CERT Communications

General Meeting
September 26, 2018

CERT Communications

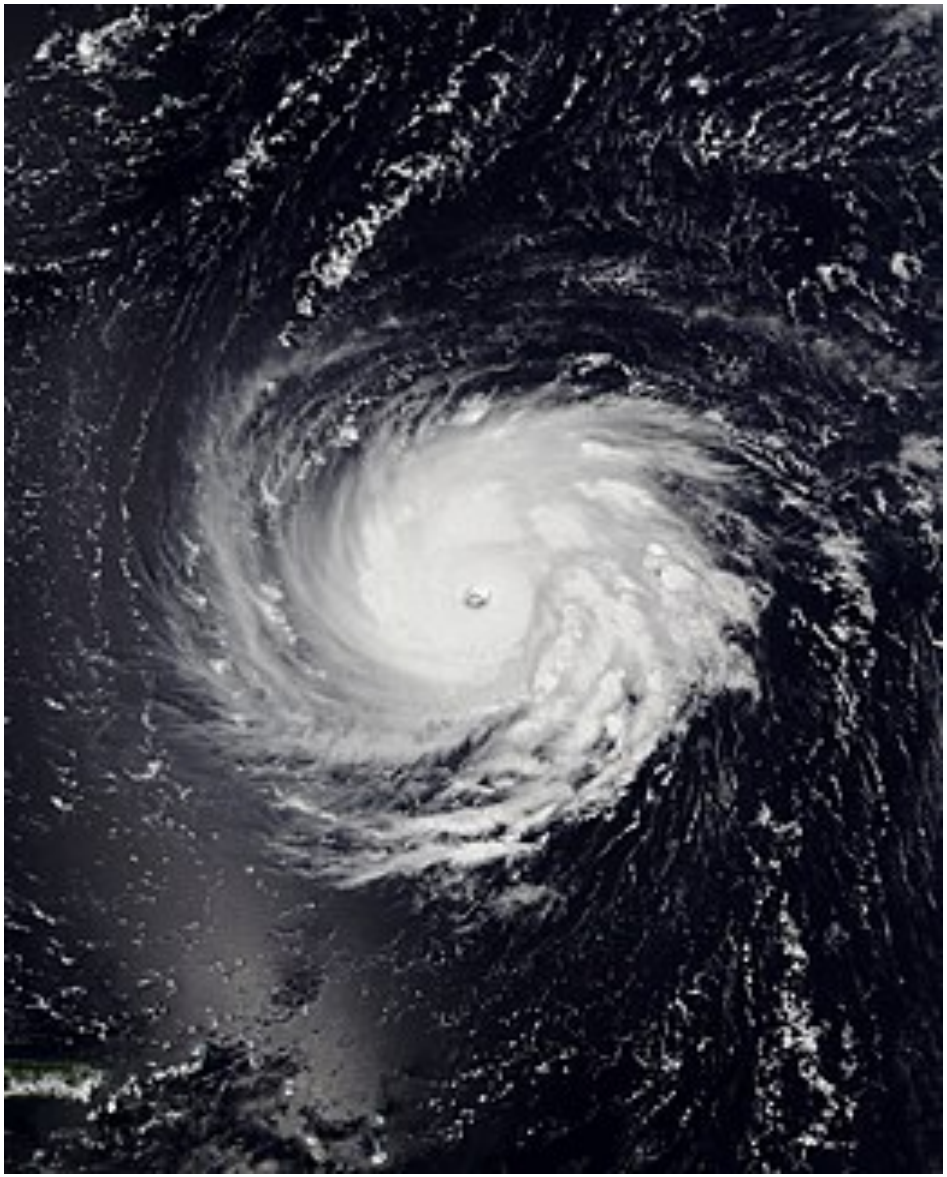
- **Objectives of this class**
  - Communication Modes
  - Importance of Communications
  - Family Communications Plan
  - Chatham CERT Communications
  - Radio Operations
  - Formal Communications (AUXCOMM)
  - What to do next

Communication Disasters

- **Hurricane Katrina**
  - 3,000,000 landline phones out. 1,477 cell towers down. Most commercial news off the air.[1]
- **Superstorm Sandy**
  - Commercial websites out; widespread network problems[2]
- **Hurricane Irma / Hurricane Maria**
  - 95% of all cell towers damaged or destroyed in Puerto Rico[3]

[1] https://georgewbush-whitehouse.archives.gov/reports/katrina-lessons-learned/chapter4.html
[2] https://www.nanog.org/meetings/nanog57/presentations/Monday/mon.panel.Golding.Superstorm.12.pdf
[3] https://www.telegeography.com/products/commsupdate/articles/2017/09/22/hurricane-maria-destroyed-95-of-puerto-ricos-cell-sites/

Then came Hurricane Florence



Just in Chatham County:

