USE AND DISTRIBUTION NOTICE

- Santa Clara County RACES authorization is granted to use and duplicate this material as-is as long as this page and the copyright notices on each page are included, acknowledging Santa Clara County ARES/RACES as the holder of the copyright.
- Permission is granted to adapt this presentation to your needs as long as you acknowledge our copyright and include a note similar to "adapted with permission from Santa Clara County ARES/RACES”
- For additional information on training or any of our programs send an email to: info@scc-ares-races.org

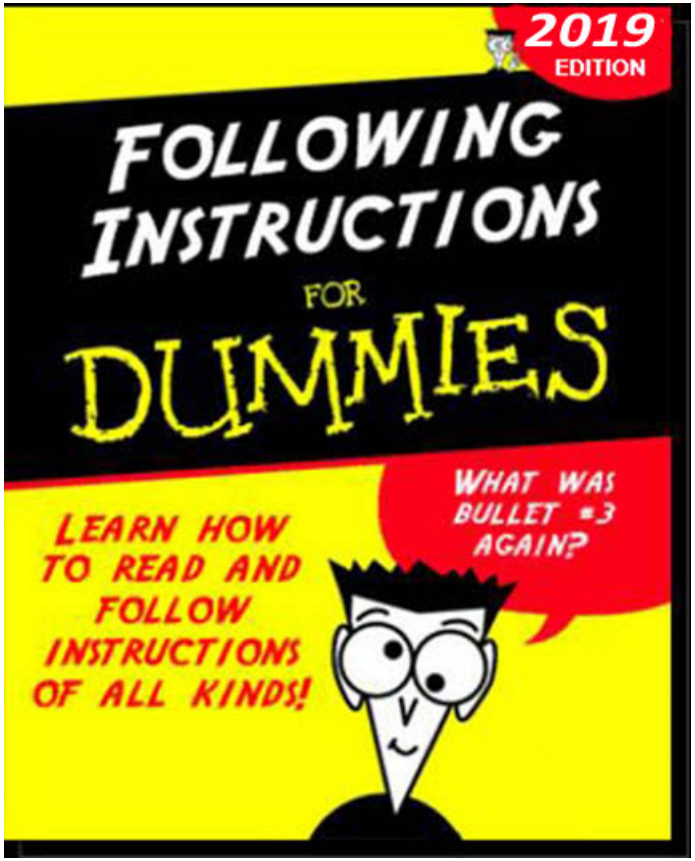
2019 Year End Summary, Update, Preview

Santa Clara County ARES®/RACES

Revised: 14-Dec-2019

Housekeeping

- Introductions
- Pen/pencil & paper
- Cell phones on silent or vibrate
- Side conversations
- Questions – on topic
- No food or drink in room
  - Water only
- Breaks
- Restrooms
- In case of emergency



Agenda

- Cupertino PSPS Deployment
- Countywide Communications Exercise
  - Lessons Learned
  - Public Service Event Paper Trail
- Training Update
  - Cross-Band, Intermod, Net Control, Pop-up Practice
- Message Passing
- Packet Update
- Network Update
- DSW Volunteer Program
- Credentialing Program Update
- Recognition

Cupertino PSPS Deployment

Jim Oberhofer, KN6PE
Darryl Presley, KI6LDM
Revised 11-Dec-2019

Cupertino PSPS Activations

Cupertino PSPS Activations

CUP-19-100, Oct08 PSPS

- On 8-October-2019, PG&E initiated a PSPS event that ultimately impacted more than 1M customers of which 3,300 homes and businesses were in Cupertino.
- The Cupertino EOC was activated and identified 4 objectives:
  - Public outreach to affected residents and community
  - Personal contact with affected residents; leave flyers
  - Establish personal electronics charging stations at City facilities
  - Monitor the situation; participate in County conference calls
- Cupertino Citizens Corps (CCC) was tasked to lead the field response and execute Objectives #1 and #2:
  - ICP at Monta Vista Fire Station ARK
  - Logistical and resource support from City GIS, PIO, and staff

What did the deployment look like?

CUP-19-100, Oct08 PSPS

- City staff decided to do an information outreach to the affected residents
- Cupertino EOC activated to Level 3, CCC to Level 1
- CCC took the lead in the field
- PG&E identified the affected addresses
- IT's GIS team developed the PSPS coverage maps
- City Managers Office developed a hand-out to be left with every affected resident, either in person or by the door.
- City GIS deployed their GIS Collector App
- ICP requested additional resources; city staff responded

By the numbers

CUP-19-100, Oct08 PSPS

	Oct08 PSPS CUP-19-100
Homes, Businesses impacted	3,300
Total Canvasser hours	304
CCC volunteer canvas hours	189
City staff canvass hours	115
Hours of the power outage	14
Days activated	3

Cupertino PSPS Activations

CUP-19-200, Oct26 PSPS

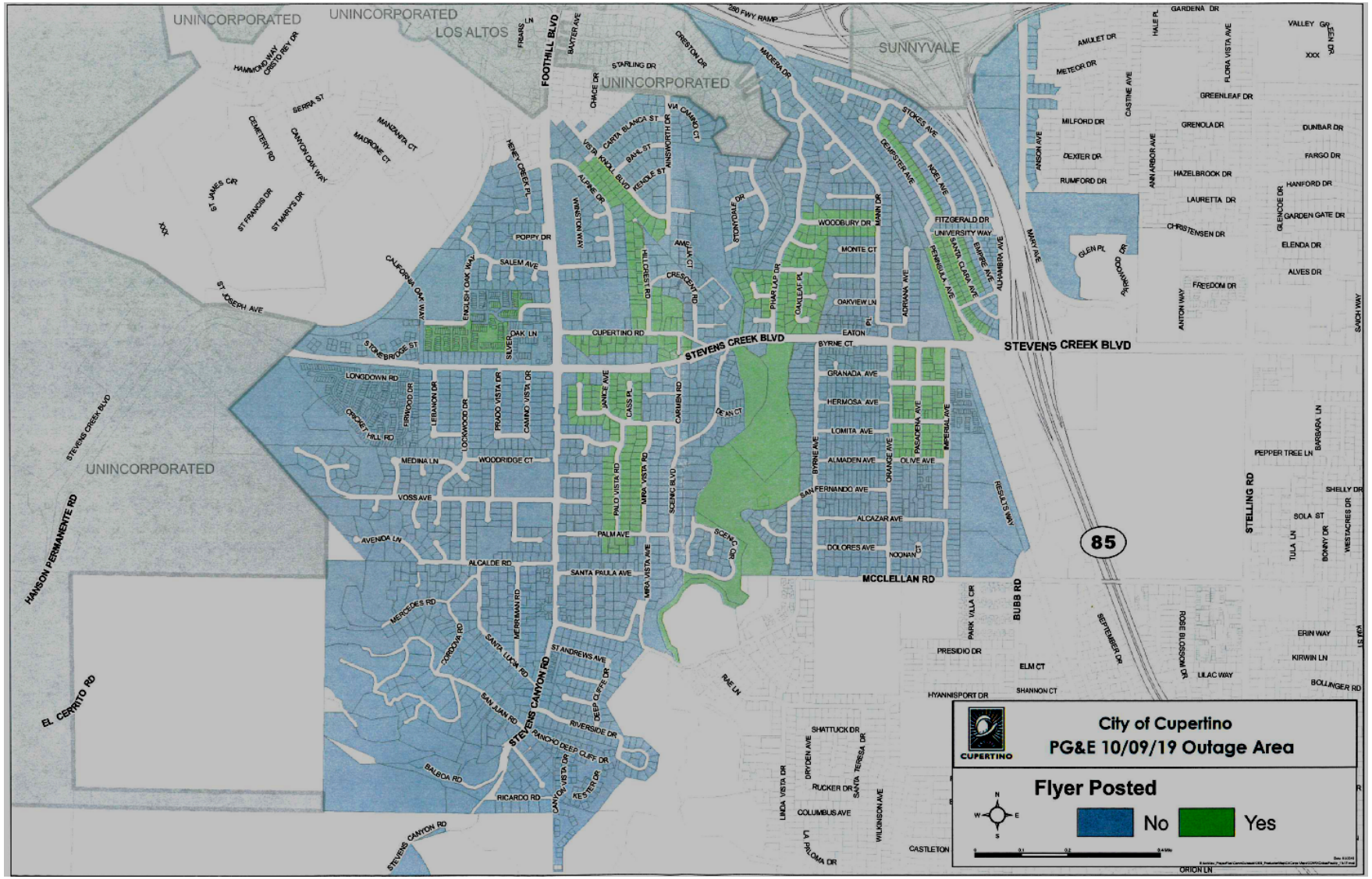
- On 24-October-2019, PG&E initiated a PSPS event that impacted 88 addresses and 160 unincorporated addresses within Cupertino's sphere of influence.
- On Saturday 26-October, Cupertino EOC was activated and Cupertino Citizens Corps was tasked to lead the field response:
  - ICP at Regnart School ARK
  - Logistical and resource support from City GIS, PIO

