. Amateur Radio (ARS) and General Mobile Radio Service (GMRS) Channel Utilization

Radio Type/ Cache	Channel ID	Function	Frequency / Tone	Info.	Remarks
VHF-2m	Ham 1	HAM Radio - NE Sector	147.495		Requires Amateur Radio Lic.
VHF-2m	Ham 2	HAM Radio - NW Sector	147.525		Requires Amateur Radio Lic.
VHF-2m	Ham 3	HAM Radio - SW Sector	146.565		Requires Amateur Radio Lic.
VHF-2m	Ham 4	HAM Radio -SE Sector	146.595		Requires Amateur Radio Lic.
VHF-2m	Ham 5	Ham Radio Mutual Aid	146.415		Requires Amateur Radio Lic.
VHF-2m	Ham 6	Fairfax Ham Repeater	146.79-		Requires Amateur Radio Lic.
VHF-2m	Ham 7	Tyson's Ham Repeater	146.91-		Requires Amateur Radio Lic.
UHF-GMRS	REACT1	NoVA REACT GMRS Repeater	462.675+ (141.3)		Requires GMRS Lic.
UHF-GMRS	FRS1	Neighborhood Watch To Responders	462.5625		*Max 5w w/GMRS Lic.
UHF-GMRS	FRS2	Team Leaders to Command	462.5875		*Max 5w w/GMRS Lic.
UHF-GMRS	FRS3	CERT Planning	462.6125		*Max 5w w/GMRS Lic.
UHF-GMRS	FRS4	CERT Logistics	462.6375		*Max 5w w/GMRS Lic.
UHF-GMRS	FRS5	CERT Admin	462.6625		*Max 5w w/GMRS Lic.
UHF-GMRS	FRS6	Public Safety Coordination	462.6825		*Max 5w w/GMRS Lic.
UHF-GMRS	FRS7	Safety Officer-EMERGENCY	462.7125	RIT	*Max 5w w/GMRS Lic.
UHF- FRS	FRS 8	Inter-Team Coordination	467.5625	No GMRS	FRS only 500mw
UHF - FRS	FRS 9	CERT Operations	467.5875	No GMRS	FRS only 500mw
UHF - FRS	FRS10	CERT Operations	467.6125	No GMRS	FRS only 500mw
UHF - FRS	FRS 11	CERT Operations	467.6375	No GMRS	FRS only 500mw
UHF - FRS	FRS12	CERT Operations	467.6625	No GMRS	FRS only 500mw
UHF- FRS	FRS 13	CERT Operations	467.6875	No GMRS	FRS only 500mw
UHF - FRS	FRS 14	CERT Operations	467.7125	No GMRS	FRS only 500mw

\*Use of the GMRS interstitial simplex channels at 5 watts requires a GMRS license and an FCC Part 95 Type Accepted Radio. ICOM F21GM is suggested for this purpose.

5. Prepared by ( Communications Unit Leader, (COML) Unit Leader Type III)

Name \_\_\_\_\_ FCC Call sign \_\_\_\_\_

# CTCSS Tones & Designators

*Sub-audible tone alphanumeric designators and corresponding frequency (Hertz)*

Code	(Hz)	No.	Code	(Hz)	No.	Code	(Hz)	No.
XZ	67.0	1	1B	107.2	14	6A	173.8	28
WZ	69.3	n/a	2Z	110.9	15	6B	179.9	29
XA	71.9	2	2A	114.8	16	7Z	186.2	30
WA	74.4	3	2B	118.8	17	7A	192.8	31
XB	77.0	4	3Z	123.0	18	M1	203.5	32
WB	79.7	5	3A	127.3	19	8Z	206.5	n/a
YZ	82.5	6	3B	131.8	20	M2	210.7	33
YA	85.4	7	4Z	136.5	21	M3	218.1	34
YB	88.5	8	4A	141.3	22	M4	225.7	35
ZZ	91.5	9	4B	146.2	23	9Z	229.1	n/a
ZA	94.8	10	5Z	151.4	24	M5	233.6	36
ZB	97.4	11	5A	156.7	25	M6	241.8	37
1Z	100.0	12	5B	162.2	26	M7	250.3	38
1A	103.5	13	6Z	167.9	27	0Z	254.1	n/a