- Numerous county agencies – phones out
- Cell phone service (Verizon) interrupted
- Incoming calls to Emergency Operations Center – knocked out for a period of time
- Businesses – lost internet

Communication Modes

Runners	• Reliable, flexible, available, no special training • Limited in distance and time • Requires written messages for accuracy • Requires familiarity with area
Landline	• Enhanced 911 • Not mobile • Can overload easily • Easy to disrupt (network, power outages)
Cell Phones	• Mobile: almost every one has one all the time • Can send text, pictures, locations, can use apps. • Easy to disrupt (network, power outages, tower damage)
Computers	• Relatively secure transmission of large amounts of data • Provides electronic records • Requires power, network connections • Can use special apps like WinLink
Radio	• Mobile • Can operate in austere conditions • Requires some training to operate

Key Comms Questions*

1. **Who are you?**
2. **With whom do you need to communicate?**
3. **Are they able to hear you and communicate back with you?**
4. **How far do you need to communicate?**
5. **How often will you need to communicate?**
6. **Do you need to be mobile?**
7. **Will you have a power supply? How long will it last? (fuel supply sufficient?)**
8. **Do you have the skills and equipment you need?**

Ponder, discuss, and write down your answers!

*From 'Personal Emergency Communications' by Andrew Blaze, 2012

Family Emergency Comms

- **Family Communications**
  - Make a Plan: phone numbers, email addresses, social media contacts. Give copies to each member of your family.
  - Know your schools' emergency plans.
  - Keep up with the local emergency news and weather.
- **Important items for meeting arrangements:**
  - Who meets,
  - Where they meet,
  - What to bring,
  - What time,
  - How long to wait at the meeting point, and
  - What to do if things change.
- **And,**
  - Beware of who might be listening.

Family Communications

- **How will you contact one another when disaster strikes? Have each family member call, text, or email the same friend or relative in the event of an emergency.**
- **Carry important phone numbers and contact information with you:**
  - Out-of-town contact person
  - School
  - Work
  - Childcare
  - Doctor, Dentist
  - Insurance policies
  - Veterinarian
  - Utilities

Get sample forms at ready.gov/make-a-plan

Emergency news

- **ALERT Chatham – imminent threat notification**
  - chathamnc.org/codered
- **Weather Alert Radios (with battery backup)**
- **ReadyNC.org – install the app on your Android or iPhone**
- **Weather Radios (NOAA 'all hazards' network)**
- **Battery-powered or crank-up AM/FM radios**
  - WCHL-AM 1360 Chapel Hill http://chapelboro.com/
  - WPTF-AM 680 wptf.com http://player.listenlive.co/47781/
  - WTKK 106.1 FM Raleigh http://www.iheart.com/live/1061-FM-1649/
  - WUNC-FM 91.5 http://tunein.com/radio/WUNC-915-s23398/
- **SKYWARN**
  - Primary frequency is 146.88mHz (-)(no tone) WB4TQD, or http://www.broadcastify.com/listen/feed/5620/?rl=rr
  - 1st backup is 147.105 mHz (+)(82.5Hz)
  - 2nd backup is 147.135 mHz (+)(82.5Hz).
  - 3rd backup is Carolina 440 UHF Link System

SKYWARN Information Net every Tuesday evening at 9:15 PM (21:15)