By the numbers
CUP-19-200, Oct26 PSPS

	Oct08 PSPS CUP-19-100	Oct26 PSPS CUP-19-200
Homes, Businesses impacted	3,300	248
Total Canvasser hours	304	104
CCC volunteer canvas hours	189	95
City staff canvass hours	115	11
Hours of the power outage	14	60
Days activated	3	1

First day canvas results

CUP-19-100, Oct08 PSPS



Ready for sign-ups

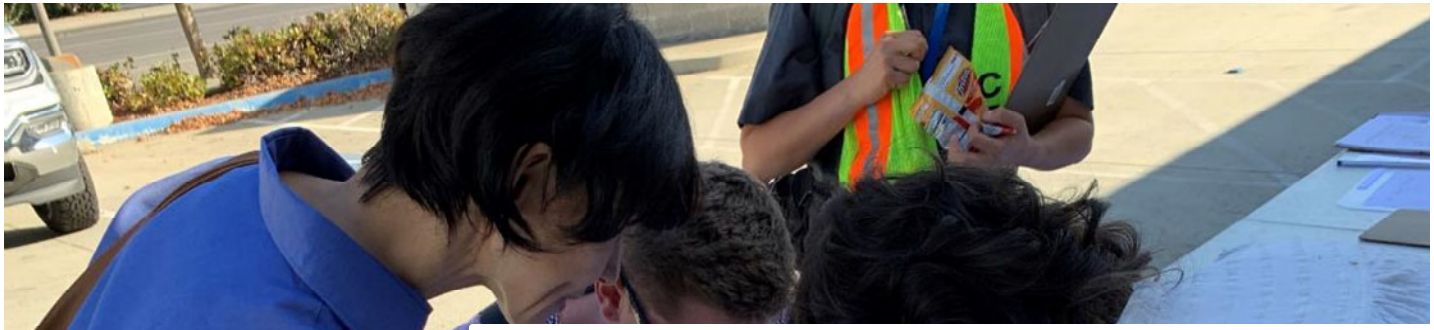
CUP-19-100, Oct08 PSPS

CCC and City staff go to work

CUP-19-100, Oct08 PSPS

GIS with maps, real-time support

CUP-19-100, Oct08 PSPS



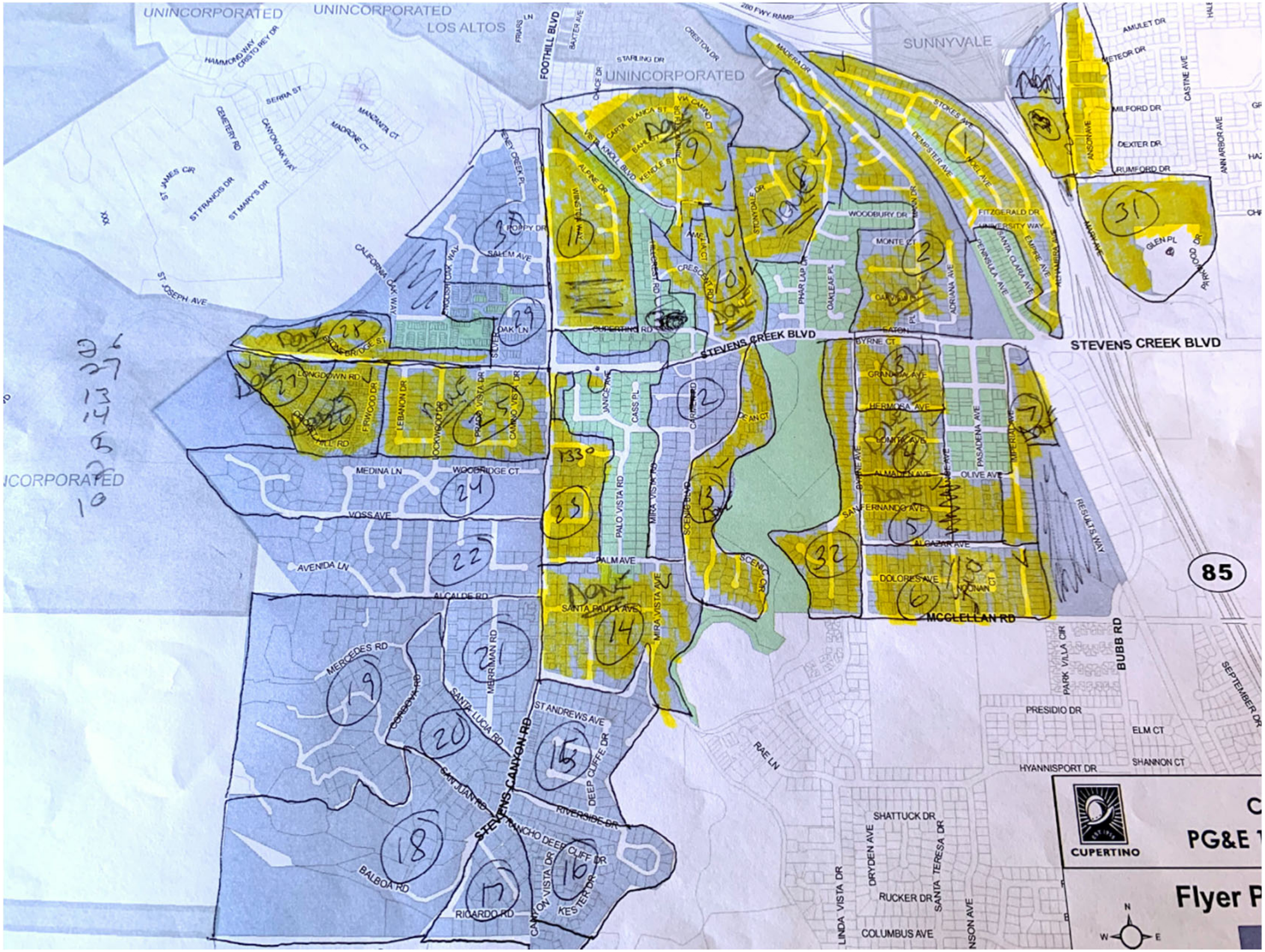
Comms were key

“An army marches on its stomach”… *Napoleon*

CUP-19-100, Oct08 PSPS

Day 2: Canvas Results

CUP-19-100, Oct08 PSPS



Day 3: The Power Shutoff

CUP-19-100, Oct08 PSPS

- Wednesday, ~23:00: Power goes out
- Thursday Morning: cell tower batteries quit
- Amateur Radio was the only means for contacting field teams and the EOC.
- EOC becomes aware of cell tower outages and modifies their EOC Action Plan (EAP)

Day 3: The Power Shutoff – Comms

CUP-19-100, Oct08 PSPS

- We did not have enough ARES folks to staff all teams
- Resource and message nets were combined due to fewer CARES volunteers
- There were no issues combining the two nets
- Communications with ARES members of Field teams and the EOC was maintained at all times on Amateur radio message net

Day 3: The Power Shutoff – Comms

CUP-19-100, Oct08 PSPS

- Amateur Radio Nets
  - Communications with ARES members of Field teams and the EOC was maintained at all times on Amateur radio message net
- Cell Phone Nets
  - Field teams without ARES members provided cell phone numbers to the ICP
  - Health & Welfare checks were conducted by calling/texting the cell phone number of the Field team
- Cell phone nets worked on Days 1 and 2 but NOT on Day 3
  - Cell phone coverage was sporadic
  - We lost contact with some Field teams until they returned to the ICP