# Pro-Word Review of the “Basic Four”

*Everyone who uses a 2-way radio  
should learn and use these:*

- **“THIS IS”** - Used to identify who is calling
- **“OVER”** - Means *“I have finished speaking and it’s now your turn”*
- **“GO AHEAD”** - Means *“I’m ready to copy”*
- **“OUT”** - Means - *“I am finished and expect no reply”*

The station who initiates the call always TERMINATES it.

## *Some More Prowords....)*

- **"COPY"** - Means OK, received and understood
- **"AFFIRMATIVE"** or **"NEGATIVE"** Use instead of "yes" or "no" because its sound is distinctive and meaning clear, even under noisy operating conditions.
- **"SAY AGAIN"** Used to request a word or phrase be repeated from the last known word preceding or referenced, for example:

**'SAY AGAIN ALL AFTER...<known word>'**

# More Prowords....)

- **“CORRECTION”** - I made an error and am transmitting again from after the last correct word...
- **“CORRECT?”** - Am I Correct?
- **“CORRECT (AFFIRMATIVE)”** - You are correct.
- **“WAIT”**
  - Cease transmission until told to **“Go Ahead”** by ‘Control’
  - Example: **“Fourth floor acknowledged, WAIT,... Evac Chair make your call”**

# More useful Prowords....

But, thank goodness we are almost done!

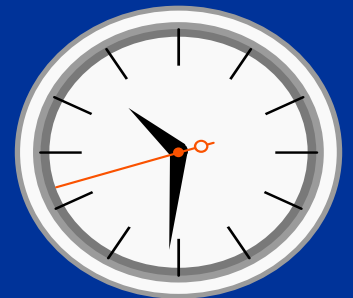
- **“I SPELL”** - Copy as I spell phonetically
- **“FIGURE(S)”** - Copy numbers following
- **“INITIAL”** - Single letter follows
- **“MIXED GROUP”** - following Group contains both numbers and letters
- **Speak SLOWLY and DISTINCTLY!**

# Transmission of Numbers - Examples

<b>10</b>	<b>becomes</b>	<b>one zero</b>
<b>75</b>	<b>becomes</b>	<b>seven five</b>
<b>100</b>	<b>becomes</b>	<b>one zero zero</b>
<b>5800</b>	<b>becomes</b>	<b>five eight zero zero</b>
<b>11000</b>	<b>becomes</b>	<b>one one thousand</b>
<b>121.5 MHz</b>	<b>becomes</b>	<b>one two one decimal five Megahertz</b>
<b>\$0.75</b>	<b>becomes</b>	<b>currency, seven five cents</b>
<b>\$17.25</b>	<b>becomes</b>	<b>dollars, one seven decimal two five</b>

# *24-Hour Time Examples*

<b>12:45 a.m.</b>	<b>zero zero four five hours</b>
<b>12:00 noon</b>	<b>one two zero zero hours</b>
<b>11:45 p.m.</b>	<b>two three four five hours</b>
<b>12:00 midnight</b>	<b>two four zero zero hours</b>
<b>1:30 a.m.</b>	<b>zero one three zero hours</b>