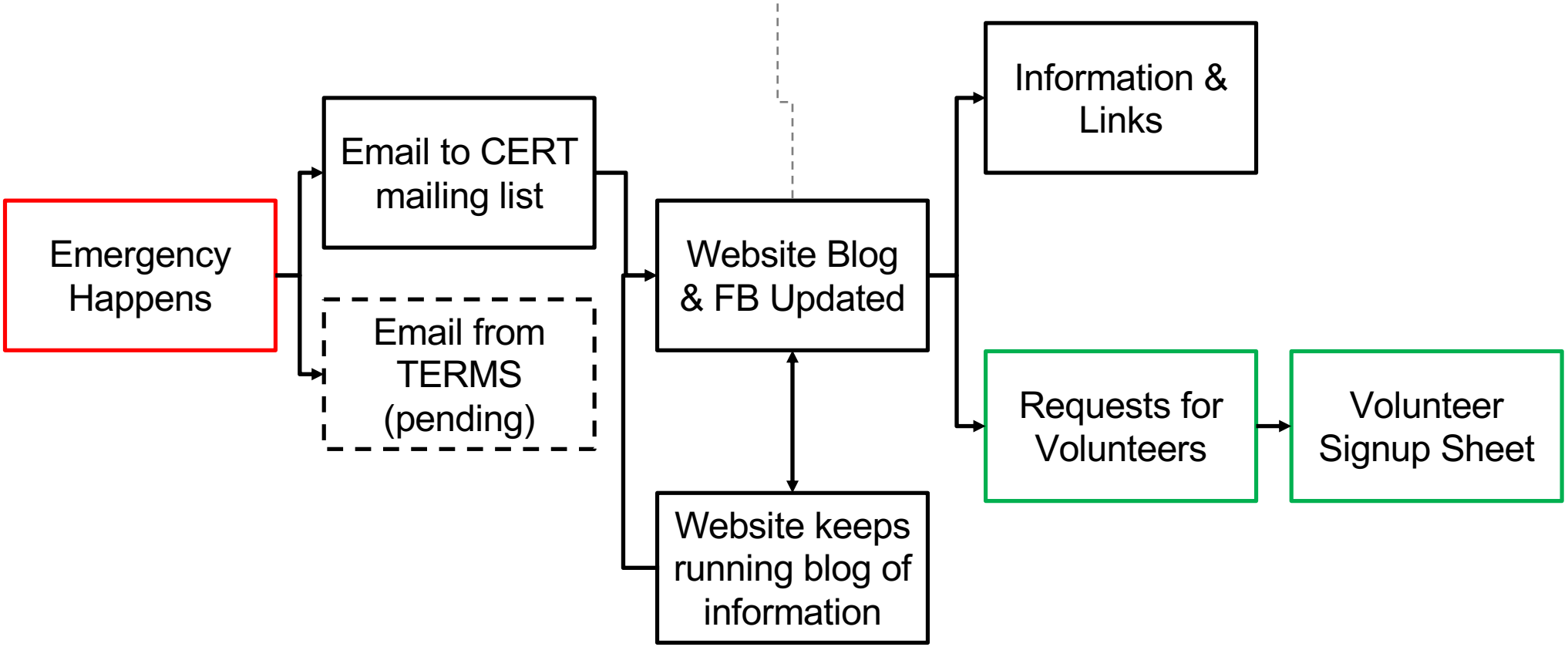
Communicating with First Responders

- **Emergencies: call 911**
  - Provide the facts and just the facts
    - What is the emergency
    - Conditions of the victims
    - What is happening now
    - What is your location
    - Who you are and what phone number are you calling from
    - Don’t hang up until released by the 911 operator

- **Non-emergency information: call 919-542-2911**

Contacting CERT and Volunteers: CERT Social Media

- Website: http://www.chathamcert.org (primary)
- Facebook: @ChathamCERT
- Twitter: @CertChatham



CERT Intra-Team Communications

- **Methods to contact CERT members**
  - Group email pointing to website (blog with information) at http://www.chathamcert.org. Website will have link to signups for support requirements
  - Social media – CERT Facebook page and CERT Twitter
  - Group text, then phone calls, then Zello, then amateur radio.
- **Methods to communicate within CERT teams**
  1. FRS / GMRS radio
  2. Text / cell phone / email
  3. Phone applications (Zello)

Text preferred over calls and email in emergencies

- **Methods for CERT field teams to communicate with CERT Emergency Operations**
  1. Text / cell phone / email
  2. Amateur radio (ham) to EOC
  3. Emergency service radios (when authorized)

Communicating within CERT Teams

- **Methods to communicate within CERT teams**
  1. Text
  2. Cellphone calls
  3. FRS / GMRS radio
  4. Phone applications (Zello)
  5. Email

Take a few minutes to confirm cell numbers of CERT teammates and their email addresses.

Texts are preferred over calls and email in emergencies

Communicating with the CERT Emergency POC

- **CERT field teams communication with CERT Emergency Point of Contact**
  1. Text / email to CERT POC (contact information on website blog)
  2. Cell phone to CERT POC (contact information on website blog)
  3. Amateur radio (ham) to EOC auxiliary comms
     1. Repeater 146.88(-)
     2. 2m SIMPLEX 146.52 (then directed to alternate freq)
     3. 70cm SIMPLEX 446.00 (then directed to alternate freq)
  4. Emergency service (VIPER) radios (only when issued and authorized)

