

South County ARES

A decorative graphic consisting of overlapping yellow, red, and blue squares with a black crosshair, positioned in the upper left corner of the slide.

Understanding Radio Communications

By
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South County ARES
16 March 2011



South County ARES ?

- Amateur Radio organization since 1972
- Affiliated with ARRL (National Org of Hams)
- ARES = Amateur Radio Emergency Service
- Members provide backup communications for Southern San Mateo County, (city affiliations, PD)
- Provide Training – Radio use, messages
- Many CERT members with Ham licenses
- Provide communications for non-profit events
- Website: K6MPN.org



Communications Outline

- Frequencies available, radios to use, capabilities/limitations, local established customs
- Show and tell – radios available – how to use the radios – communications planning, ICS, nets and tactical call signs
- Message handling (formal vs. informal), ARRL Radio-Gram, ICS: IC-213
- Practice
- Q & A



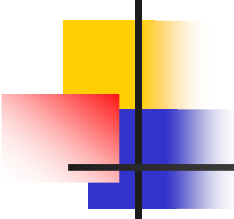
The RF Spectrum

- **HF** – from broadcast to Shortwave
1 MHz to 30 MHz (local, world-wide)
- **VHF** – TV(low), FM, Ham 2m, Marine, Fire
50 MHz to 200 MHz (line of sight)
- **UHF** – TV(high), Ham 70cm, FRS, GMRS,
Police
400 MHz to 500 MHz (line of sight)



Radios

Show and Tell





Radios – Frequencies to Use, Service Advantages - Limitations

- FRS – UHF, line of sight, low power (0.5 W) 14 channels, 1-2 mile range, fixed antennas, **no license required**
- GMRS – UHF, line of sight, higher power (5 W) 7+ channels, **license required (no test) (\$85/5 y)** (family), external antenna capability, repeaters
- Amateur Radio (Ham), many frequencies available, VHF, UHF, line of sight, repeaters, >50W , external antennas, very versatile, **license required (technical test), ~\$30**



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



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



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



GMRS/FRS Frequencies

Channel		Channel		Channel	
GRMS only	repeater out	GMRS/FRS		FRS only	repeater in
15	462.5500				467.5500
	462.5625	1		8	467.5625
16	462.5750				467.5750
	462.5875	2		9	467.5875
17	462.6000				467.6000
	462.6125	3		10	467.6125
18	462.6250				467.6250
	462.6375	4		11	467.6375
19	462.6500				467.6500
	462.6625	5		12	467.6625
20	462.6750				467.6750
	462.6875	6		13	467.6875
21	462.7000				467.7000
	462.7125	7		14	467.7125
22	462.7250				467.7250



Amateur Radio

Typical bands for local communications

- 2 meter (144 – 148 MHz)
Very common, HT (~ \$130) or mobile, every Ham has a 2m HT (first radio), entry license required, line of sight range, many repeaters, use for wide area communications.
- 70 cm (440 – 450 MHz)
Shorter range than 2m, usually combined with 2m in a dual band radio, entry license required, line of sight, repeaters restricted, use for local communications.
- Dual band recommended (2m, 70cm)
SCARES: 70cm Resource Net, 2m Tactical Net
or Listen to FRS/GMRS, 2m Tactical Net
- Amateur Radio: Versatile - external gain antennas, amplifiers, repeaters, mobile, many accessories.

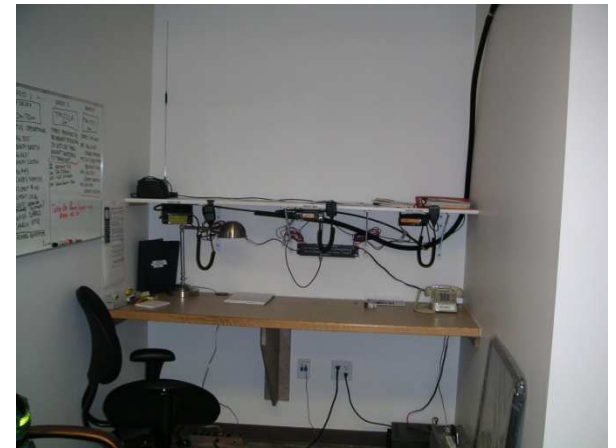


Band Utilization

- No license: **FRS**
- Pay fee (~\$85/5 yr), No test, higher power: **GMRS**
- Technical test, One time fee (~\$30), versatile: **Amateur Radio**

Radio Installations

South County ARES





What HT radio to buy?

- Topic is **EXTREMELY SUBJECTIVE**
- **FRS**: see below
- **GMRS**: Midland GXT1000/1050 family radios (suggested by San Mateo CERT), AA batteries, GMRS or FRS, see Fry's for deals
- **Ham**: **2m** – Yaesu FT-250, Icom V-80
Dual Band (2m, 70cm): Yaesu FT-60, Icom T-70 (buy AA battery pack, after-market HT antenna, external mag-mount antenna)



What mobile Ham radio to buy?

- Radio, 12V power supply, antenna, cable
- Most groups are standardizing on Yaesu
- In order of \$\$ available:
 - Yaesu – FT-8900 quad band, 10m, 6m, 2m, 70cm
 - Yaesu – FT-8800 dual band, 2m, 70 cm (VHF **and** UHF)
 - Yaesu – FT-7900 dual band, 2m, 70 cm (VHF **or** UHF)
 - Yaesu – FT-1900 2m
- Antenna depends on bands of radio, buy at least a 2m, 70 cm (Base: Diamond DX-50)