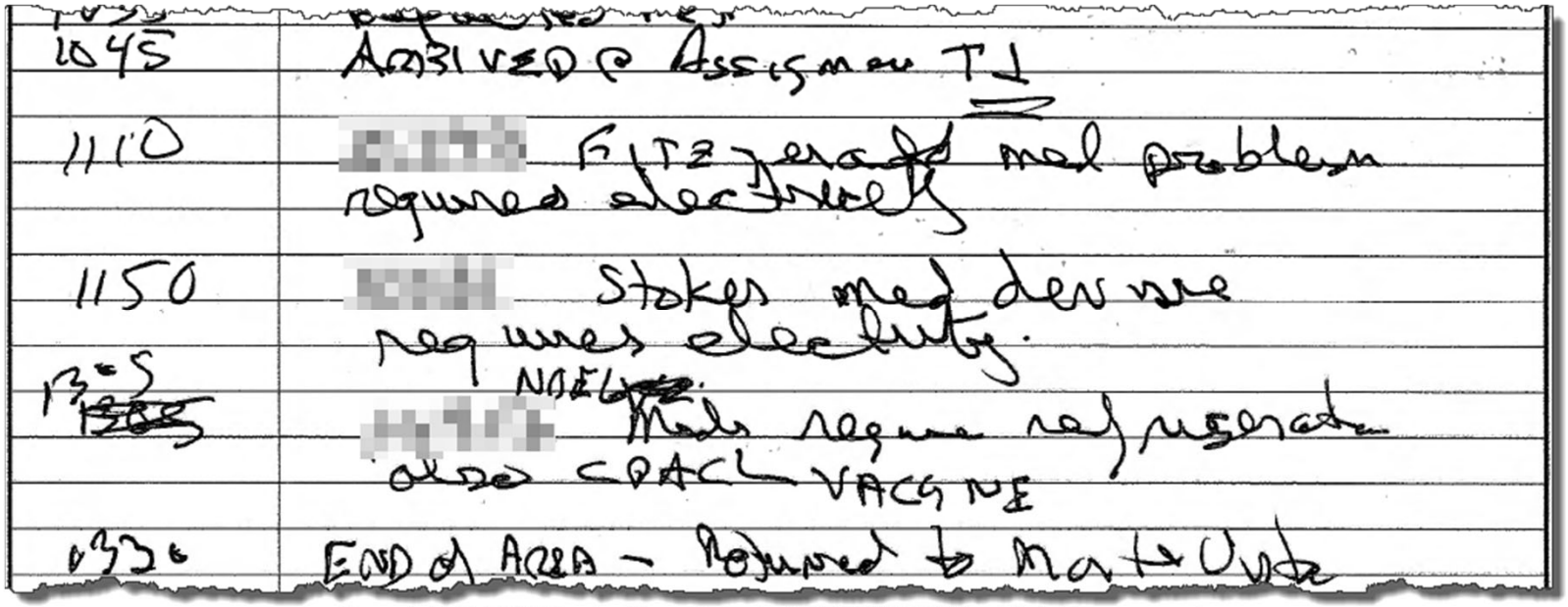
Five take-aways

1. *Documentation is key*

   City received all field paperwork (forms, reports, etc.) and were looking specifically for…

   - Field responder injuries
   - Report-out of unusual interactions with residents
   - Documenting residents at risk from loss of power
   - Support City After Action report to County

ICS214 Excerpt



Five take-aways

2. Community readiness

- Encountered residents who were ill prepared for a power shutoff.
- Some were totally unaware that a shutoff was imminent.
- The largest category of these residents were elderly and Access and Functional Needs (AFN) individuals.
- If residents are not prepared for an event that was well publicized, then they will not be prepared for the earthquake that will hit unannounced.

3. City reliance on Cupertino Citizen Corp

- City relied on CCC to manage the field response.
- With specific objectives in hand, CCC put a plan in place to deliver results.
- Strong relationship between CARES, CERT, MRC and City staff made this happen.

Five take-aways

4. Practice makes perfect

- Used several processes and procedures that have been well practiced during exercises and public service events.
- City recognized our capabilities and relied on us as a reliable and competent partner.

5. When all else fails…

- Amateur radio was truly the communications means of last resort.

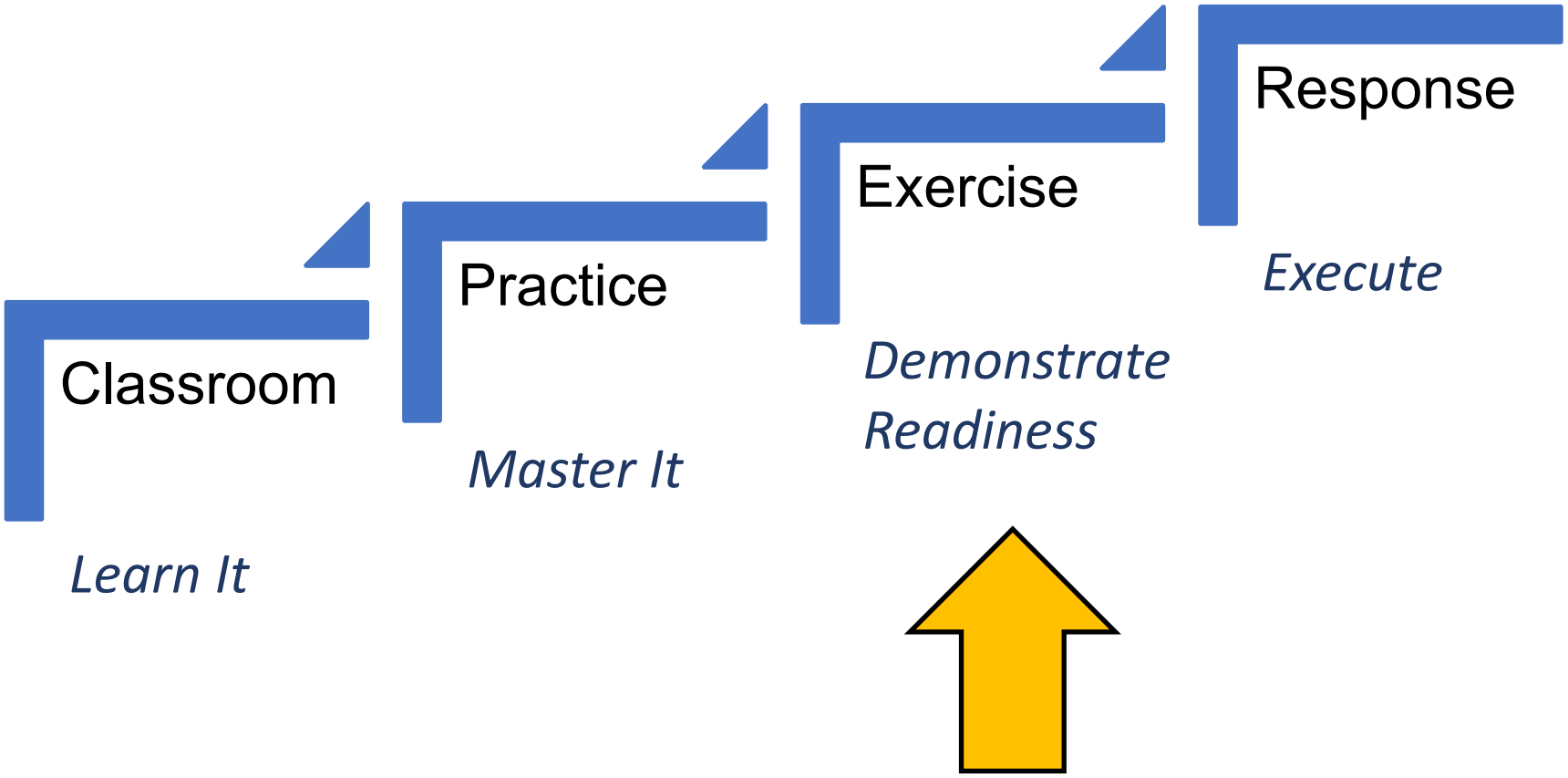
2019 Countywide Communications Exercise

Michael E Fox, N6MEF

Andreas Ott, K6OTT

Revised 11-Dec-2019

How Do We Prepare For A Response?



2019 Countywide Communications Exercise

Planning and Preparation

- Format
  - Input from jurisdictions: multi-activity exercise
- Location
  - Support our unique needs: group size, generators, pop-ups, etc.
  - Thanks to Campbell for facilitating!
- Goals for Participant Experience
  - Everyone leaves each activity a better operator
  - Everyone has fun
- Training Goals
  - All: Field deployment (procedures, equipment, operating, …)
  - Leadership: Exercise/event planning and operations
  - Credential candidates: Performance evaluations
- A total of approximately 550 hours spent planning, preparing!

Staging - Sunnyvale

Staging - Sunnyvale

Staging - Sunnyvale

Radio Programming - Saratoga

Radio Programming - Saratoga

Field Comms (Intro) - Campbell

Field Comms (Intro) - Campbell

Field Comms (Intro) - Campbell

Net Control (Intro) - Cupertino

Net Control (Intro) - Cupertino

Net Control (Intro) - Cupertino

Packet – Mountain View

Packet – Mountain View

Packet – Mountain View

Packet – Mountain View

Net Control (Experienced) - Milpitas

Net Control (Experienced) - Milpitas

Net Control and Packet

Field Comms (Experienced) – San Jose

Cross-band Repeat – Los Altos Hills

Shadow – Andreas Ott

County Fire, Comms, Sheriff, EMS

(Displayed vehicles; explained public safety comms capabilities)

Mark Schroeder, W7KHZ (County Comms)
Matt Yost, N6FYR (County Fire)

SCCo Office of Emergency Management (and Bob)

Statistics - Day of the Exercise

- Participation:
  - 120 amateur radio operators (52 “new”, licensed since 2015)
  - 12 agency/CERT/guests
  - Over 650 volunteer hours (onsite that day)
  - 16 agencies simulated
  - 17 communities represented
- Activities
  - Approximately 180 activities completed
  - People/#Activities: 3/4; 17/3, 25/2, 23/1
  - Staff: 52
- 100% of stations on emergency power (except BBS)
- Formal Message count: voice 12 (?), packet 101
- Probably our highest score ever for the ARRL Simulated Emergency Test (probably top 10)

What Went Right?

