Emergency Communication

Family plan

- Print off all phone contacts
- Make small card with contact numbers
- Identify place where to meet if communication is cut off
- Site specific plan: schools, work, etc
- Out of area contact
- Emergency radios
    - FRS(0.5w)/GMRS (5w)1-7
    - FRS 8-14
    - GMRS 15-22

Neighborhood plan

- Get to know your neighbors
- Know your neighbors skills
- Know contact information for neighbors
- Radio channel on radio
    - Ch1 National call distress
    - Ch 11(National drill channel)
    - Ch 7 Alternate channel
- Alternate communication (Flags)
- Communication with Region (County)
    - Designate someone
- Identify someone with advance radio skills to coordinate with larger community

Identify options for common scenarios

- Earthquake (local vs regional)
    - Regional communication disrupted. Tower misaligned
- Volcano
    - Most communication disrupted
    - Earthquakes common
- Nuclear
    - Most communication disrupted initially
- Flooding
    - Most communication intact
- Refugees from earthquake on the west side. Communications overwhelmed

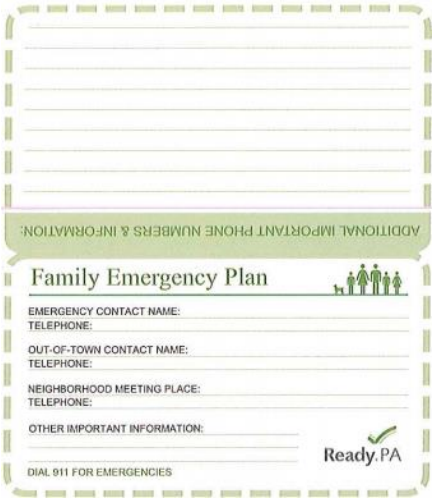
Community Plan

- Know emergency listening channels
- Know community contacts
    - Personal “Team” members
    - Who would you call if you had 30 min notice? (Solar Bouy)
- Have contacts printed out
- Binder with information
- Battery chargers

Regional plan

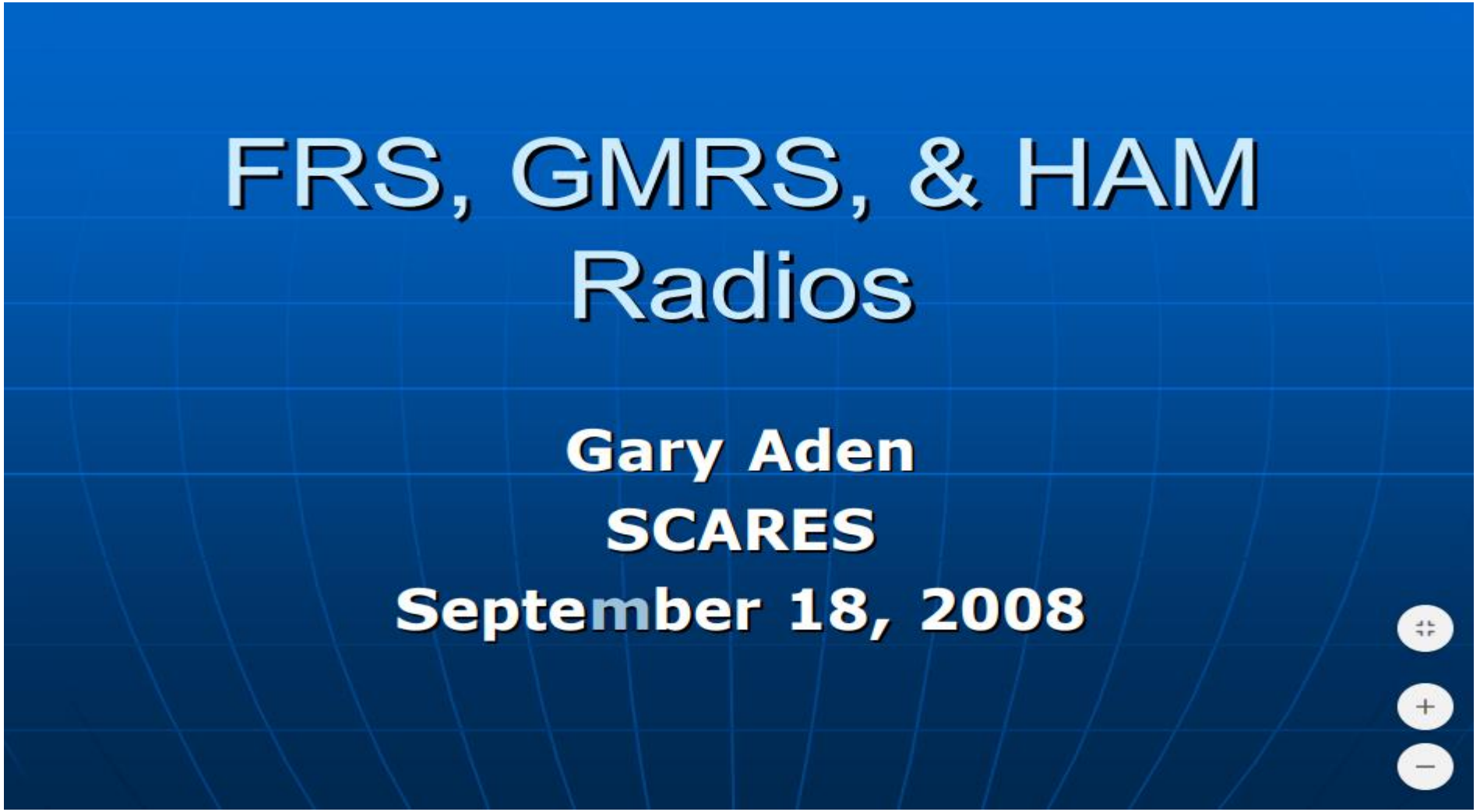
- Extended band receiver
- Ham Radio (consider getting license)
    - Extended network
    - LDS church network
- CB radio
- GoTenna Mesh network (New)