# International Telecommunication Union (ITU) Standard Phonetics

A - Alpha

B - Bravo

C - Charlie

D - Delta

E - Echo

F - Foxtrot

G - Golf

H - Hotel

I - India

J - Juliet

K - Kilo

L - Lima

M - Mike

N - November

O - Oscar

P - Papa

Q - Quebec

R - Romeo

S - Sierra

T - Tango

U - Uniform

V - Victor

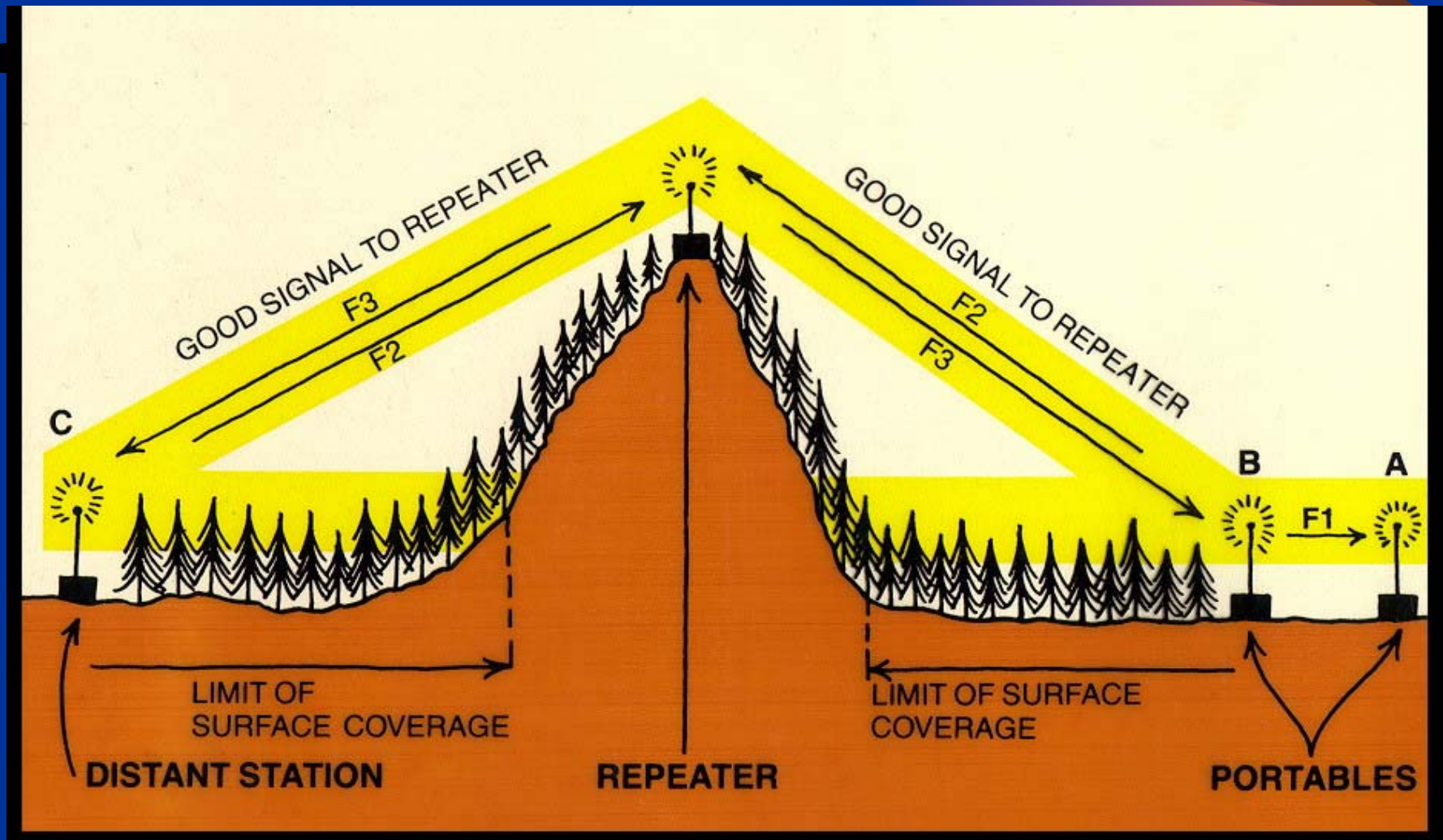
W - Whiskey

X - Xray

Y - Yankee

Z - Zulu

# FM Repeater (Line of Sight)



# REPEATERS



- “Repeats” signals to extend range of portable and mobile units.
- Receive on one frequency while re-transmitting on another (Duplex).
- Amateur and REACT repeaters are available to licensed CERT users.
- Commercial equipment used is similar to that in public safety radio.
- Repeaters are located on high-rise buildings or towers.
- Transmit at 50-100 times the power of a portable radio.
- Repeaters may be linked together in a network.
- Some repeaters enable “phone patch” to 911.
- Coverage depends upon “radio horizon,” typically 20 to 60 miles operating radius for licensed users with commercial-grade equipment.