- Lots of participation
  - Lots of experience gained by new operators
  - Experience gained by many others who rarely attend exercises
  - Lots of planning experience gained at the city level
- Two main participant goals achieved
  - People learned new skills or improved existing skills at each activity
  - They had fun doing it
  - Confirmed by nearly unanimous feedback …

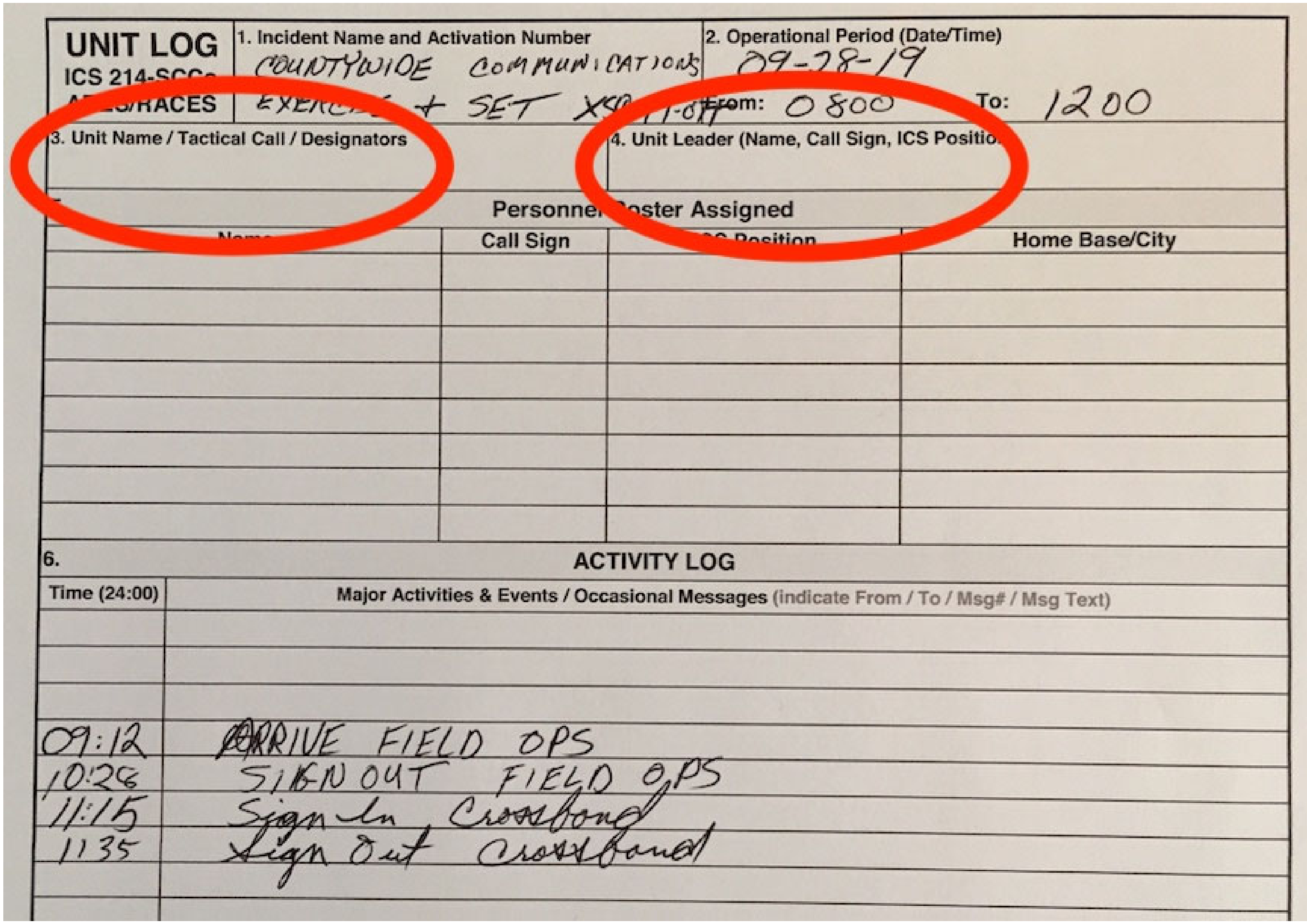
- But …

Houston, We Have a Problem

- Missing paperwork (some was not turned in at all)
- Paperwork was missing lots of information
- In general, very hard to recreate what happened from the paperwork
- Had this been a real event, or had a real problem occurred, the paperwork would not have been adequate

- For example …

ICS-214 Unit Log Bad Examples



UNIT LOG
ICS 214-SCC...
...S/RACES

1. Incident Name and Activation Number: COUNTYWIDE COMMUNICATIONS EXERC... + SET XS... 1-0...

2. Operational Period (Date/Time): 09-28-19 From: 0800 To: 1200

3. Unit Name / Tactical Call / Designators

4. Unit Leader (Name, Call Sign, ICS Positio...

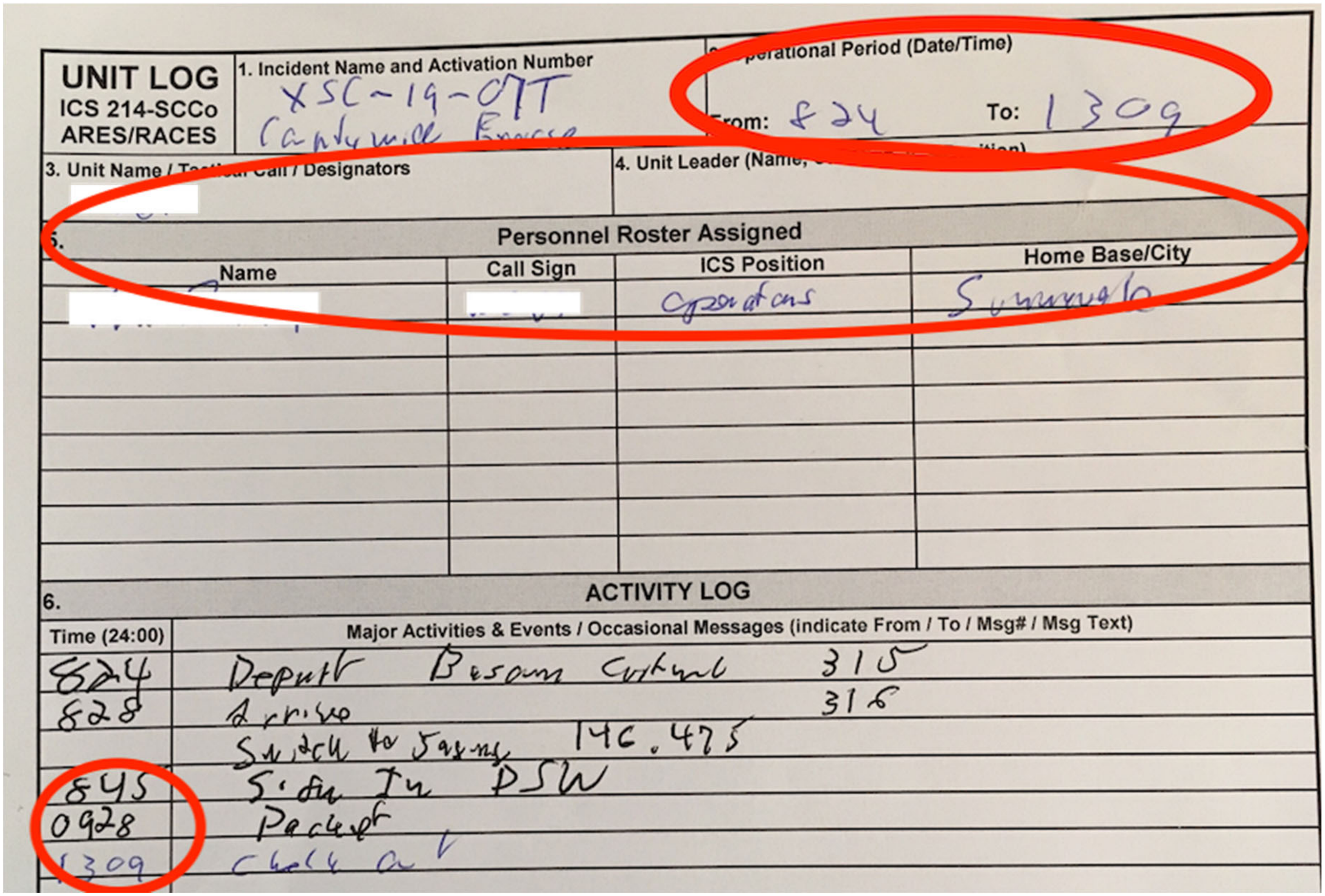
Personnel Roster Assigned

Name	Call Sign	ICS Position	Home Base/City

6. ACTIVITY LOG

Time (24:00)	Major Activities & Events / Occasional Messages (indicate From / To / Msg# / Msg Text)
09:12	ARRIVE FIELD OPS
10:26	SIGN OUT FIELD OPS
11:15	Sign In Crossband
1135	Sign Out Crossband