Get Started!!!



Emergency Radio Communication Options

Full talk is available on approachingready.com



Outline

- Family Radio Service (FRS)
- General Mobile Radio Service (GMRS)
- Amateur Radio (HAM)
- Hybrid Radios (FRS/GMRS)
- FRS/GMRS Radio Frequencies
- Codes (tones)
- CERT & Radios
- Deployment example

FRS
Family Radio Service

- **The Family Radio Service (FRS) is a unlicensed walkie talkie radio system**
  - **FRS radios are compact, handheld, wireless 2-way radios**
  - **FRS radios provide very good clarity over a relatively short range**
  - **FRS is a license free radio service**


Garmin


ICOM


Midland


Cobra


Uniden


Motorola

GMRS

General Mobile Radio Service

- **The General Mobile Radio Service (GMRS) is a licensed walkie talkie or base station radio system**
  - **GMRS radios are typically handheld portable devices much like FRS radios, and share some frequencies with FRS**
  - **GMRS radios provide very good clarity over a slightly longer range than FRS**
  - **GMRS is a licensed radio service ($85/5 years)**

Note: A Ham radio license does not cover GMRS frequencies

Motorola

CB/ Marine Band radios

- 40 Channel frequencies
- Ch 9 for emergency communications
- Ch 19 Most common monitored channel
- May be used for Business or Personal
- No longer needs a license
- 5 mile range on most units

Radio Amateur - HAM

- **The Amateur Radio Service (HAM) is a licensed radio service for many radio bands and many radio types**
  - **CERT teams often use HAM radios that are handheld portable devices call handy talkies (HT's) on the 2M (VHF) or 440 (UHF) bands**
  - **HT radios on these bands provide very good clarity over a much longer range than GMRS**
  - **HAM radio is a licensed radio service that requires passing a test.**

Comparison

FRS

~0.5 mi range*
$15-$80
AA or AAA
No License

GMRS

~1-2 mi range*
$30-$200
AA or NiMH
FCC License

Ham

~5 mi range* **
$100-$400
AA or NiMH
FCC test &
License

* typical range in a city **much farther using repeaters

Dual-Service or Hybrid Radios
FRS/GMRS

- **These common radios provide access to both the FRS and GMRS bands**
  - **FRS channels (1-14) and**
  - **GMRS channels (1-7 & 15-22).**
  - **GMRS channels requires an FCC operator's license.**