Zello www.zello.com

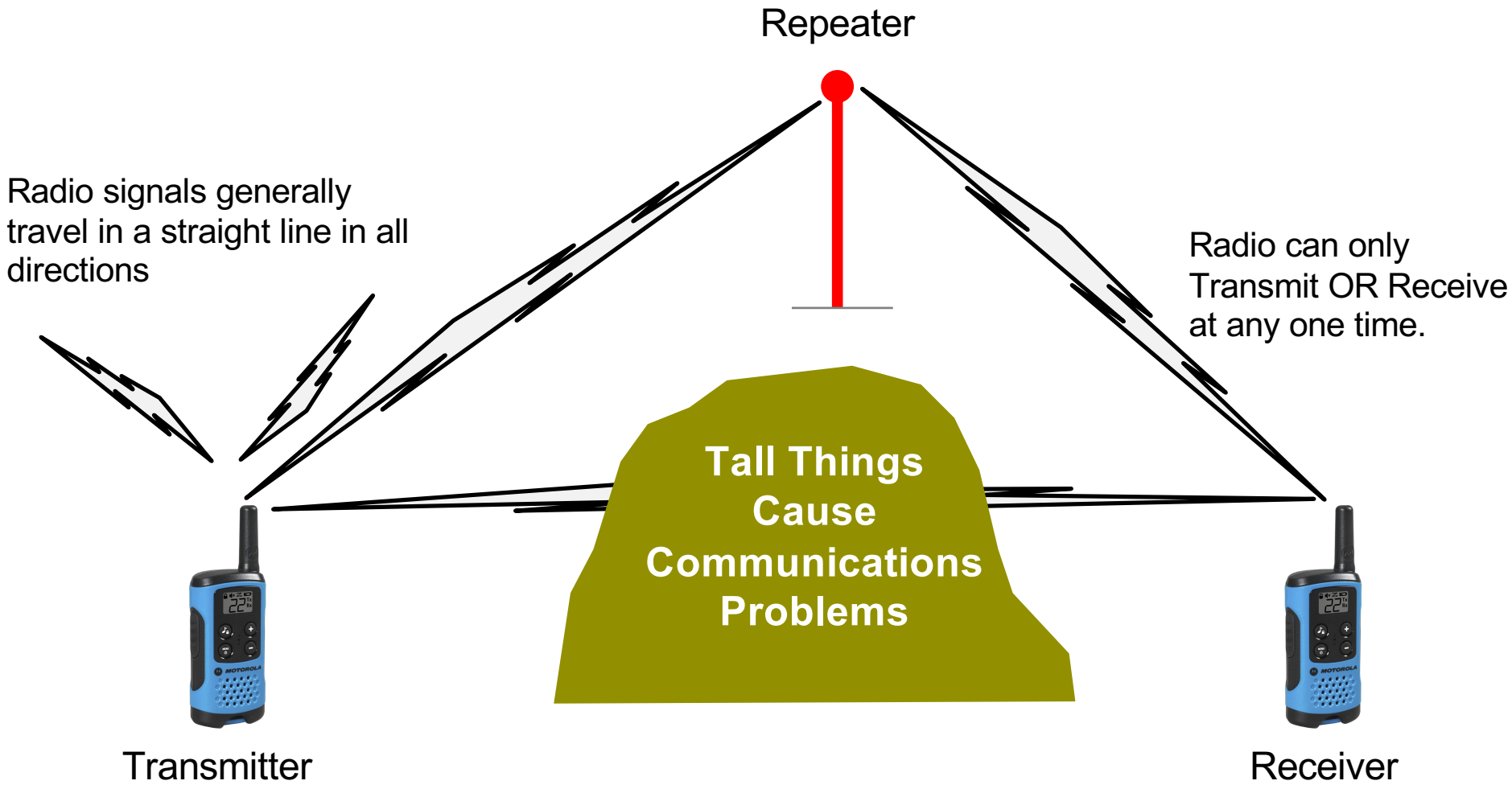
- **Zello is a free walkie-talkie app for cell phones**
- **Available wherever there is WiFi or minimal cell data services**
- **Default app for emergencies (remember the Cajun Navy?)**
  1. Install the Zello app
  2. Sign up for an account
  3. Add contacts
  4. Join the **Chatham CERT** channel
  5. Test your audio
  6. Get familiar with the app

Monitor as needed

What else to use?

Radios!

How Radios Communicate



Basic Radio Terms

Base Station: radio at a fixed site such as the EOC or a shelter.

Mobile Radio: used in or attached to a vehicle.

Portable: battery-powered hand-held two-way radio

Repeater: devices to boost signal over a longer distance. The repeater picks up one frequency and then retransmits it on another frequency

Frequency: the number of times a wave oscillates up or down per second. One cycle per second is called a hertz (Hz). Kilohertz (KHz) is thousands of hertz, and megahertz (MHz) is mllions of hertz.

UHF Band*: ultra-high frequency, 420 MHz to 450 MHz (higher energy)

Also known as 70 centimeters

VHF Band*: very high frequency, 144 MHz to 148 MHz (greater distance)

Also known as 2 meters

Channel: built-in frequency on some radios

*US Amateur Radio Band Frequencies

Basic Radio Types

- **FRS (Family Radio Service)**
  - Inexpensive, widely used, no license, 14 channels
  - 1 mile range line of sight
  - Handheld only
  - No license needed
- **GMRS (General Mobile Radio Service)**
  - Inexpensive, widely used
  - 2 – 5 mile range line of sight (can boost with external antenna)
  - Requires an FRN License (1 / family) $70, good for 10 years
- **FRS / GMRS Hybrid ← Most commonly sold now, but no longer authorized by FCC**
  - Channels 1 - 7 are shared FRS and GMRS (low power)
  - Channels 8 – 14 FRS only
  - Channels 15 – 22 GMRS only, requires FRN license

Basic handheld radios

Antenna (not a handle)

Squelch (maybe). Used to eliminate noise

Channel Indicator (must use the correct channel)

Push To Talk (PTT) Button (release to listen)

Combination Speaker and Microphone

FRS / GMRS radios start about about $30 per pair.