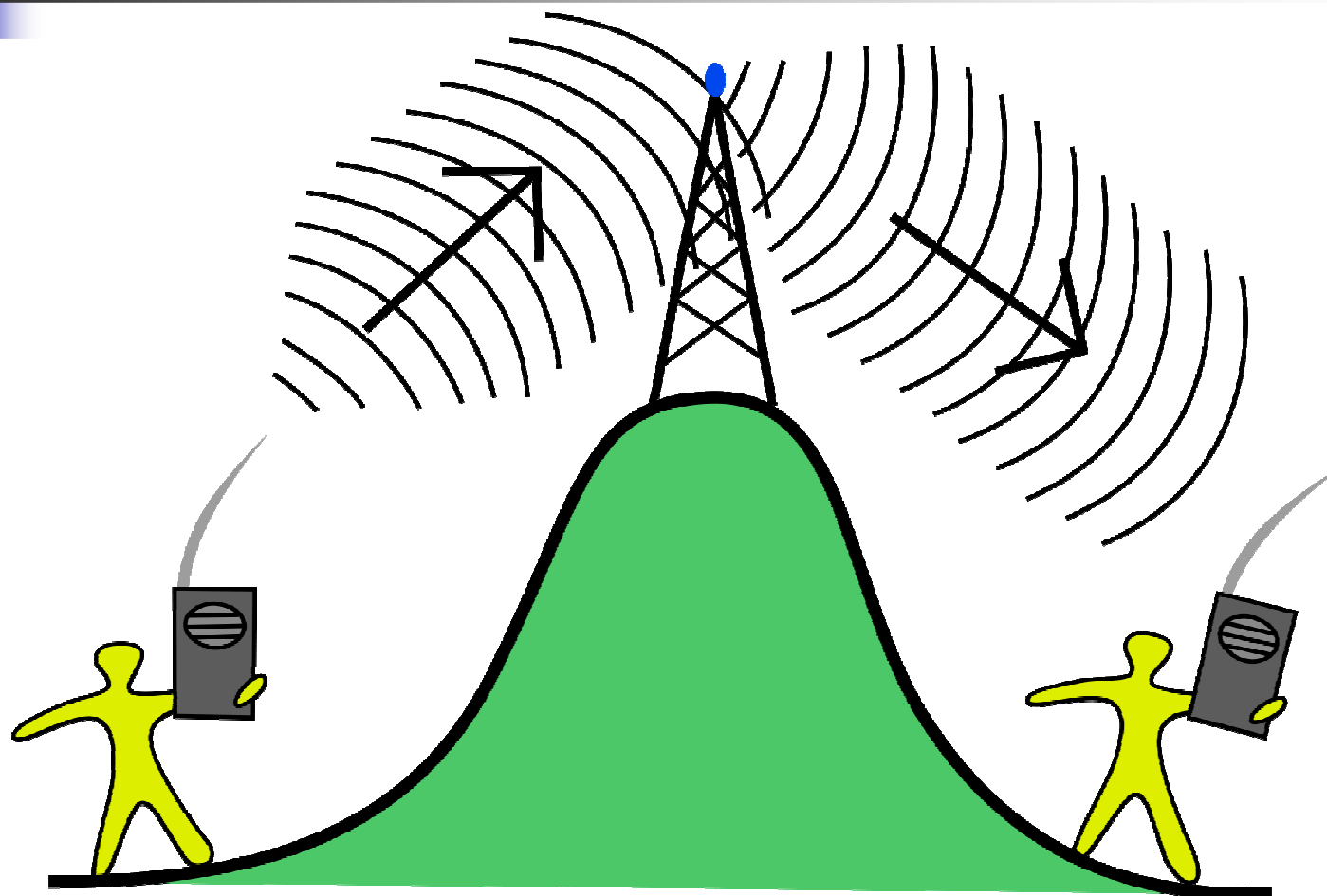


Radio Usage

- Read the radio manual
- Determine the local frequencies to use
- Setting the frequency: 146.52s (simplex, Tx-Rx same frequency)
- Setting the offset for repeaters - **REPEATERS?**
146.865-, 147.09+ (2m: +/- 0.6 MHz)
- Setting the CTCSS (sub-audible tone, PL)
146.865- PL 114.8, 147.09+ PL 100
- Store favorites in MEMORY
- (Buy the programming software, Ham only)



Repeater: Receives on F1 Transmits Simultaneously on F2





SCARES UHF Repeater on Kaiser Hospital RWC

Receives on 449.5 MHz, PL 100 Hz
Transmits on 444.5 MHz, PL 100 Hz



San Mateo County Frequencies

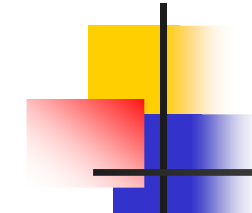
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San Mateo County Sheriff's Office of Emergency Services								
Comment	Frequency	Offset	Display	Resource Name	Tone Mode	CTCSS	Reviewed By/Date	Notes
SMCo. South Pri. Net - South	146.865	Minus	865-S	KC6ULT	T Sql	114.8	D.Bennett 4/1/2009	
SMCo. North Pri. Net - North	146.925	Minus	925-N	WA6TOW	T Sql	114.8	D.Bennett 4/1/2009	
SMCo. South Pri. Net Direct	146.865	Simplex	865DIR	Simplex	T Sql	114.8	D.Bennett 4/1/2009	
SMCo. North Primary Net Direct	146.925	Simplex	925DIR	Simplex	Tone	114.8	D.Bennett 4/1/2009	
SMCo. South Alt. Net - Unofficial	145.370	Minus		N6ZX	Tone	107.2	B.Dumbar 4/15/2009	
SMCo. UHF Pri. Net - Unofficial	441.100	Plus	UHFPRI	WA6FUL	T Sql	114.8	B.Dumbar 4/15/2009	
SMCo. UHF Alt. Net - Unofficial	440.075	Plus	UHFALT	K6HN	T Sql	114.8	B.Dumbar 4/15/2009	
SMCo. Hospital Net	440.725	Plus	HOSPTEL	WA6AFT	Tone	114.8	B.Dumbar 4/15/2009	
SMCo. OES Tactical Net	147.540	Simplex	OESTAC	Simplex	T Sql	114.8	D.Bennett 4/1/2009	
SMCo. South Tactical	147.495	Simplex	TAC-S	Simplex	T Sql	114.8	New Addition 6/24/2009	Locations South of Highway 92
SMCo. North Tactical	147.465	Simplex	TAC-N	Simplex	T Sql	114.8	New Addition 6/24/2009	Locations North of Highway 92
VHF Back Up Net - Out of County	146.850	Minus		WA6AFT	Tone	162.2	D.Bennett 4/1/2009	
UHF Back Up Net - Out of County	443.725	Plus		N6HWI	T Sql	127.3	D.Bennett 4/1/2009	
Red Cross Local Net	147.420	Simplex	REDCRS	Simplex	Tone	114.8	D.Bennett 4/1/2009	
Bay Area Hospital Net	147.060	Plus	BAHOSP	W6CX	Tone	100.0	D.Bennett 4/1/2009	