- **These radios may be used without a license, if ...**
  - **the "FRS only" channels (8-14) are used, or**
  - **channels 1-7 are used on low power (<0.5 w)**

FRS Summary

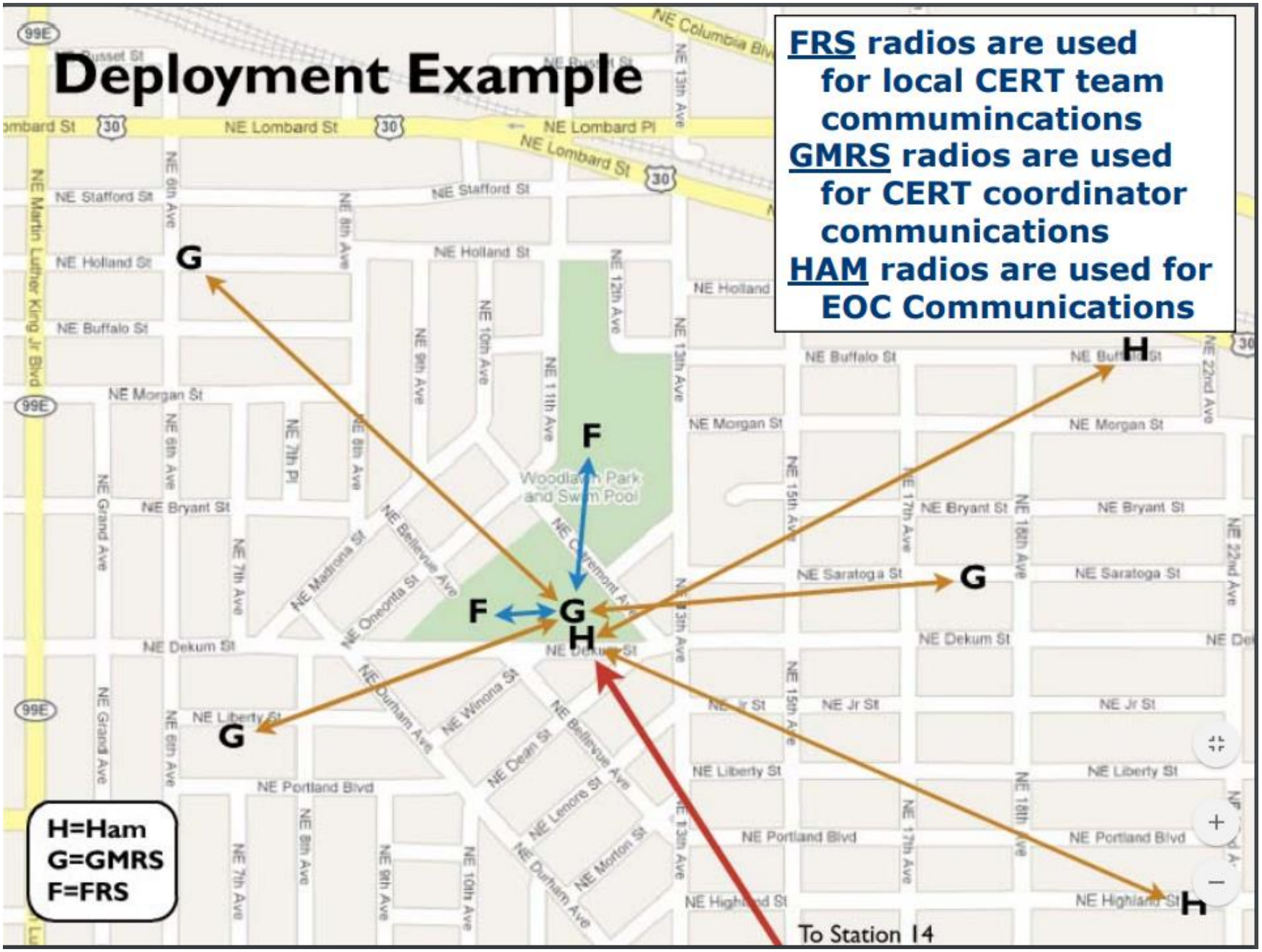
- License
  - None
- Pros
  - Simple Operation
  - Inexpensive
  - Plentiful
  - No license required
  - Shares frequencies with GMRS
- Cons
  - Poor range in urban areas
  - Interference from other FRS/GMRS users
  - Not usually rugged or waterproof
- Uses
  - Intra-Field Team Communications
  - Staging Area Communications