# *Resources for More Information*

- Amateur Radio Relay League Emergency Communications

<http://www.emergency-radio.org/>

- FCC General Mobile Radio Service Licensing Information

<http://wireless.fcc.gov/feesforms/feeguide/services/generalmobile.pdf>

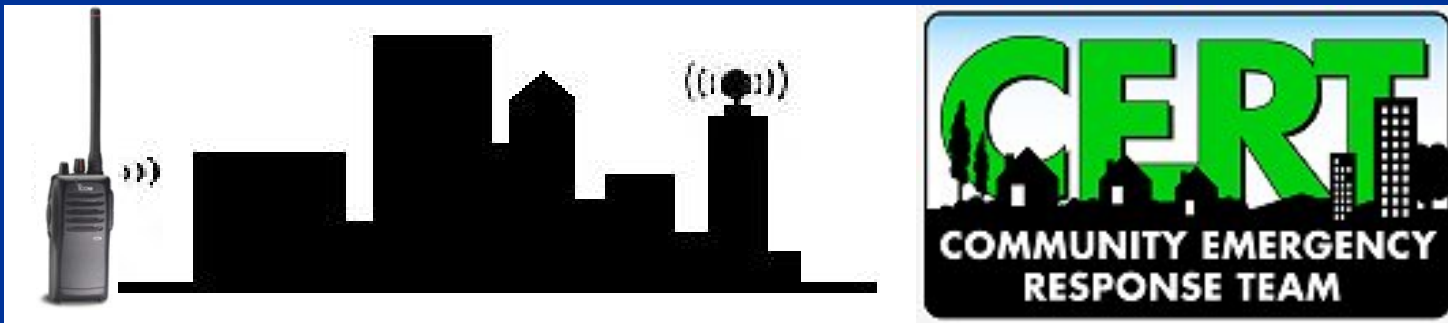
- REACT International

[http://www.reactintl.org/teaminfo/usa\\_teams/teams-usva.htm](http://www.reactintl.org/teaminfo/usa_teams/teams-usva.htm)