Atherton								
Comment	Frequency	Offset	Display	Resource Name	Tone Mode	CTCSS	Reviewed By/Date	Notes
Atherton Tactical	147.555	Simplex	ATH 1	Simplex	T Sql	114.8	K. Dueker 3/29/2009	Shared with EPA, HMB & Menlo Park
Atherton Tactical	146.595	Simplex	ATH 2	Simplex	T Sql	114.8	New Addition 6/24/2009	Shared with EPA & Menlo Park
Belmont								
Comment	Frequency	Offset	Display	Resource Name	Tone Mode	CTCSS	Reviewed By/Date	Notes
Belmont VHF Repeater	147.090	Plus	BELVHF	WB6CKT	Tone	100.0	SCARES	Under Agreement with Nolan Lewis
Belmont Tactical	147.585	Simplex	BELMNT	Simplex	Tone	114.8	New Addition 6/24/2009	Shared with HMB
Brisbane								
Comment	Frequency	Offset	Display	Resource Name	Tone Mode	CTCSS	Reviewed By/Date	Notes
Brisbane Tactical	146.505	Simplex	BRS 1	Simplex	Tone	114.8		Shared in North County
Brisbane Tactical	146.415	Simplex	BRS 2	Simplex	Tone	114.8	New Addition 6/24/2009	Shared in North County
Broadmoor								
Comment	Frequency	Offset	Display	Resource Name	Tone Mode	CTCSS	Reviewed By/Date	Notes
Broadmoor Tactical	146.505	Simplex	BRD 1	Simplex	Tone	114.8		Shared in North County
Broadmoor Tactical	146.415	Simplex	BRD 2	Simplex	Tone	114.8	New Addition 6/24/2009	Shared in North County
Burlingame								
Comment	Frequency	Offset	Display	Resource Name	Tone Mode	CTCSS	Reviewed By/Date	Notes
Burlingame Tactical	147.525	Simplex	BURL1	Simplex	Tone	114.8	D.Bennett 4/1/2009	Shared with Hillsborough
Burlingame Tactical	146.435	Simplex	BURL2	Simplex	Tone	114.8	New Addition 6/24/2009	Shared with Millbrae & Hillsborough
Colma								
Comment	Frequency	Offset	Display	Resource Name	Tone Mode	CTCSS	Reviewed By/Date	Notes
Colma Tactical	146.505	Simplex	COLMA1	Simplex	Tone	114.8		Shared in North County
Colma Tactical	146.415	Simplex	COLMA2	Simplex	Tone	114.8	New Addition 6/24/2009	Shared in North County
Daly City								
Comment	Frequency	Offset	Display	Resource Name	Tone Mode	CTCSS	Reviewed By/Date	Notes
Daly City Tactical	146.505	Simplex	DCY 1	Simplex	Tone	114.8		Shared in North County
Daly City Tactical	146.415	Simplex	DCY 2	Simplex	Tone	114.8	New Addition 6/24/2009	Shared in North County
East Palo Alto (EPA)								
Comment	Frequency	Offset	Display	Resource Name	Tone Mode	CTCSS	Reviewed By/Date	Notes
East Palo Alto Tactical	147.555	Simplex	EPA 1	Simplex	T Sql	114.8	K. Dueker 3/29/2009	Shared with Atherton, HMB & Menlo Park
East Palo Alto Tactical	146.595	Simplex	EPA 2	Simplex	T Sql	114.8	New Addition 6/24/2009	Shared with Atherton & Menlo Park
Foster City								
Comment	Frequency	Offset	Display	Resource Name	Tone Mode	CTCSS	Reviewed By/Date	Notes
Foster City North Area Tactical	147.570	Simplex	FCY-N	Simplex	Tone	114.8	J.Watkins 4/1/2009	
Foster City South Area Tactical	146.565	Simplex	FCY-S	Simplex	Tone	114.8	J.Watkins 4/1/2009	
Foster City Tactical	446.000	Simplex	FCY	Simplex	Tone	114.8	New Addition 6/24/2009	
Half Moon Bay (HMB)								
Comment	Frequency	Offset	Display	Resource Name	Tone Mode	CTCSS	Reviewed By/Date	Notes
Half Moon Bay VHF Repeater	147.285	Plus	HMBVHF	WA6ASD	T Sql	114.8	Web Site 4/15/2009	
Half Moon Bay UHF Repeater	444.900	Plus	HMBUHF	WR6HMB/R	Tone	91.5	Web Site 4/15/2009	
Half Moon Bay Tactical	147.555	Simplex	HMB 1	Simplex	Tone	114.8	Web Site 4/15/2009	Shared with Atherton, EPA, & Menlo Park
Half Moon Bay Tactical	147.585	Simplex	HMB 2	Simplex	Tone	114.8	New Addition 6/24/2009	