GMRS Summary

- **License**
  - $85 for 5-year FCC license
- **Pros**
  - Simple Operation
  - Inexpensive
  - Plentiful
  - Shares frequencies with GMRS
  - Pro-grade radios available
  - License requires no test
- **Cons**
  - Limited range in urban areas
  - Interference from other FRS/GMRS users
- **Uses**
  - Command/Field Team Communications
  - Intra-Field Team Communications
  - Staging Area/Logistics Communications

HAM Summary
(Amateur Radio Service)

- **License**
  - $14/Exam for 10 year FCC license
- **Pros**
  - Quality construction
  - Compatible with City systems
  - Many frequencies & longer range
  - Powerful mobile & base station units available
- **Cons**
  - Complicated operation
  - Exam required
  - Expensive
- **Uses**
  - Command / EOC / FMZ (fire management zone)
  - Command / Field Team
  - Health & Welfare


Deployment Example
FRS radios are used for local CERT team communincations
GMRS radios are used for CERT coordinator communications
HAM radios are used for EOC Communications
H=Ham
G=GMRS
F=FRS
To Station 14
NE Lombard St
NE Stafford St
NE Holland St
NE Buffalo St
NE Morgan St
NE Bryant St
NE Saratoga St
NE Dekum St
NE Liberty St
NE Portland Blvd
NE Jr St
NE Highland St
NE Martin Luther King Jr Blvd
NE Grand Ave
NE 6th Ave
NE 7th Ave
NE 8th Ave
NE 9th Ave
NE 10th Ave
NE 11th Ave
NE 12th Ave
NE 13th Ave
NE 15th Ave
NE 17th Ave
NE 18th Ave
NE 22nd Ave
Woodlawn Park and Swim Pool
NE Bellevue Ave
NE Durham Ave
NE Dean St
NE Lenore St
NE Morton St
NE Winona St
NE Madrona St
NE Oneonta St
NE 7th Pl

FRS, GMRS, & HAM Radios

Gary Aden
SCARES
September 18, 2008

Outline

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- Deployment example

FRS
Family Radio Service

- The **Family Radio Service** (FRS) is a unlicensed walkie talkie radio system
  - FRS radios are compact, handheld, wireless 2-way radios
  - FRS radios provide very good clarity over a relatively short range
  - FRS is a license free radio service


Garmin


ICOM


Midland


Cobra


Uniden


Motorola

FRS
key features

- Uses “channelized” frequencies in the ultra high frequency (UHF) band. Operate on any of 14 dedicated channels (1-14)
- Is quiet and clear because it uses frequency modulation (FM) instead of amplitude modulation (AM).
- Has limited range (~0.5 mi) because
  - They have a maximum allowable power of 1/2 watt, and
  - They have a fixed small (poor) antenna

Note: FRS Radio transceivers and their antennas may not be modified to extend their range.

FRS radio distinctions:

1) Unlike with CB (citizens band), Ham radios, and most other 2-way radios, there is no license required to use an FRS radio.
2) There are no fees for usage, airtime or per-call charges. (Aside from the cost of batteries, they are virtually free to use.)