Using a Radio

- **Using a Radio**
  - Make sure it is on and the volume is correct
  - Listen first before transmitting to get an idea of what is going on.
  - Take a couple seconds to 'key' (pressing the Push To Talk switch changes from receive to transmit)
  - Speak firmly and clearly in a normal voice across the microphone, a couple inches away. Don't shout!
  - Keep antenna vertical at head height
  - Improve reception: get higher, move around, rotate your position.
  - Consider using a headset if available.
  - Use lowest power possible.
  - PLAIN LANGUAGE – no '10-codes', no Q-codes, no CB talk.
- **Concerns**
  - Handheld radios eat batteries.
  - No expectation of privacy.
  - Follow the FCC rules (law).
  - Radios are not like conference calls – only 1 transmission can be received at a time.

Prowords – simplify communication

ALL BEFORE	The portion of the message to which I am referring is that portion which precedes ___.
ALL AFTER	The portion of the message to which I am referring is that portion which follows ___.
AFFIRMATIVE	You are correct.
NEGATIVE	You are incorrect.
THIS IS	Identifies who is calling.
GO AHEAD	I am ready to copy.
ROGER	I have received satisfactorily and understood your message.
WILCO	I have received, and understood, and will comply. (Never used along with ROGER; that is redundant).
SAY AGAIN, I SAY AGAIN	I am repeating the transmission, or the portion you need repeated. (do not say repeat)
WAIT	I need a few seconds before we continue talking. Do not transmit, wait for me to continue.
I SPELL	to clarify words
FIGURES	clarifies that numbers will follow
OVER	I have finished speaking and am waiting on your reply
OUT	I am finished and expect no reply

Tactical Call Signs

Tactical call signs identify the radio station's location or purpose during an event, regardless of who is operating the station.

Tactical call signs are used for all emergency nets if there are more than just a few participants.

- "Net Control" – net control station
- "Checkpoint 1" – for the first checkpoint in an event
- "North Shelter" – for the emergency shelter at North High School

Avoid these bad habits

- Thinking out loud on the air “Ahh, well, let me see …”
- On-air arguments, criticism.
- Shouting into the microphone.
- Cute terms and incorrect phonetics.
- Using anything other than Plain Language.
- Not planning what you are going to say.
- Is this communication important? If it isn’t, then hold off.
- Idle chatter to pass the time.

Basic Net Operations

- **Nets allow us to operate in group settings**
  - High volume of disorganized messages can quickly turn into a mess.
  - Nets effectively move as much radio traffic as accurately as possible.
- **The 'Net Control Station' (NCS) controls the message flow**
  - Coordinate and facilitate communication (aka traffic).
- **Types of Nets**
  - Free: minimal central control by NCS. Stations can call each other directly.
  - Directed (Formal): NCS prioritizes radio traffic by nature of the message and priority.
    - NCS runs all net operations.
    - Stations cannot interrupt unless directed by NCS or for emergencies.
    - Tactical call signs will probably be used.

Directed Net Operations

- **'Check-in' at two times:**
  - When you first join the net (listen to the net and respond when the NCS asks for check-ins).
  - When you have messages to send.
- **Examples**
  - Check-in
    - NCS: 'this net is open for check-ins'.
    - Radio operator: 'this is Checkpoint 2, OVER'.
  - Sending a message
    - Radio operator: 'Checkpoint 2, OVER'.
    - NCS: 'Go ahead Checkpoint 2'.
    - Radio operator: 'Checkpoint 2 with a priority message for North Shelter …OVER'

Note that Radio Operator does not continue until directed by Net Control

Operational Security (OPSEC)

- Radio communication is not Private!
- Do not broadcast any information which identifies individual Team Participants or members of the general public.
- Do not disclose mission details before, during or after the event.
- Use assigned tactical call signs
- Use assigned Functional Designators instead of actual locations.
- Maintain all mission documentation in a secure manner.