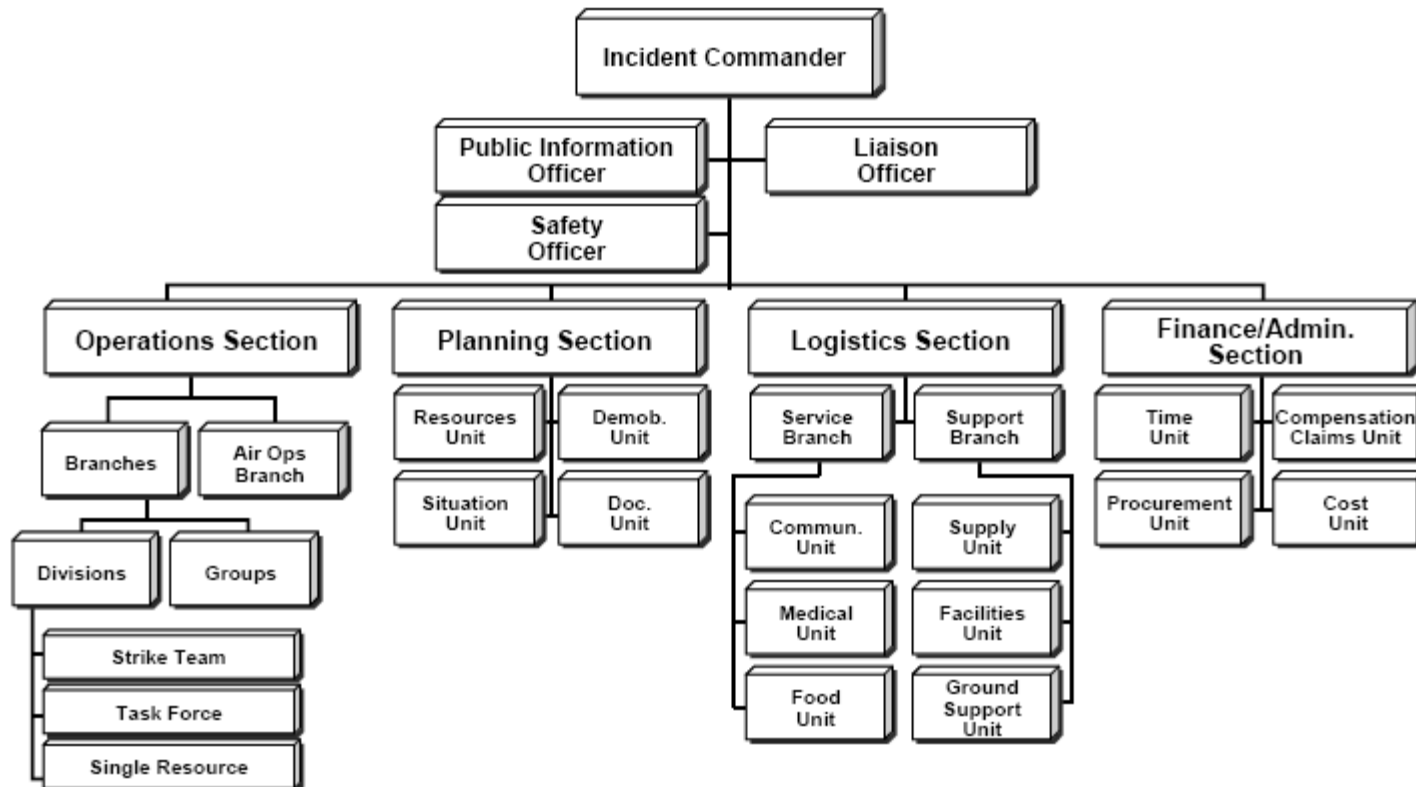
Hillsborough								
Comment	Frequency	Offset	Display	Resource Name	Tone Mode	CTCSS	Reviewed By/Date	Notes
Hillsborough Tactical	147.525	Simplex	HILLSB	Simplex	Tone	114.8	D.Bennett 4/1/2009	Shared with Burlingame
Hillsborough Tactical	146.435	Simplex	BURL	Simplex	Tone	114.8	New Addition 6/24/2009	Shared with Millbrae & Burlingame
Kings Mountain								
Comment	Frequency	Offset	Display	Resource Name	Tone Mode	CTCSS	Reviewed By/Date	Notes
Kings Mountain Tactical	144.345	Simplex	KNGMT1	Simplex	Tone	114.8		
Kings Mountain Tactical	146.475	Simplex	KNGMT2	Simplex	Tone	114.8	New Addition 6/24/2009	
La Honda								
Comment	Frequency	Offset	Display	Resource Name	Tone Mode	CTCSS	Reviewed By/Date	Notes
La Honda VHF Repeater	146.730	Minus	LAHVHF	W6SCF	Tone	114.8	P.Wargo 3/27/2009	
La Honda UHF Repeater	440.100	Plus	LAHUHF	WA6DQP	Tone	114.8	P.Wargo 3/27/2009	
La Honda Tactical	145.565	Simplex	LAHNDA	Simplex	Tone	114.8	P.Wargo 3/27/2009	
Loma Mar								
Comment	Frequency	Offset	Display	Resource Name	Tone Mode	CTCSS	Reviewed By/Date	Notes
Loma Mar Tactical	146.520	Simplex	LOMAMR	Simplex	Tone	114.8	P.Wargo 3/27/2009	Shared with National Simplex
Menlo Park								
Comment	Frequency	Offset	Display	Resource Name	Tone Mode	CTCSS	Reviewed By/Date	Notes
Menlo Park Tactical	147.555	Simplex	Menlo1	Simplex	T Sql	114.8	K. Dueker 3/29/2009	Shared with Atherton, EPA & HMB
Menlo Park Tactical	146.595	Simplex	Menlo2	Simplex	T Sql	114.8	New Addition 6/24/2009	Shared with Atherton & EPA
Millbrae								
Comment	Frequency	Offset	Display	Resource Name	Tone Mode	CTCSS	Reviewed By/Date	Notes
Millbrae Tactical	146.490	Simplex	MILB 1	Simplex	Tone	114.8	R.Caine 4/15/2009	
Millbrae Tactical	146.435	Simplex	MILB 2	Simplex	Tone	114.8	New Addition 6/24/2009	Shared with Burlingame & Hillsborough
Pacifica								
Comment	Frequency	Offset	Display	Resource Name	Tone Mode	CTCSS	Reviewed By/Date	Notes
SMCo. North Pri. Net - North	146.925	Minus	925-N	WA6TOW	T Sql	114.8	F. Erbacher 3/31/2009	Shared with County Wide Area Net
Pacifica Tactical	146.535	Simplex	PAC 1	Simplex	Tone	114.8	F. Erbacher 3/31/2009	
Pacifica Tactical	147.405	Simplex	PAC 2	Simplex	Tone	114.8	F. Erbacher 3/31/2009	Shared with San Carlos
Pescadero								
Comment	Frequency	Offset	Display	Resource Name	Tone Mode	CTCSS	Reviewed By/Date	Notes
Pescadero VHF Repeater	146.625	Minus	PESVHF	KE6MNJ	Tone	114.8	P.Wargo 8/8/2009	Can link with
Pescadero Tactical	146.520	Simplex	PESCAD	Simplex	Tone	114.8	P.Wargo 3/27/2009	Shared with National Simplex
Portola Valley								
Comment	Frequency	Offset	Display	Resource Name	Tone Mode	CTCSS	Reviewed By/Date	Notes
Portola Valley Tactical	146.430	Simplex	PORTLA	Simplex	Tone	114.8		Shared with San Bruno
Redwood City (RWC)								
Comment	Frequency	Offset	Display	Resource Name	Tone Mode	CTCSS	Reviewed By/Date	Notes
Redwood City Tactical	147.450	Simplex	RWC 1	Simplex	Tone	114.8		
Redwood City Tactical	146.460	Simplex	RWC 2	Simplex	Tone	114.8	New Addition 6/24/2009	
San Bruno								
Comment	Frequency	Offset	Display	Resource Name	Tone Mode	CTCSS	Reviewed By/Date	Notes
San Bruno Tactical	146.430	Simplex	SNB 1	Simplex	Tone	114.8		Shared with Portola Valley
San Bruno Tactical	147.480	Simplex	SNB 2	Simplex	Tone	114.8		Shared with Woodside