GMRS

General Mobile Radio Service

- The **General Mobile Radio Service** (GMRS) is a licensed walkie talkie or base station radio system
  - GMRS radios are typically handheld portable devices much like FRS radios, and share some frequencies with FRS
  - GMRS radios provide very good clarity over a slightly longer range than FRS
  - GMRS is a licensed radio service ($85/5 years)

Note: A Ham radio license does not cover GMRS frequencies

Motorola

GMRS
key features

- Uses “channelized” frequencies in the ultra high frequency (UHF) band. Operate on any of 15 dedicated channels (1-7, & 15-22)
- Is quiet and clear because it uses frequency modulation (FM) instead of amplitude modulation (AM).
- Has slightly longer range (~1-2 mi) because
  - HT’s have a typical power of 1-5W, but
  - Still have a small antenna (sometimes removable)

Note: GMRS Base stations can have power up to 50W (on channels 15-22) and may use an external, gain antenna.

GMRS

- Is intended for use by an individual who possesses a valid GMRS license, as well as his or her immediate family members.
  - FCC definition of immediate family includes a spouse, children, parents, grandparents, aunts, uncles, nephews, nieces, and in-laws
  - Immediate relatives of the GMRS system licensee are entitled to communicate among themselves for personal or business purposes.
  - Employees or friends of the licensee, who are not family members, may not use this service.
- There is no longer a GMRS license available for clubs or groups.

Radio Amateur - HAM

- The **Amateur Radio Service** (HAM) is a licensed radio service for many radio bands and many radio types
  - CERT teams often use HAM radios that are handheld portable devices call handy talkies (HT's) on the 2M (VHF) or 440 (UHF) bands
  - HT radios on these bands provide very good clarity over a much longer range than GMRS
  - HAM radio is a licensed radio service that requires passing a test.

Comparison

FRS

~0.5 mi range*
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FCC License

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FCC test &
License

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Dual-Service or Hybrid Radios
FRS/GMRS

- These common radios provide access to both the FRS and GMRS bands
  - FRS channels (1-14) and
  - GMRS channels (1-7 & 15-22).
  - GMRS channels requires an FCC operator's license.

- These radios may be used without a license, if ...
  - the "FRS only" channels (8-14) are used, or
  - channels 1-7 are used on low power (<0.5 w)

FRS/GMRS Shared Frequencies
(Ch 1-7, GMRS 5w max power)

Name	Frequency (MHz)	Motorola convention	Icom F21-GM convention
"FRS 1" or "5625"	**462.5625**	** **Ch. 1** **	**Ch. 9**
"FRS 2" or "5875"	**462.5875**	**Ch. 2**	**Ch. 10**
"FRS 3" or "6125"	**462.6125**	**Ch. 3**	**Ch. 11**
"FRS 4" or "6375"	**462.6375**	**Ch. 4**	**Ch. 12**
"FRS 5" or "6625"	**462.6625**	**Ch. 5**	**Ch. 13**
"FRS 6" or "6875"	**462.6875**	**Ch. 6**	**Ch. 14**
"FRS 7" or "7125"	**462.7125**	**Ch. 7**	**Ch. 15**

** National Call/Distress Channel by REACT & National SOS Radio Network

FRS Only Frequencies
(Ch 8-14*, 0.5w max)

Channel	Frequency	Notes
FRS 8	**467.5625**	FRS use only
FRS 9	**467.5875**	FRS use only
FRS 10	**467.6125**	FRS use only
FRS 11	**467.6375**	FRS use only National Drill Channel
FRS 12	**467.6625**	FRS use only
FRS 13	**467.6875**	FRS use only
FRS 14	**467.7125**	FRS use only

* Great channels for CERT, no license needed on any radio

GMRS Only Frequencies
(Ch 15-22, GMRS up to 50w)

Name	Simplex frequency (MHz) Repeater output	Repeater input (MHz)	Motorola convention	Icom F21-GM convention
"550"	462.550	467.550	Ch. 15	Ch. 1
"575"	462.575	467.575	Ch. 16	Ch. 2
"600"	462.600	467.600	Ch. 17	Ch. 3
"625"	462.625	467.625	Ch. 18	Ch. 4
"650"	462.650	467.650	Ch. 19	Ch. 5
"675"	462.675	467.675	Ch. 20	Ch. 6
"700"	462.700	467.700	Ch. 21	Ch. 7
"725"	462.725	467.725	Ch. 22	Ch. 8