ICS-214 Unit Log Bad Examples



UNIT LOG
ICS 214-SCCo
ARES/RACES

1. Incident Name and Activation Number: XSC-19-OTT Cantywill Exercise

Operational Period (Date/Time) From: 824 To: 1309

3. Unit Name / Tactical Call / Designators:

4. Unit Leader (Name, ...

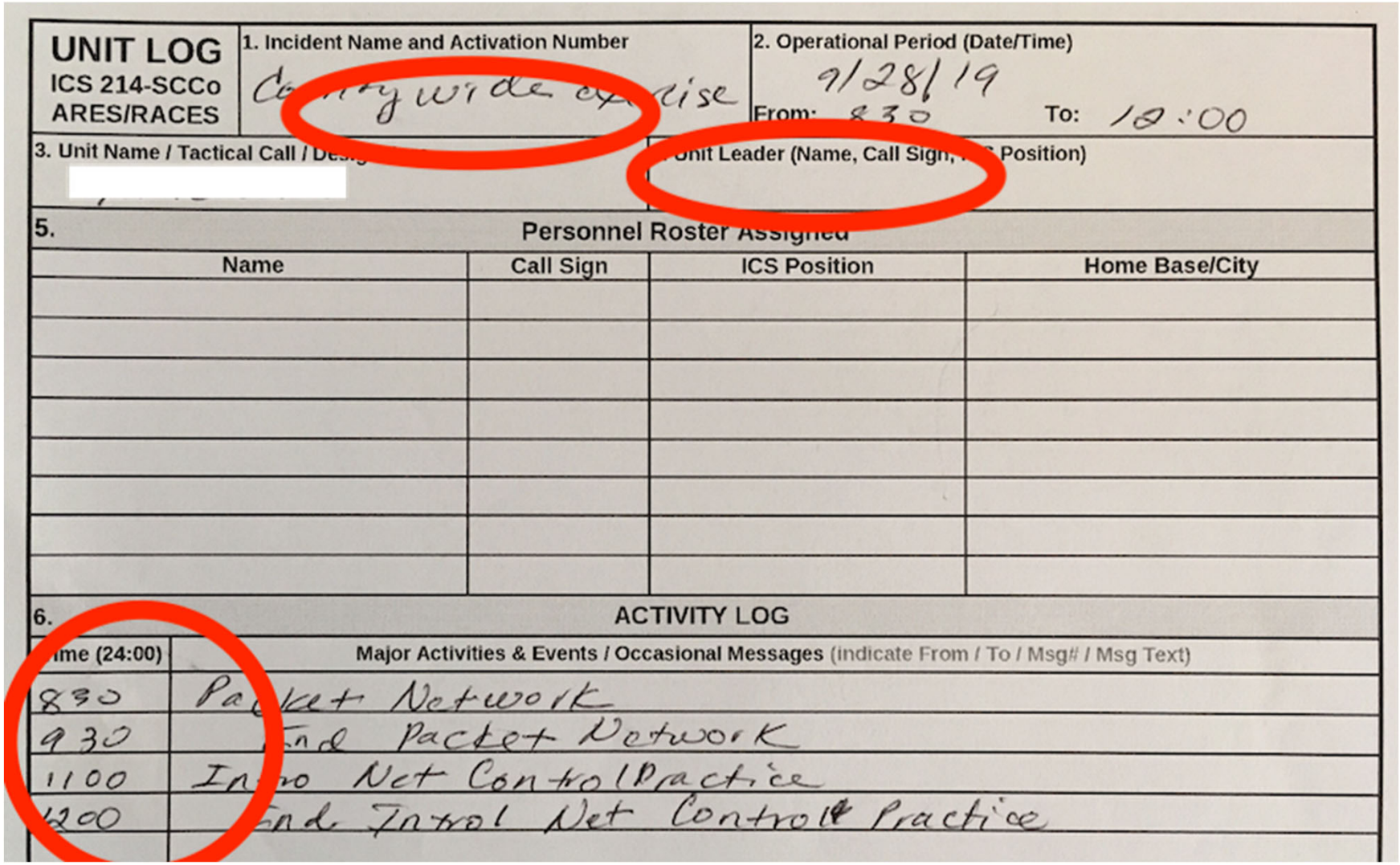
5. Personnel Roster Assigned

Name	Call Sign	ICS Position	Home Base/City
		Operations	Sunnyvale

6. ACTIVITY LOG

Time (24:00)	Major Activities & Events / Occasional Messages (indicate From / To / Msg# / Msg Text)
824	Depart Bascom Cortland 315
828	Arrive 316
	Switch to Sayny 146.475
845	Sign In DSW
0928	Packet
1309	Check out

ICS-214 Unit Log Bad Examples



UNIT LOG
ICS 214-SCCo
ARES/RACES

1. Incident Name and Activation Number: County wide exercise

2. Operational Period (Date/Time): 9/28/19 From: 830 To: 12:00

3. Unit Name / Tactical Call / Des...

...Unit Leader (Name, Call Sign, ...Position)

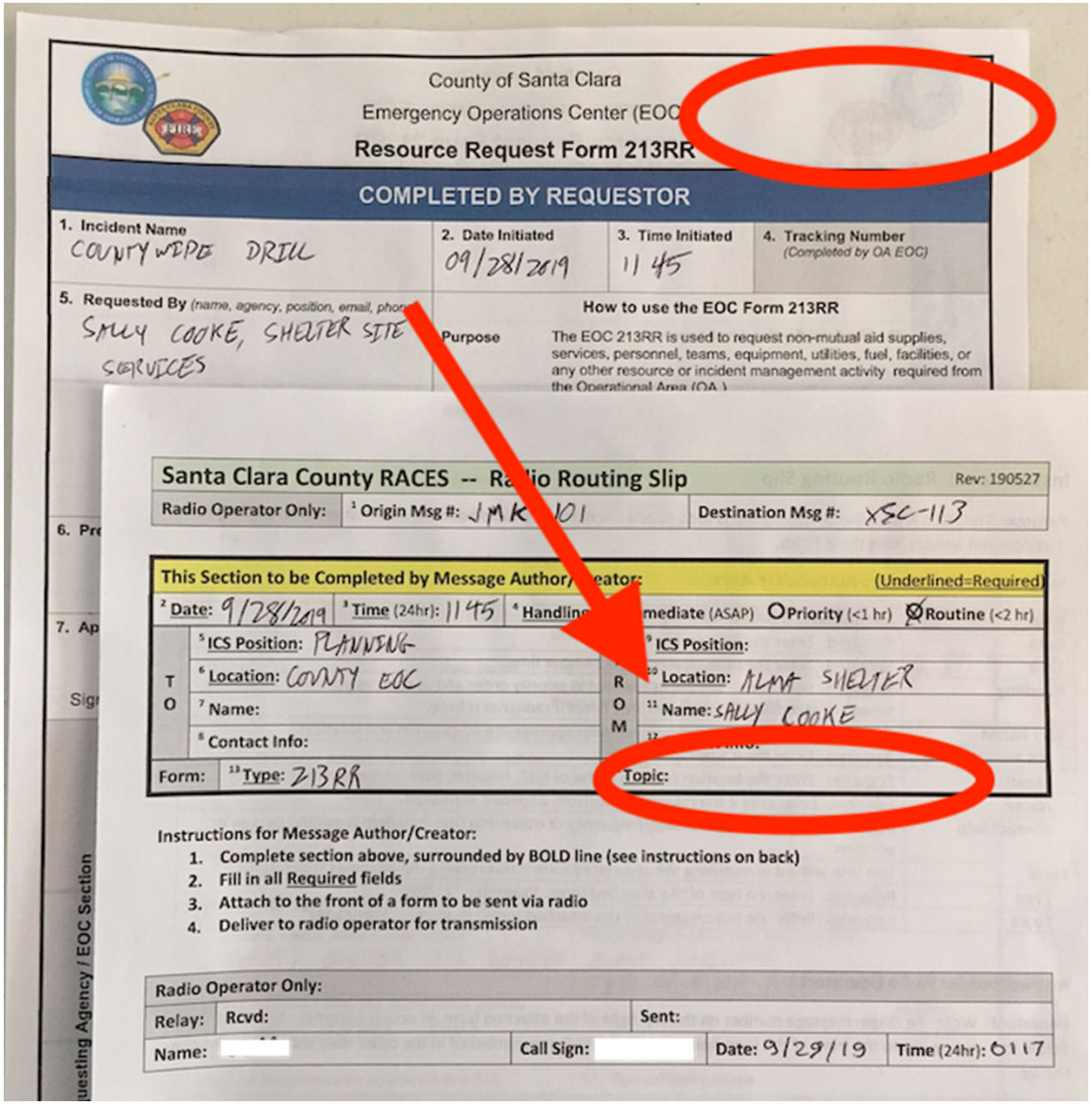
5. Personnel Roster Assigned

Name	Call Sign	ICS Position	Home Base/City

6. ACTIVITY LOG

...me (24:00)	Major Activities & Events / Occasional Messages (indicate From / To / Msg# / Msg Text)
830	Packet Network
930	End Packet Network
1100	Intro Net Control Practice
1200	End Intro Net Control Practice

Routing Slip Bad Example



County of Santa Clara
Emergency Operations Center (EOC)
Resource Request Form 213RR

COMPLETED BY REQUESTOR

1. Incident Name	2. Date Initiated	3. Time Initiated	4. Tracking Number (Completed by OA EOC)
COUNTY WIDE DRILL	09/28/2019	1145	

5. Requested By (name, agency, position, email, phone): SALLY COOKE, SHELTER SITE SERVICES

How to use the EOC Form 213RR

Purpose The EOC 213RR is used to request non-mutual aid supplies, services, personnel, teams, equipment, utilities, fuel, facilities, or any other resource or incident management activity required from the Operational Area (OA.)