24-hour Clock

AM/PM	24-hr time
Midnight	24:00
1:00 AM	01:00
2:00 AM	02:00
3:00 AM	03:00
4:00 AM	04:00
5:00 AM	05:00
6:00 AM	06:00
7:00 AM	07:00
8:00 AM	08:00
9:00 AM	09:00
10:00 AM	10:00
11:00 AM	11:00
Noon	12:00
1:00 PM	13:00
2:00 PM	14:00
3:00 PM	15:00
4:00 PM	16:00
5:00 PM	17:00
6:00 PM	18:00
7:00 PM	19:00
8:00 PM	20:00
9:00 PM	21:00
10:00 PM	22:00
11:00 PM	23:00
Midnight	24:00

12:45 am	0045 hrs	Zero zero four five hours
12 noon	1200 hrs	One two zero zero hours
11:45 PM	2345 hrs	Two three four five hours
12 midnight	2400 hrs	Two four zero zero hours

Amateur Radio (ham radio)

- **Long(er) Range**
- **Widely available**
- **Moderately priced**
  - Licensing is easy and essentially free.
- **Reliable**
- **Easy to use**
  - Some radios and operating methods can be complex.
- **Several classes of licenses with varying permissions**
  - Technician class = introductory license. No Morse Code necessary!
  - General class and above have more frequencies and modes available.
  - Technician licensing class in Chatham Co later this fall.

Amateur Radio

Pros

- **Long-range**
- **Reliable**
- **Thousands of frequencies**
- **Increase power output**
- **Can use antennas**
- **Can listen-only for emergency information**

Cons

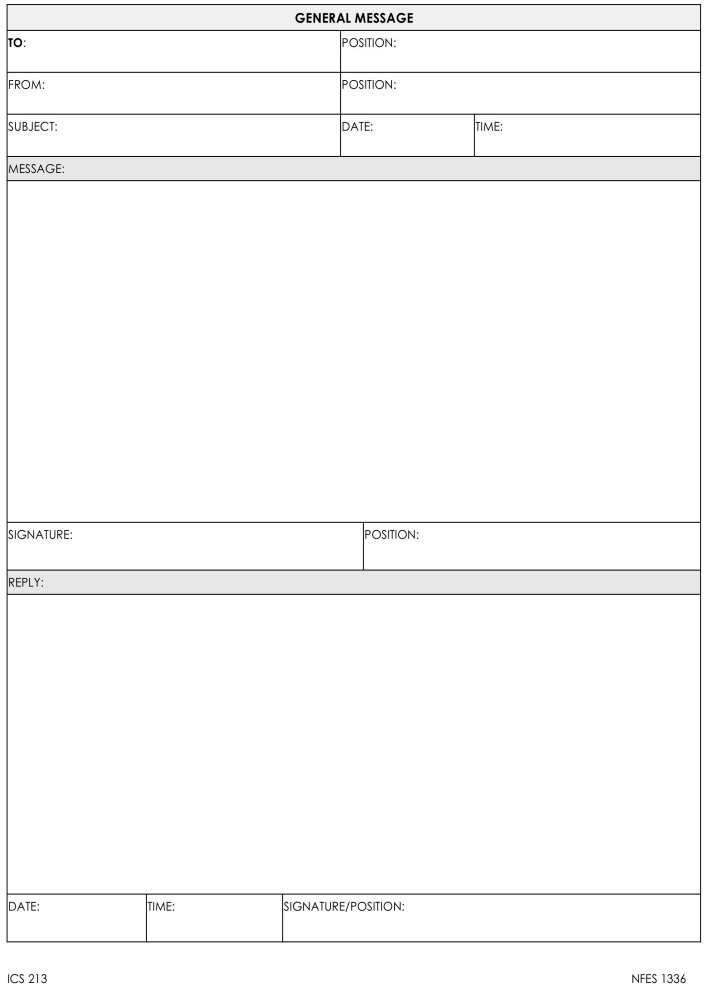
- **You need a license (free, but must pass a basic test)**
- **May be more challenging to operate (since they are more powerful)**
- **A bit more expensive than FRS / GMRS radios**
- **Just the idea may be intimidating**

Ham Radio Recommendations

1. **Get an FCC technician license.**
   - We are planning a basic class later this year.
   - **Study on your own**
     - HamStudy.org
     - No Nonsense Study Guide https://www.kb6nu.com/study-guides/
     - Practice exams http://arrlexamreview.appspot.com
   - **Take the test** http://www.arrl.org/find-an-amateur-radio-license-exam-session
2. **Find a inexpensive (new or used) dual-band (2M / 70CM) handheld radio ("HT").**
3. **Get involved and practice!**

AUXCOMM (Formal Emergency Comm)

- **AUXCOMM is a system of formal procedures used during emergencies**
- **Participant Requirements:**
  - Amateur Radio license
  - Complete IS100, IS200, IS700, IS800 courses
  - Understand formal message traffic (ICS213 messages)
- **Chatham Co AUXCOMM (NC4CH*) will hold Directed Nets and handle all traffic during emergencies.**
- **We need interested CERT volunteers to support the EOC AUXCOMM systems - Contact Nick or John**



GENERAL MESSAGE			
TO:	POSITION:		
FROM:	POSITION:		
SUBJECT:	DATE:	TIME:	
MESSAGE:			
SIGNATURE:	POSITION:		
REPLY:			
DATE:	TIME:	SIGNATURE/POSITION:	

ICS 213 NFES 1336

*Callsign is pending

North Carolina Emergency Comms

Voice Interoperability Plan for Emergence Responders (VIPER)

- The North Carolina statewide emergency radio network
- VIPER links public safety, emergency response, medical facilities and emergency operations.
- Used by professional emergency responders – never used by CERT teams unless specifically authorized.
- For more information see http://smrs.emspic.org/viper/.