Codes (Tones) 1 of 4

Tone	Cobra 250/300	Cherokee 465	Midland 75-510	Motorola Sport	Motorola TalkAbout	Radio Shack
67.0	1	1	1		1	1
69.3		2				
69.4						2
71.9	2	3	2		2	3
74.4	3	4	3		3	4
77.0	4	5	4	A	4	5
79.7	5	6	5		5	6
82.5	6	7	6		6	7
85.4	7	8	7		7	8
88.5	8	9	8	B	8	9
91.5	9	10	9		9	10
94.8	10	11	10		10	11
97.4	11	12	11	C	11	12

Codes (Tones) 2 of 4

Tone	Cobra	Cherokee	Midland	Motorola Sport	Motorola TalkAbout	Radio Shack
100.0	12	13	12		12	13
103.5	13	14	13		13	14
107.2	14	15	14	D	14	15
110.9	15	16	15		15	16
114.8	16	17	16		16	17
118.8	17	18	17	E	17	18
123.0	18	19	18		18	19
127.3	19	20	19	F	19	20
131.8	20	21	20		20	21
136.5	21	22	21	G	21	22
141.3	22	23	22		22	23
146.2	23	24	23		23	24
151.4	24	25	24		24	25

Codes (Tones) 3 of 4

Tone	Cobra	Cherokee	Midland	Motorola Sport	Motorola TalkAbout	Radio Shack
156.7	25	26	25		25	26
159.8		27				27
162.2	26	28	26		26	28
165.5						29
167.9	27	29	27		27	30
171.3						31
173.8	28	30	28		28	32
177.3						33
179.9	29	31	29		29	34
183.5		32				35
186.2	30	33	30		30	36
189.9		34				37
192.8	31	35	31		31	38

Codes (Tones) 4 of 4

Tone	Cobra	Cherokee	Midland	Motorola Sport	Motorola TalkAbout	Radio Shack
196.6		36				
199.5		37				
203.5	32	38	32		32	
206.5		39				
210.7	33	40	33		33	
218.1	34	41	34		34	
225.7	35	42	35		35	
229.1		43				
233.6	36	44	36		36	
241.8	37	45	37		37	
250.3	38	46	38		38	
254.1		47				

CERT & Radios

- FRS are great radios for CERT teams
  - Radio communication within the team
  - Radio comms with CERT local command
  - Follow simple “FRS Radio Basics”
  - Do not use codes (tones) use “separation”
- BUT - most “blister pack” Radios sold today are dual purpose (FRS/GMRS) and CERT trailers and teams will most likely have this type, so…
  - Assign & Practice with FRS only channels (8-14)
  - Do not use the GMRS frequencies unless all (or key) team members have a GMRS license

Ham & FRS/GMRS

Ham radios

- Are excellent for communications from CERT team “monitors” to the local, city or county EOC’s (Emergency Operation Center)
- Can monitor all FRS/GMRS frequencies
  - Can be set to scan all frequencies
  - Excellent for monitoring multiple teams
- Cannot be used to communicate to the teams on FRS or GMRS frequencies

FRS Summary

- **License**
  - None
- **Pros**
  - Simple Operation
  - Inexpensive
  - Plentiful
  - No license required
  - Shares frequencies with GMRS
- **Cons**
  - Poor range in urban areas
  - Interference from other FRS/GMRS users
  - Not usually rugged or waterproof
- **Uses**
  - Intra-Field Team Communications
  - Staging Area Communications