Santa Clara County RACES -- Radio Routing Slip Rev: 190527

Radio Operator Only: [1] Origin Msg #: JMK 101 Destination Msg #: XSC-113

This Section to be Completed by Message Author/Creator: (Underlined=Required)

[2] Date: 9/28/2019 [3] Time (24hr): 1145 [4] Handling: mediate (ASAP) O Priority (<1 hr) Ø Routine (<2 hr)

TO		ROM	
	[5] ICS Position: PLANNING		[9] ICS Position:
	[6] Location: COUNTY EOC		[10] Location: ALMA SHELTER
	[7] Name:		[11] Name: SALLY COOKE
	[8] Contact Info:		

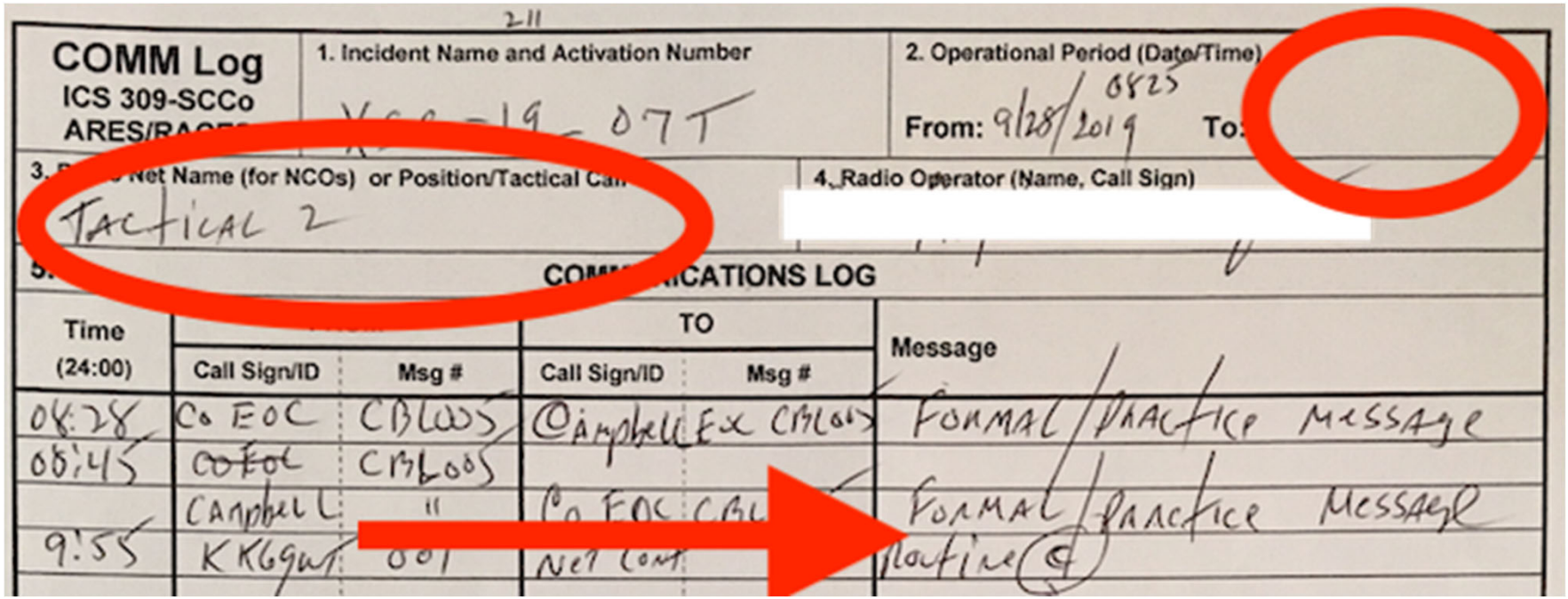
Form: [13] Type: 213RR Topic:

Instructions for Message Author/Creator:
1. Complete section above, surrounded by BOLD line (see instructions on back)
2. Fill in all Required fields
3. Attach to the front of a form to be sent via radio
4. Deliver to radio operator for transmission

Radio Operator Only:
Relay: Rcvd: Sent:
Name: Call Sign: Date: 9/29/19 Time (24hr): 0117

6. Pr
7. Ap
Sig
uesting Agency / EOC Section

ICS-309 Comm Log Bad Examples



COMM Log
ICS 309-SCCo
ARES/RACES

1. Incident Name and Activation Number: [illegible] -19- 07T

2. Operational Period (Date/Time)
From: 9/28/2019 0825 To:

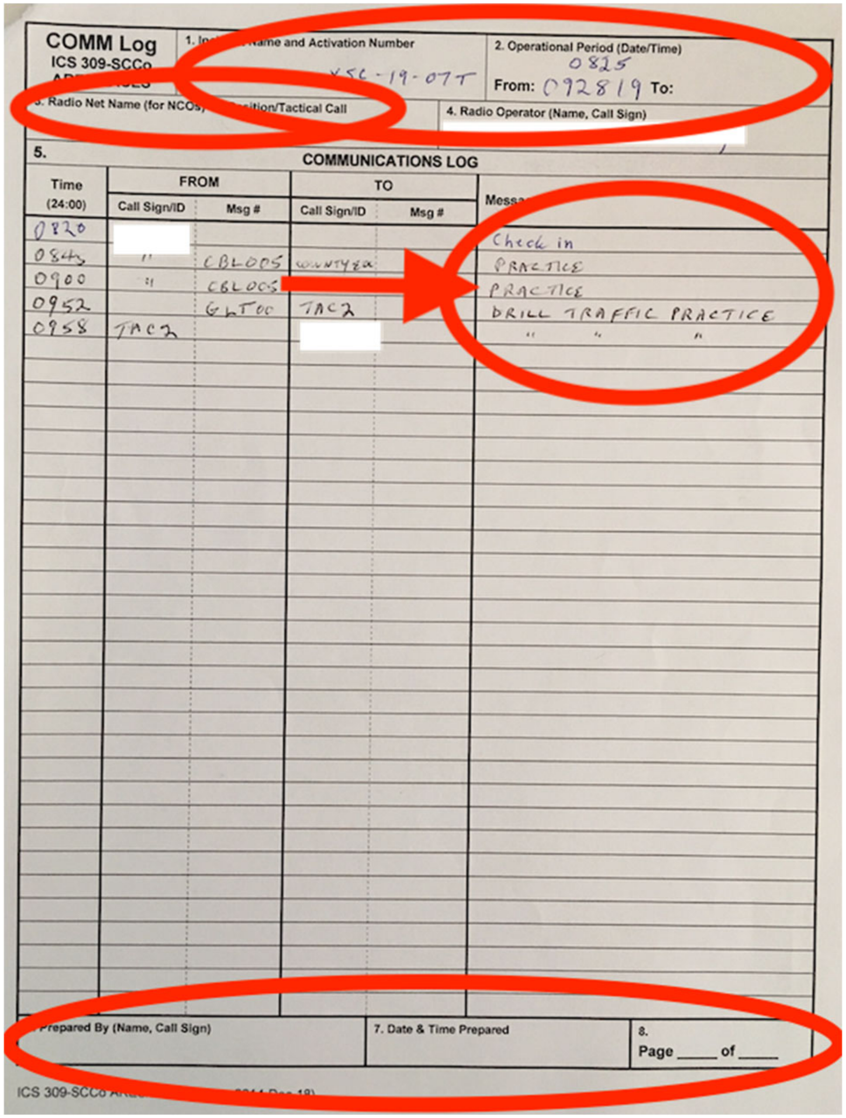
3. [illegible] Net Name (for NCOs) or Position/Tactical Call: TACTICAL 2