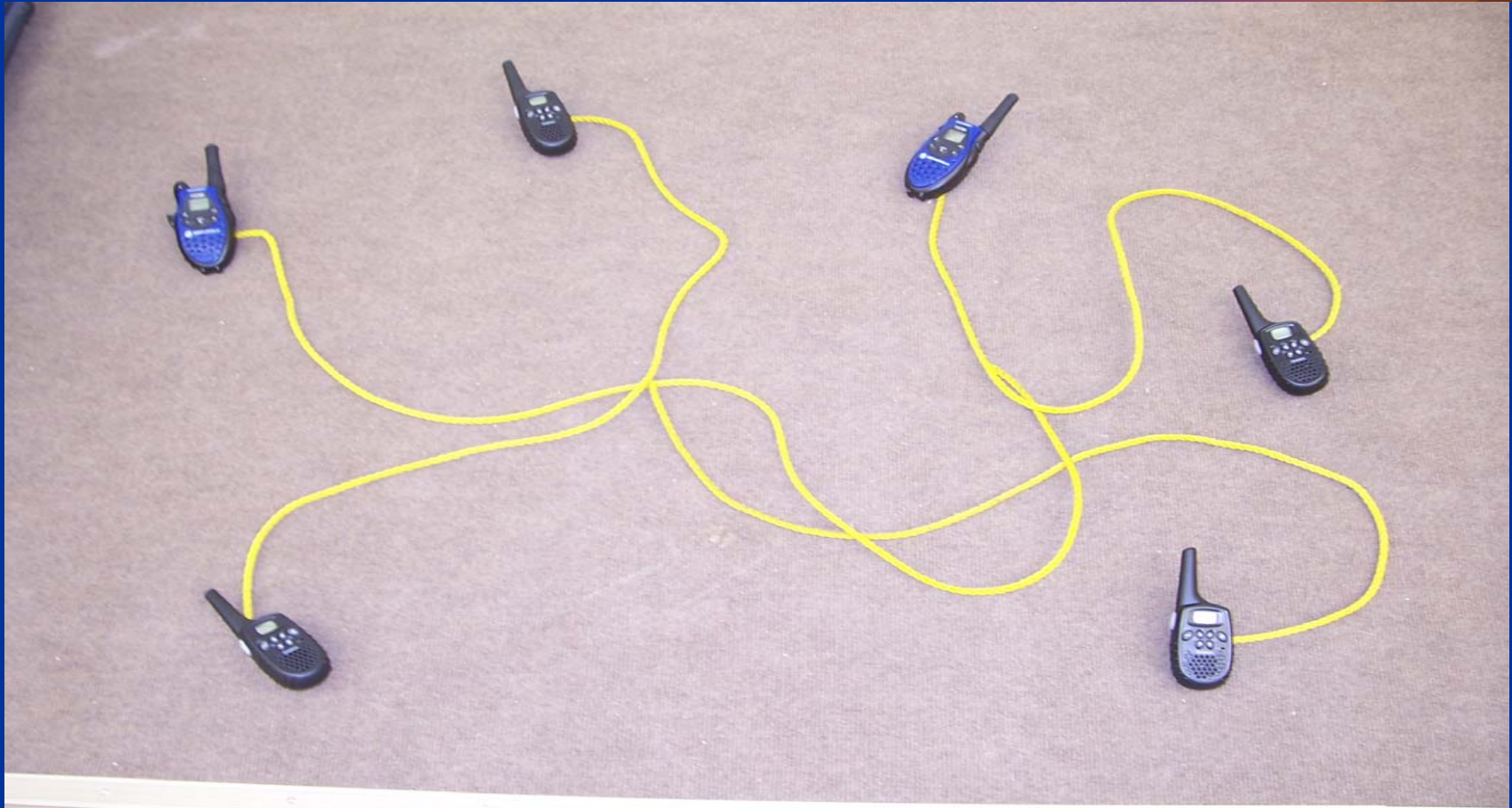
- Establishing CERT Communications

- <https://www.citizencorps.gov/cert/start-3-1g.shtm#item4>

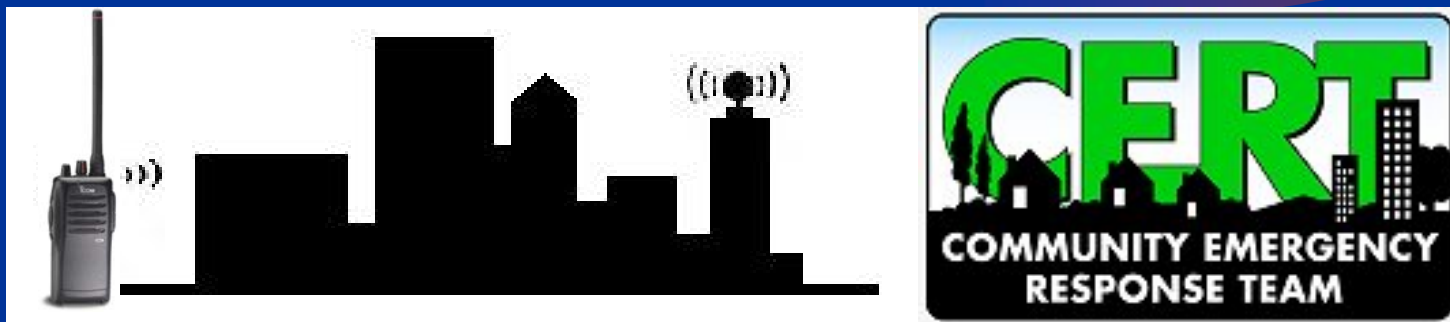
# *Break for a “10-4 Good Buddy” exercise*



*Walk on me one more time and I'll poke ya  
in the eye!*



# *“Hot Wash” the Exercise*



## *TIME FOR QUESTIONS*