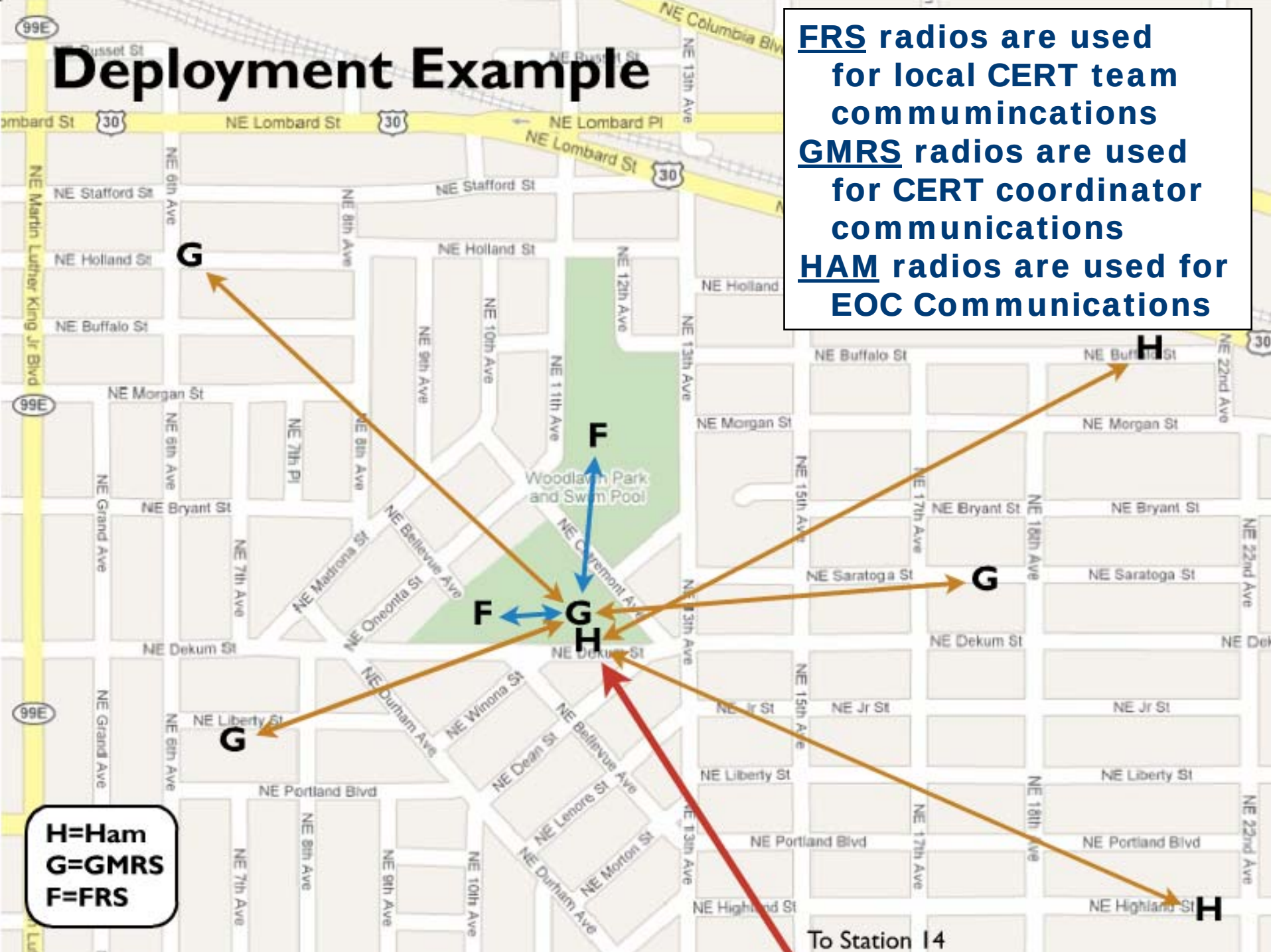
GMRS Summary

- **License**
  - $85 for 5-year FCC license
- **Pros**
  - Simple Operation
  - Inexpensive
  - Plentiful
  - Shares frequencies with GMRS
  - Pro-grade radios available
  - License requires no test
- **Cons**
  - Limited range in urban areas
  - Interference from other FRS/GMRS users
- **Uses**
  - Command/Field Team Communications
  - Intra-Field Team Communications
  - Staging Area/Logistics Communications

HAM Summary
(Amateur Radio Service)

- **License**
  - $14/Exam for 10 year FCC license
- **Pros**
  - Quality construction
  - Compatible with City systems
  - Many frequencies & longer range
  - Powerful mobile & base station units available
- **Cons**
  - Complicated operation
  - Exam required
  - Expensive
- **Uses**
  - Command / EOC / FMZ (fire management zone)
  - Command / Field Team
  - Health & Welfare

Deployment Example



END

- Q&A
- Hands On

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