4. Radio Operator (Name, Call Sign)

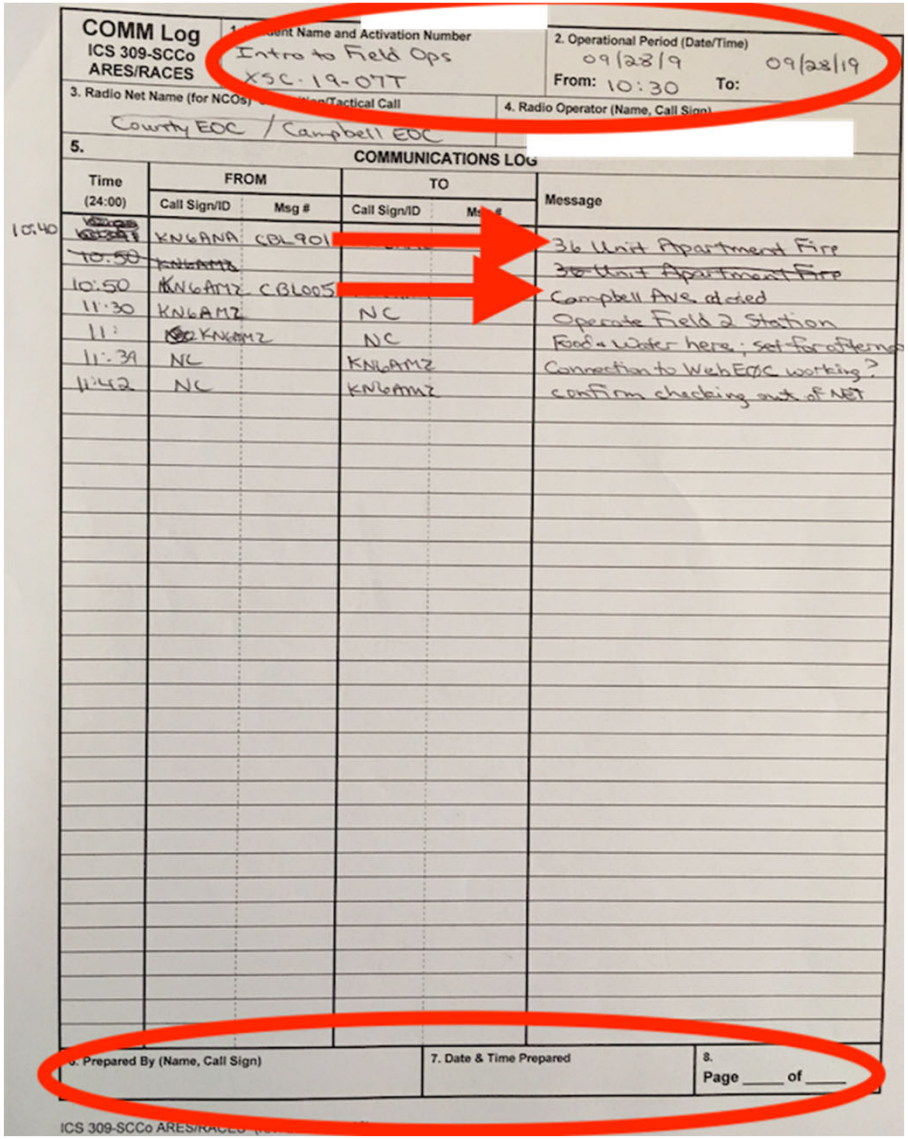
5. COMMUNICATIONS LOG

Time (24:00)	FROM Call Sign/ID	FROM Msg #	TO Call Sign/ID	TO Msg #	Message
08:28	Co EOC	CB005	@Campbell Ex CM005		FORMAL PRACTICE MESSAGE
08:45	CO EOC	CM005			
	CAMPBELL	"	Co EOC CM		FORMAL PRACTICE MESSAGE
9:55	KK6GWT	001	Net Cont		Routine @

ICS-309 Comm Log Bad Examples



ICS-309 Comm Log Bad Examples



COMM Log
ICS 309-SCCo
ARES/RACES

Intro to Field Ops
XSC-19-07T

2. Operational Period (Date/Time)
09/28/9 09/28/19
From: 10:30 To:

3. Radio Net Name (for NCOs)
County EOC / Campbell EOC

4. Radio Operator (Name, Call Sign)

5. COMMUNICATIONS LOG

Time (24:00)	FROM Call Sign/ID	FROM Msg #	TO Call Sign/ID	TO Msg #	Message
10:40	KN6ANA	CBL901			36 Unit Apartment Fire
~~10:50~~	~~KN6AMZ~~				~~36 Unit Apartment Fire~~
10:50	KN6AMZ	CBL005			Campbell Ave. closed
11:30	KN6AMZ		NC		Operate Field 2 Station
11:	KN6AMZ		NC		Food + Water here; set for afterno
11:39	NC		KN6AMZ		Connection to WebEOC working?
11:42	NC		KN6AMZ		confirm checking out of NET

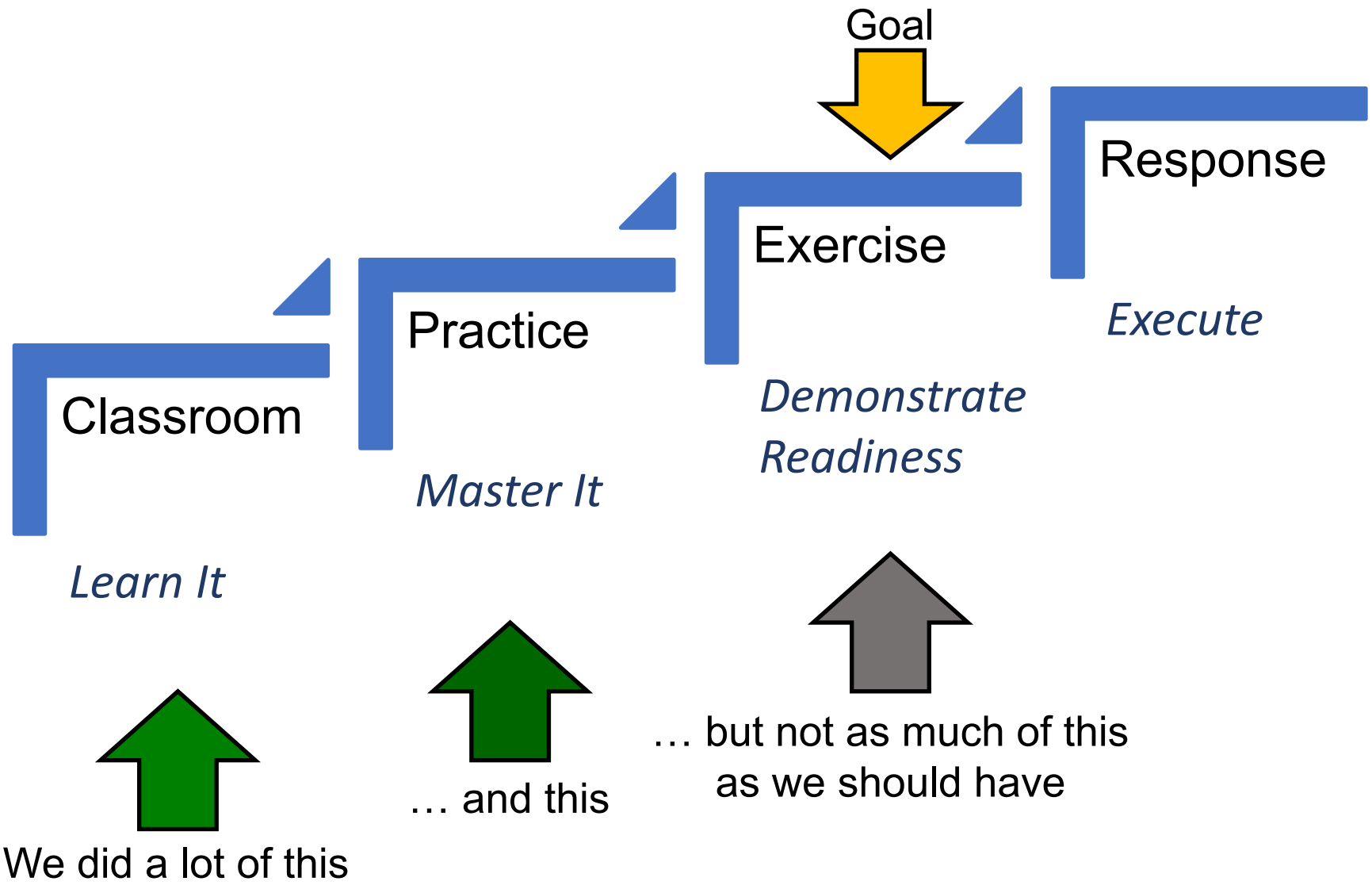
6. Prepared By (Name, Call Sign)
7. Date & Time Prepared
8. Page ____ of ____

ICS 309-SCCo ARES/RACES

Bottom Line

- Approximate error rate on forms = 30%
  - Even though there are instructions are on the back of each form!
- Most errors were from people who are not trained
  - Brand new; didn't take classes yet
  - Been around, but haven't kept up with training
- Those who regularly attend our training activities made few to no errors!
- Clearly, training classes and practice is the answer

How Did We Do Overall?



How Do We Improve?