San Carlos								
Comment	Frequency	Offset	Display	Resource Name	Tone Mode	CTCSS	Reviewed By/Date	Notes
San Carlos Tactical	147.405	Simplex	SNC 1	Simplex	Tone	114.8	SCARES	Shared with Pacifica
San Carlos Tactical	146.415	Simplex	SNC 2	Simplex	Tone	114.8	New Addition 6/24/2009	Shared with North County
San Gregorio								
Comment	Frequency	Offset	Display	Resource Name	Tone Mode	CTCSS	Reviewed By/Date	Notes
San Gregorio	146.520	Simplex	SNGREG	Simplex	Tone	114.8		Shared with National Simplex
San Mateo								
Comment	Frequency	Offset	Display	Resource Name	Tone Mode	CTCSS	Reviewed By/Date	Notes
San Mateo Tactical	145.650	Simplex	SMO 1	Simplex	Tone	114.8	San Mateo Web Site 6/1/2009	
San Mateo Tactical	146.550	Simplex	SMO 2	Simplex	Tone	114.8	New Addition 6/24/2009	
San Mateo Tactical	441.000	Simplex	SMO 3	Simplex	Tone	114.8	New Addition 6/24/2009	
SCARES								
Comment	Frequency	Offset	Display	Resource Name	Tone Mode	CTCSS	Reviewed By/Date	Notes
SCARES UHF Repeater	444.500	Plus	SCARES	K6MPN	Tone	100.0	SCARES Orange Book 4/1/2009	
SCARES Tactical	146.445	Simplex	SCARES	Simplex	T Sqr	114.8	SCARES Orange Book 4/1/2009	SCARES Repeater Remtote Base, Tone: 114.8
SCARES Tactical	144.450	Simplex	SCARES	Simplex	T Sqr	114.8	SCARES Orange Book 4/1/2009	
Skylonda								
Comment	Frequency	Offset	Display	Resource Name	Tone Mode	CTCSS	Reviewed By/Date	Notes
Skylonda Tactical	144.345	Simplex	SKYLDA	Simplex	Tone	114.8		
South San Francisco								
Comment	Frequency	Offset	Display	Resource Name	Tone Mode	CTCSS	Reviewed By/Date	Notes
South San Francisco Tactical	146.505	Simplex	SSF 1	Simplex	Tone	114.8		Shared in North County
South San Francisco Tactical	146.415	Simplex	SSF 2	Simplex	Tone	114.8	New Addition 6/24/2009	Shared in North County
Woodside								
Comment	Frequency	Offset	Display	Resource Name	Tone Mode	CTCSS	Reviewed By/Date	Notes
Woodside Tactical	146.430	Simplex	WDSIDE	Simplex	Tone	114.8		
Woodside Tactical	147.48	Simplex	WDSIDE	Simplex	Tone	114.8	New Addition 6/24/2009	Shared with San Bruno
Un-Incorporated San Mateo County (El Granada, Ladera Area, Vista Verde & Los Trancos Woods)								
Comment	Frequency	Offset	Display	Resource Name	Tone Mode	CTCSS	Reviewed By/Date	Notes
Un-Incorporated Tactical	146.520	Simplex	SMCO 1	Simplex	Tone	114.8		Shared with National Simplex
Un-Incorporated Tactical	144.345	Simplex	SMCO 2	Simplex	Tone	114.8	New Addition 9/24/2009	



Communications in the ICS system





City – Community Frequencies

- Generate a frequency plan
 - Intra-Team: FRS
 - Inter-Team-ICP-Trailers: GMRS/FRS
 - ICP-EOC-Trailers: Ham
- Use ICS-205
- Test the plan with an exercise
- Test the plan with a wide area exercise
- Be ready to modify – if interference exists

INCIDENT RADIO COMMUNICATIONS PLAN	1. Incident Name	2. Date/ Time Prepared	3. Operational Period Date/Time
	Functional EOC Exercise - Belmont	2-Apr-10	DD MMM YYYY 0800 TO 1200 HRS (TBD)