Call exercises – Practice!

- **You are calling Chatham EOC, and you will initiate the call.**
  - NC4CH, this is North Shelter, over.
  - NC4CH, over.
  - NC4CH, this is North Shelter. Send 22 stretchers, needed by 1800 hours tonight.
  - North Shelter, this is NC4CH. I copy 22 stretchers, needed by 1800 hours tonight.
  - NC4CH, this is North Shelter. Read back is correct. Out.
- **The NCS is calling you, and initiates the call.**
  - Checkpoint One this is Net Control, over.
  - Net Control, this is Checkpoint One, over.
  - Checkpoint One, this is Net Control. You may close down your checkpoint, over.
  - Net Control, this is Checkpoint One. Wilco, over.
  - Checkpoint One, this is Net Control. Out.

What you should do now

- Prepare your Family Communications Plan and practice it
- Sign up for chathamnc.org/codered to get emergency notifications
- Get and use a weather radio and program it for your location
- Bookmark the Chatham CERT website, and follow CERT Facebook and Twitter
- Get and practice with an FRS / GMRS radio
- Study for and pass your Amateur Radio Technician License
- Purchase an inexpensive HT radio
- Practice! Call in to weekly SKYWARN sessions, chat with other ham radio operators, communicate with family and friends
- Set up Zello on your phone and join the ‘Chatham CERT’ group
  - Practice Zello with family members; we will practice at CERT meetings.
  - Can also use for intra-family communications.

Technician License Classes

- **Get your first Amateur Radio License – the Technician Class.**
- **Three class session:**
  - 9:00 AM to Noon
  - October 6, 13, 20
  - Chatham County Emergency Operations Center
- **Exam session**
  - 9:00 AM, October 27
  - Chatham County Emergency Operations Center
  - Open to class attendees and walk-ins for all classes of Amateur License exams

Additional Information

Radio Frequency Chart

	FRS	GMRS	Ham	Public Safety
Frequency Band	462 MHz UHF	462 & 467 MHz UHF	HF, VHF, UHF, Microwave	Low Band VHF, VHF, UHF
FCC CFR 47	Part 95	Part 95	Part 97	Part 90
License Fee / Test	None	Fee $70 / 10 yrs	Test $15	Fee
Bandwidth	Wide	Wide	Both	Narrow
Repeater use	No	Yes	Yes	Yes
Max transmit power	0.5 watts	50 watts	1,000 watts	110 watts
Channels / Bandwidth	14	23	May	1400
External antenna allowed	No	Yes (unless combined FRS/GMRS radio)	Yes	Yes
Location Specific Use	No	No	No	Yes
Comments	Very low transmit power; inexpensive	Good for portable and mobile comms. Small antenna	Local & worldwide. Amateur use only.	DO NOT USE unless authorized.

FRS / GMRS Channels

- **Channels 1 – 7**
  - Shared between FRS and GMRS.
  - No license needed when operating at lower power levels
- **Channels 8 – 14**
  - FRS only channels, low power. No license needed.

CERT teams will mostly use these channels.