4. Basic Radio Channel Utilization

Radio Type	Channel	Function	Frequency (MHz)	Tone	Mode	Assignment	Remarks
Bel EOC Knwd - TM-733	Right Radio M-	KC6ULT, San Mateo County, 2m repeater Net	RX: 146.865-	114.8	FM	San Mateo County EOC to City EOC Net	KC6ULT repeater, if repeater down, simplex on output frequency
			TX: 146.265	114.8			
Bel EOC ICOM-2820	Left Radio M-	K6MPN, South County ARES, 70cm repeater Net	RX: 444.500+	100.0	FM	South County Ham Resource net	K6MPN repeater, if repeater down, simplex on output frequency
			TX: 449.500	100.0			
Bel EOC ICOM-2820	Left Radio M-	WB6CKT, Belmont, 2m repeater Net	RX: 147.090+	100.0	FM	Intra - Belmont Primary Tactical Ham Net	WB6CKT repeater, if repeater down, simplex on output frequency
			TX: 147.690	100.0			
Bel EOC Knwd - TM-733	Right Radio M-	2 meter simplex local communications	RX: 147.585	114.8	FM	Intra - Belmont Alternate Tactical Ham Net	Belmont alternate simplex frequency
			TX: 147.585	114.8			
GMRS/FRS	1	GMRS/FRS General Calling	RX: 462.5625		FM	GMRS General calling (do not use)	no PL on GMRS or FRS channels, GMRS license required for high power (5W)
GMRS/FRS	2	GMRS/FRS Communications	RX: 462.5875		FM	(do not use)	no PL on GMRS or FRS channels, GMRS license required for high power (5W)
GMRS/FRS	3	GMRS/FRS Communications	RX: 462.6125		FM	(do not use)	no PL on GMRS or FRS channels, GMRS license required for high power (5W)
GMRS/FRS	4	GMRS/FRS Communications	RX: 462.6375		FM	CALLING - Primary, inter CERT, BEL EOC communications	no PL on GMRS or FRS channels, GMRS license required for high power (5W)
GMRS/FRS	5	GMRS/FRS Communications	RX: 462.6625		FM	CALLING - Alternate 1, Inter CERT, BEL EOC communications	no PL on GMRS or FRS channels, GMRS license required for high power (5W)
GMRS/FRS	6	GMRS/FRS Communications	RX: 462.6875		FM	CALLING - Alternate 2, Inter CERT, BEL EOC communications	no PL on GMRS or FRS channels, GMRS license required for high power (5W)
GMRS/FRS	7	GMRS/FRS Communications	RX: 462.7125		FM	CALLING - Alternate 3, Inter CERT, BEL EOC communications	no PL on GMRS or FRS channels, GMRS license required for high power (5W)
FRS	8	FRS Intra CERT Team A	RX: 467.5625		FM	CERT Team Alpha - communications	no PL on FRS channel (0.5 W)
FRS	9	FRS Intra CERT Team B	RX: 467.5875		FM	CERT Team Bravo - communications	no PL on FRS channel (0.5 W)
FRS	10	FRS Intra CERT Team C	RX: 467.6125		FM	CERT Team Charlie - communications	no PL on FRS channel (0.5 W)
FRS	11	FRS Intra CERT Team D	RX: 467.6375		FM	CERT Team Delta - communications	disaster drill channel, no PL on FRS channel (0.5W)
FRS	12	FRS Intra CERT Team E	RX: 467.6625		FM	CERT Team Echo - communications	no PL on FRS channel (0.5 W)
FRS	13	FRS Intra CERT Team F	RX: 467.6875		FM	CERT Team Foxtrot - communications	no PL on FRS channel (0.5 W)
FRS	14	FRS Intra CERT Team G	RX: 467.7125		FM	CERT Team Golf - communications	no PL on FRS channel (0.5 W)
			RX:				
			TX:				
			RX:				
			TX:				

Prepared by: Robert Lombaerde, EC Belmont, WB6WGM, WQJ631 cell: 650-740-2783

INCIDENT RADIO COMMUNICATIONS PLAN			1. Incident Name	2. Date/Time Prepared	3. Operational Period Date/Time		
			City of San Mateo	12-Nov-10			
4. Basic Radio Channel Utilization							
Radio Type	Channel	Function	Frequency	Tone	Mode	Assignment	Remarks
SM EOC ICOM-2800H #1	Left M10	San Mateo City OES Simplex	145.850	114.8	FM	City of San Mateo EOC ham resource net	SM EOC hams <-> SM County hams
SM EOC ICOM-2800H #1	Right M5	San Mateo CERT Simplex	148.550	114.8	FM	Intra-San Mateo CERT Tactical Ham Net	SM ERD hams <-> SM EOC hams
SM EOC ICOM-2800H #2	Left M13	KC8ULT, San Mateo County, 2m repeater Net	148.865 -Dup	114.8	FM	San Mateo County EOC to City EOC Net	KC8ULT repeater, if repeater down, simplex on output frequency
SM EOC ICOM-2800H #2	Right M11	K8MPN, South County ARES, 70cm repeater Net	444.500 +Dup	100.0	FM	South County ham resource net	K8MPN repeater, if repeater down, simplex on output frequency
SM Trailers ICOM-2100	M5	San Mateo CERT Simplex	148.550	114.8	FM	Intra-San Mateo CERT Tactical Ham Net	Backup is on 70cm, which trailer radios cannot do
GMR5/FRS	4	Intra San Mateo GMR5/FRS Calling, EOC - Primary	462.6375		FM	CERT Calling - Primary	Call to find out if activated and what channel to use (primary)
GMR5/FRS	5	Intra San Mateo GMR5/FRS Calling, EOC - Secondary	462.6625		FM	CERT Calling - Alternate 1	Call to find out if activated and what channel to use (alternate)
FRS	8	FRS Communications	467.5625	1 (67.0 Hz)	FM	CERT neighborhood communications	(4) Baywood
FRS	8	FRS Communications	467.5625	2 (71.9 Hz)	FM	CERT neighborhood communications	(5) Baywood Park
FRS	8	FRS Communications	467.5625	3 (74.4 Hz)	FM	CERT neighborhood communications	(10) Hacienda
FRS	8	FRS Communications	467.5625	4 (77.0 Hz)	FM	CERT neighborhood communications	(11) Harbortown
FRS	8	FRS Communications	467.5625	5 (79.7 Hz)	FM	CERT neighborhood communications	(15) Laurelwood
FRS	8	FRS Communications	467.5625	6 (82.5 Hz)	FM	CERT neighborhood communications	(17) North Central
FRS	8	FRS Communications	467.5625	7 (85.4 Hz)	FM	CERT neighborhood communications	(21) San Mateo Glendale Village
FRS	8	FRS Communications	467.5625	8 (88.5 Hz)	FM	CERT neighborhood communications	(24) Shoreview Parkside
FRS	9	FRS Communications	467.5875	1 (67.0 Hz)	FM	CERT neighborhood communications	(1) 19th Avenue Park
FRS	9	FRS Communications	467.5875	2 (71.9 Hz)	FM	CERT neighborhood communications	(3) Aragon
FRS	9	FRS Communications	467.5875	3 (74.4 Hz)	FM	CERT neighborhood communications	(7) Central
FRS	9	FRS Communications	467.5875	4 (77.0 Hz)	FM	CERT neighborhood communications	(20) Laurie Meadows
FRS	9	FRS Communications	467.5875	5 (79.7 Hz)	FM	CERT neighborhood communications	(23) San Mateo Park
FRS	9	FRS Communications	467.5875	6 (82.5 Hz)	FM	CERT neighborhood communications	(30) Hillsdale Park
FRS	9	FRS Communications	467.5875	7 (85.4 Hz)	FM	CERT neighborhood communications	(33) Marina East
FRS	9	FRS Communications	467.5875	8 (88.5 Hz)	FM	CERT neighborhood communications	(34) Lakeshore
FRS	9	FRS Communications	467.5875	9 (91.5 Hz)	FM	CERT neighborhood communications	(35) Glendora
FRS	10	FRS Communications	467.6125	1 (67.0 Hz)	FM	CERT neighborhood communications	(8) Beresford/Hillsdale
FRS	10	FRS Communications	467.6125	2 (71.9 Hz)	FM	CERT neighborhood communications	(8) Clearview
FRS	10	FRS Communications	467.6125	3 (74.4 Hz)	FM	CERT neighborhood communications	(9) Fiacta Gardens
FRS	10	FRS Communications	467.6125	4 (77.0 Hz)	FM	CERT neighborhood communications	(18) North Shoreview
FRS	10	FRS Communications	467.6125	5 (79.7 Hz)	FM	CERT neighborhood communications	(19) Parrot Park
FRS	10	FRS Communications	467.6125	6 (82.5 Hz)	FM	CERT neighborhood communications	(22) San Mateo Highlands
FRS	10	FRS Communications	467.6125	7 (85.4 Hz)	FM	CERT neighborhood communications	(25) Sunnybrae
FRS	10	FRS Communications	467.6125	8 (88.5 Hz)	FM	CERT neighborhood communications	(28) South San Mateo
FRS	10	FRS Communications	467.6125	9 (91.5 Hz)	FM	CERT neighborhood communications	(31) Railroad North
FRS	10	FRS Communications	467.6125	10 (94.8 Hz)	FM	CERT neighborhood communications	(32) Marina West
FRS	10	FRS Communications	467.6125	11 (97.4 Hz)	FM	CERT neighborhood communications	(35) Los Prados



Using the Radios for Communications

- Assign a Net Control (traffic cop)
- **Assign a scribe, runner, keep a log, listen**
- Assign Tactical Call Signs: location, post, position (not a person's name, people get relieved, transferred)
- Assign frequencies to field stations – release them after successful radio check
- Announce the purpose of using the frequency and have radio checks regularly
- PTT – Push-To-Talk (Release To Listen - not a cell phone)
- Speak slowly and clearly (across the mike, not into the mike)

Net Control Station

TdP – 3 Frequency Net

South County ARES



When *Not* to Operate

During emergency operations listening and common sense are key.

Steve Sant Andrea, AG1YK

As this is being written in January 2010, Haitian earthquake disaster operations are ongoing. Such a disaster is immediately accompanied by a loss of the communications links that are vital for obtaining aid. We all have a desire to help those in need, but hams can do something immediate and concrete — supply that needed communications.

The down side to this desire to help comes when we fail to realize that equipment and training are two different things. ←

Emergency Nets

The Salvation Army and the International Red Cross have nets that operate on a regular basis. In an emergency these nets automatically shift to disaster mode. Other nets are often established and a general notice goes out regarding these frequencies on the ARRL Web site, through ARRL news broadcasts and at other ham oriented Web sites. All hams are requested to keep those frequencies clear.

A request to keep a frequency clear signifies that a guard band is established around the frequency. All modulation forms have a typical bandwidth. For example, the SSB bandwidth is 3 kHz.

aware of is that emergency nets are not contests. The disaster doesn't suddenly disappear at 0007. Activity often comes in bursts. Just

"We all desire to help...we (often) fail to realize that equipment and training are two different things"

DX pileup or just a ragchew taking place on a frequency, tune up somewhere else. Shifting the frequency of your transmitter 5, 10 or

"In one case it took almost 15 minutes to pass one 25 word message."

tics or people. In the Americas, outside of the Caribbean, the predominant language is Spanish and while English is widely understood in the Caribbean, in Haiti the official languages are French and Creole. When a disaster occurs in a non-English speaking part of the world, if you aren't *fluent* in the local language it is best to remain in listening mode.

Traffic Technique

Emergency operations have evolved and the methods for passing traffic have expanded. Much bulk information such as lists of people at a particular shelter are best sent using a digital mode. Health and welfare messages are still frequently handled in standard ARRL message format. When was the last time you handled a radiogram?

⇒ A member of my ARES® group was deployed to Hurricane Katrina operations. One of the problems he found was that many of the operators who were deployed had excellent go-kits and technical ability

but were seriously wanting in traffic handling skill. In one case it took almost 15 minutes to pass one 25 word message. ←

MASTER SGT. JEREMY LOCK





Messages

- **Informal Messages**
- General updates – information (not chat), questions, etc, Documentation not required (log it - anyway)

Example of informal message

- **Formal Messages**
Documentation required (paper trail)
Message written on std form, wording exact, use Form 1 if required, Signature required on Message

The BEST message form has not been found.