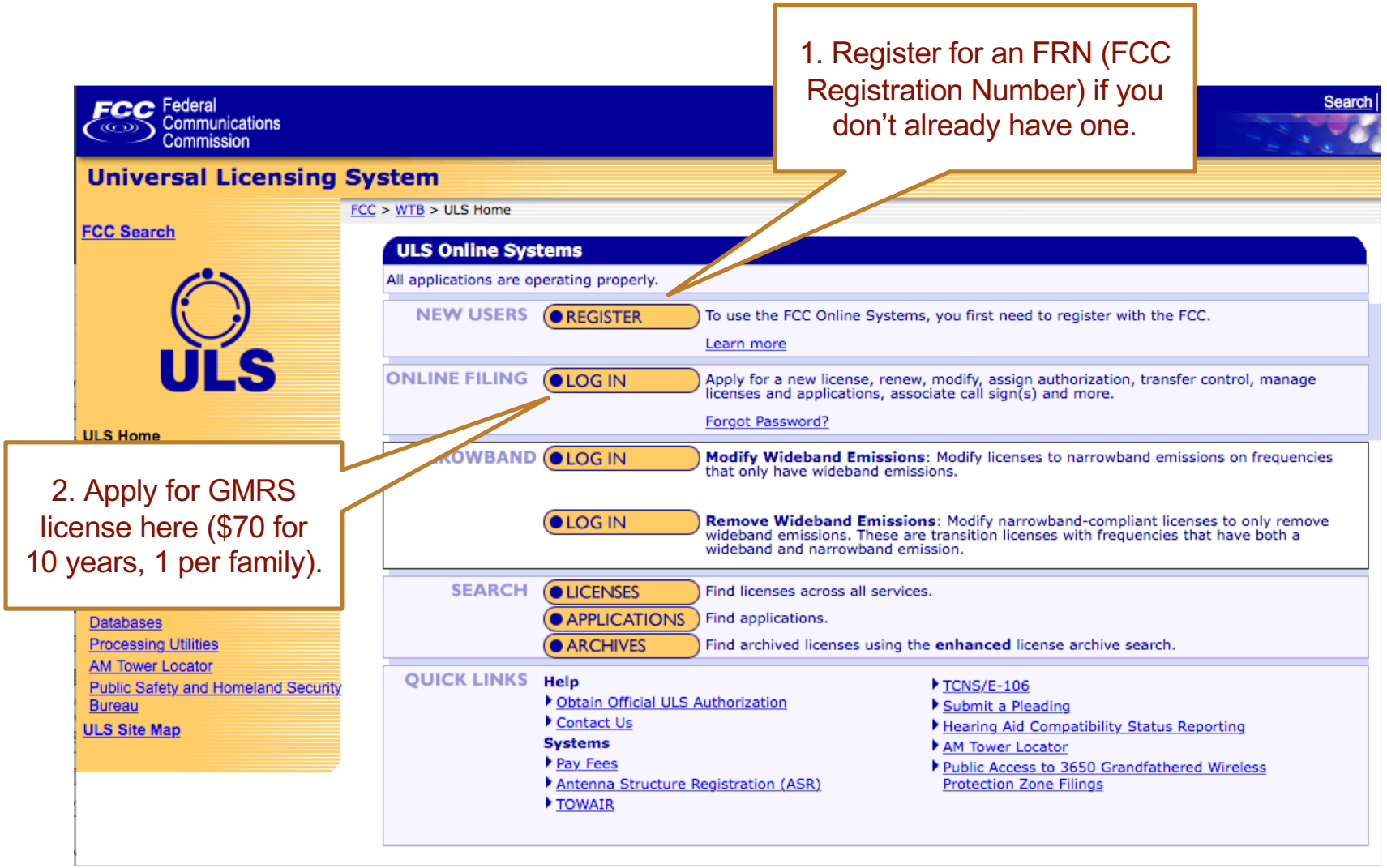
- **Channels 15 – 22**
  - GMRS only channels. Higher power allowed.
  - ➢ ***Requires a license***.

- **GMRS License**

  Apply for an FCC Registration Number at
  http://wireless.fcc.gov/uls/index.htm?job=home

Apply for GMRS License

http://wireless.fcc.gov/uls/index.htm?job=home



ICS Form 205 Comm Plan

INCIDENT RADIO COMMUNICATIONS PLAN (ICS 205)

1. Incident Name:	2. Date/Time Prepared: Date: Time:	3. Operational Period: Date From: Date To: Time From: Time To:

4. Basic Radio Channel Use:

Zone Grp.	Ch #	Function	Channel Name/Trunked Radio System Talkgroup	Assignment	RX Freq N or W	RX Tone/NAC	TX Freq N or W	TX Tone/NAC	Mode (A, D, or M)	Remarks

5. Special Instructions:

6. Prepared by (Communications Unit Leader): Name: _____ Signature: _____

ICS 205	IAP Page _____	Date/Time: _____

ICS Form 205 provides information on radio frequencies.

ICS Form 205a Com List

COMMUNICATIONS LIST (ICS 205A)

1. Incident Name:	**2. Operational Period:** Date From: Date To: Time From: Time To:

3. Basic Local Communications Information:

Incident Assigned Position	Name (Alphabetized)	Method(s) of Contact (phone, pager, cell, etc.)

4. Prepared by: Name: _____ Position/Title: _____ Signature: _____

ICS 205A | **IAP Page** _____ | Date/Time: _____

ICS Form 205A records methods of communicating with incident personnel.

Chatham Co – OCRA Repeater Use

- **Chatham County Emergency Management has an agreement with the Orange County Radio Association (OCRA) to use the OCRA repeater for emergencies and for training**
  - Chatham County licensed radio amateurs may operate for training and emergency purposes on the 442.150 repeater
  - Operations for emergency incidents do not require prior notice.
  - Regularly scheduled nets or planned drills should be coordinated with OCRA via the Chatham CERT and AUXCOMM coordinators.
  - During normal (non scheduled or emergency) usage, the repeater is an open repeater for all amateur radio operators following repeater etiquette guidelines.

Amateur Radio Operators:
Support OCRA by joining the association at *http://ncocra.org/WordPress_v1/*