Example of formal message



THE AMERICAN RADIO RELAY LEAGUE

RADIOGRAM

VIA AMATEUR RADIO



NUMBER 3	PRECEDENCE E	HX [REDACTED]	STATION OF ORIGIN WB6WGM	CHECK 10	PLACE OF ORIGIN Belmont EOC	TIME FILED 2015	DATE Mar16
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To:

ICP, Barrett Community Center

TELEPHONE NUMBER

THIS RADIO MESSAGE WAS RECEIVED AT:

AMATEUR STATION:	DATE:
NAME:	
STREET ADDRESS:	
CITY, STATE, ZIP:	

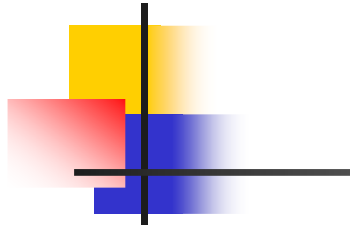
Motorcycle Crash ECR and Ralston
 X two ambulances needed ASAP

Sig: **John Smith**

	FROM	DATE	TIME		TO	DATE	TIME
REC'D				SENT			

ICS 213

South County ARES



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



San Mateo County Forms

SAN MATEO COUNTY / OPERATIONAL AREA EMERGENCY OPERATIONS CENTER

MESSAGE	DATE:	TIME:	MESSAGE NO:	INCIDENT NO:
RECEIVED VIA: <input type="checkbox"/> Telephone - Number _____ <input type="checkbox"/> Ham Radio Frequency _____ <input type="checkbox"/> Field Unit <input type="checkbox"/> Public Safety Communications <input type="checkbox"/> Walk-in				
FROM:		PRIORITY: <input type="checkbox"/> LIFE-THREATENING! <input type="checkbox"/> Urgent! <input type="checkbox"/> Not-urgent		

MESSAGE TO: <input type="checkbox"/> COMMAND <input type="checkbox"/> OPERATIONS <input type="checkbox"/> PLANNING <input type="checkbox"/> LOGISTICS <input type="checkbox"/> FINANCE <input type="checkbox"/> COASTAL REOC <input type="checkbox"/> OTHER NAME:	INCIDENT <input type="checkbox"/> WILDFIRE <input type="checkbox"/> STRUCTURE FIRE <input type="checkbox"/> FLOODING <input type="checkbox"/> BUILDING COLLAPSE <input type="checkbox"/> TRANSPORTATION <input type="checkbox"/> MULTI-CASUALTY ACCIDENT <input type="checkbox"/> WASTEWATER HAZARD <input type="checkbox"/> PUBLIC HEALTH <input type="checkbox"/> LAW MUTUAL AID <input type="checkbox"/> EMERGENCY MEDICAL <input type="checkbox"/> FIRE MUTUAL AID <input type="checkbox"/> CORONER <input type="checkbox"/> PUBLIC WORKS <input type="checkbox"/> POTABLE WATER <input type="checkbox"/> SHELTER <input type="checkbox"/> OTHER (specify) _____
ACTION <input type="checkbox"/> ACTION REQUIRED <input type="checkbox"/> REVIEW FOR BRIEF <input type="checkbox"/> INFO ONLY	JURISDICTION <input type="checkbox"/> City <input type="checkbox"/> County <input type="checkbox"/> Special District LOCATION CROSS STREET
REPLY TO: <input type="checkbox"/> SENDER <input type="checkbox"/> COMMAND <input type="checkbox"/> OPERATIONS <input type="checkbox"/> PLANNING <input type="checkbox"/> LOGISTICS <input type="checkbox"/> FINANCE <input type="checkbox"/> COASTAL REOC <input type="checkbox"/> OTHER	REPLY
NO ACTION NEEDED <input type="checkbox"/> INFO ONLY	

INSTRUCTIONS

- 1) Remain calm, observe the situation, act decisively and hope everything comes out okay
- 2) - PRESS HARD - there are 5 copies
- 3) Follow procedure to provide a completed form to the EOC Message Center for distribution

San Mateo County, CA EOC Message Form 2/18

SAN MATEO COUNTY / OPERATIONAL AREA EMERGENCY OPERATIONS CENTER					
MESSAGE FORM	DATE:	TIME:	MSG #:	INCIDENT NO:	PRIORITY:
Sent Via: Telephone _____ FAX _____ Gov't Radio (Freq. _____) Other Radio (Freq. _____) Walk In _____					CHECK ONE
MSG TO:	Agency:	Phone:			<input type="checkbox"/> Life-Threatening
MSG FROM:	Agency:	Phone:			<input type="checkbox"/> Urgent
RECEIVED BY:	Section:	Phone:			<input type="checkbox"/> Non-Urgent
ROUTING - Action Assigned by Section Chief:			MESSAGE PRESS HARD - BE LEGIBLE		
SECTION/UNIT	ACTION	INFO			
MANAGEMENT					
Director/Emergency Services					
Public Information Officer					
Local Officer					
Safety Officer					
Liaison					
OPERATIONS					
Operations Section Chief					
Law Enforcement Unit					
Fire/Rescue Unit					
Public Works Unit					
Medical Unit					
Coroner Unit					
PLANNING					
Planning Section Chief					
Message Coordinator					
Damage Assessment Unit					
Situation Status Unit					
Resource Status Unit					
Documentation Unit					
Recovery Unit					
LOGISTICS					
Logistics Section Chief					
Communications Unit					
Care/Shelter Unit					
Food Unit					
Personnel Unit					
Supply Unit					
Transportation Unit					
Staging Area Manager					
FINANCE					
Finance Section Chief					
Time Unit					
Cost Unit					



Practice - Training

- CERT training
- CERT drills
- County exercises
- SCARES Monday night weekly nets
1930 h, 444.5+ PL 100, 146.445s PL 114.8
- SCARES monthly meetings
- Events requiring communication volunteers



Communications Outline

- Frequencies available, radios to use, capabilities/limitations, local established customs
- Show and tell – radios available – how to use the radios – communications planning, ICS, nets and tactical call signs
- Message handling (formal vs. informal), ARRL Radio-Gram, ICS: IC-213
- Practice
- Q & A



Q & A

- SCARES meeting Rm 207 San Carlos City Hall
17 Mar, 7:30 PM – Topic: New Zealand
Earthquake – first hand account
- Thanks to Diana, KI6GDA; Gary, K6GDA;
Madeline, KD6JTU; Tuk, WA6TUK; Dave,
KG6LRP, Christy
- Your Turn – Over