- Increase focus on learning proper procedures
  - Review and take retake core classes
    - Field Comms, Net Control, Packet, Shadow, Message Passing…
    - Covers ICS forms used on a deployment; lots of examples
    - Recommend retaking at least every two years
  - Review Self-paced Videos
    - ICS-214 Unit Activity Log
  - Review online documentation
    - https://www.scc-ares-races.org/operations.html
- Increase focus on practice BEFORE the exercise or response
  - Monthly message passing net
  - Form local practice groups; mentored by best (credentialed) operators
  - New pop-up practice opportunities coming

For more info …

Learning: Instructor-led, self-paced, online

Practice: Nets, Drills, Exercises

https://www.scc-ares-races.org/training.html

Lessons Learned
Injury at a
Public Service Event

Dan Pugh, KM6GNG

Revised 11-Dec-2019

Why are all the Paperwork/Logs Necessary?

- Why is all of the paperwork necessary?
  - FEMA may look at practice event paperwork to see if it is done correctly
  - A poor history of improperly filled out forms can result in losing reimbursement funds after a real emergency (flooding, earthquake, etc.)
  - If there are questions after the activity, specifically an accident, a timeline of the event can be recreated
  - A “practice” event can turn into a real emergency incident at anytime
  - If you can’t complete the paperwork correctly during exercises, you’ll never complete it correctly under the stress of a real incident

- Hosted at Monterey Laguna Seca Raceway and Fort Ord back country
- 4 days, 10,000 cyclists, 70,000 spectators
- Ham radio operators set up 10-12 radio stations in the back country that has little or no cellular coverage and unpaved roads
- These stations provide a means to communicate emergency medical and support assistance in the case of an accident
- Most of the incidents were disabled cycles and minor cuts/abrasions, with the exception of one with a head injury
- All of the incidents were logged at the individual stations and the net control station

Head Injury at Marshal Point 11 (MP11)

From MP11 Station Log and Net Control Log:

- 11:21: Cyclist reported down (200 yds away) with lacerations; On site medic en route, 200 yards short of MP11, Rider Green bib #### (no personal information)
- 11:35: Medic treating rider ####, punctured knee, reported hitting head
- 11:56: Green #### pin-point pupils, requesting EMS support
- 12:00: Rider #### becoming unresponsive
- 12:01: Rider #### conscious but having trouble responding
- 12:02: Fire en route to MP11
- 12:05: National Ski Patrol medic arrives at MP11, assisting with rider
- 12:07: Fire Dept at MP11
- 12:20: NSP and Fire transporting rider #### to paved road with awaiting ambulance for final transport

After the Accident

- Sunday, April 14th: Accident occurred
- Tuesday, April 16th: Received email, hospital requesting location of rider #### helmet and glasses
- Wednesday, April 17th: Receive a phone call interview from the Ski Patrol medical lead requesting my observations of the incident. After the interview, I told him that he can correlate my observations with my station log and the Net Control Station log turned in to the Communications Lead
- The timeline of the accident was verified with the paperwork to prove that the medical response was proper and timely

Training Update

Tim Howard, KE6TIM

Andreas Ott, K6OTT

Mark Laubach, K6FJC

Revised 11-Dec-2019

Cross-band Repeating Update

Upcoming in 2020

- More contributed reference sheets in handout
- Please go and try it on your radio
- Class will incorporate lab where you can try it yourself
- If you have additional radios or corrections tell us about it

Antenna Fundamentals Update

Intermodulation Calculations

Lots of Combinations Are Possible

- 2019 countywide drill had ~ 25 frequencies to coordinate, transmitting on any two frequencies simultaneously will produce intermodulation distortion on a third frequency
- For N number of frequencies, f, Intermodulation products will exist at the frequencies

  $$k_1 f_1 + k_2 f_2 + \ldots . k_N f_N$$

  where k_1 , k_2 , $\ldots k_N$ are arbitrary positive or negative integers
- Intermodulation Order = $|k_1| + |k_2| + \ldots |k_N|$

  (Sum of the absolute values of the k factors)
- Example of determining the order

  $\mathbf{2} f_1 - (\mathbf{1})\, f_2$ -> **2 + 1 = 3 -> 3rd order**

  $(\mathbf{1}) f_1 - (\mathbf{1})\, f_2 + (\mathbf{1}) f_3$ -> **1 + 1 + 1= 3 -> 3rd order**
- Example of calculating an intermod frequency $\mathbf{2} f_1 - f_2$

  f_1 = 146.640 f_2 = 147.370

  2*146.640 – 147.370 = 145.910

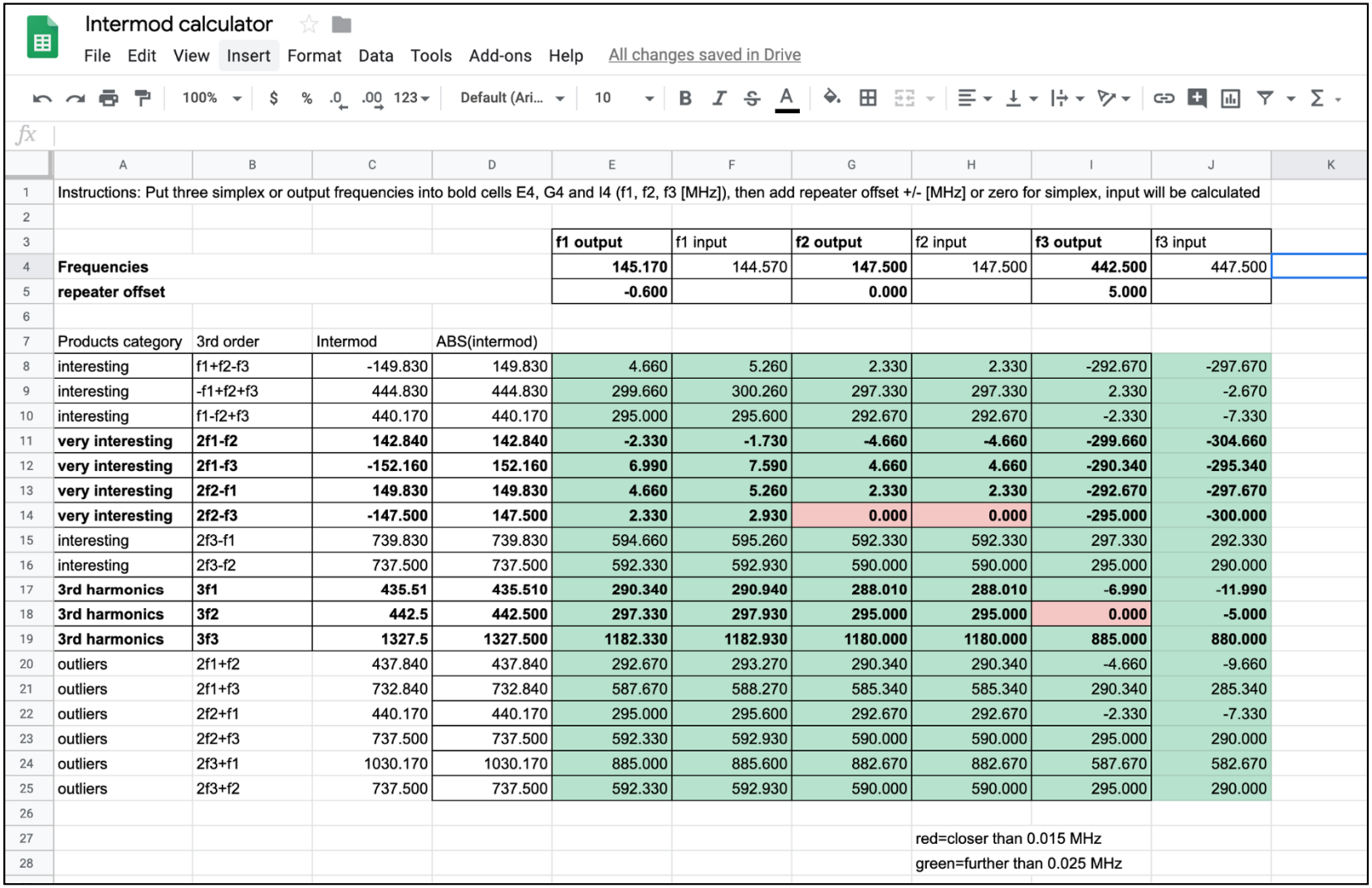
Remedies

- Frequency Choice
  - Use widely spaced frequencies
  - Use a software tool to calculate IMD products and make sure they don't fall on (or near) another frequency in use
  - Simple spreadsheet tool will available on county web site
- Antenna spacing – horizontal and vertical
  - IMD may form but be too weak to cause problems
- Power
  - Reducing power of the fundamental frequency also reduces the power of the intermodulation products

Intermod Calculator Spreadsheet (beta)

- Come to 2020 Antenna Fundamentals Class for more on this
- Follow instructions on sheet where to enter your two simplex, one simplex plus a repeater output/offset, and a third receive frequency
- Calculation for two transmit frequencies is performed for you, results are checked against three receive frequencies
- For two transmitters, the four most interesting 3rd order products are displayed and cells use conditional formatting to display red background if too close to the third frequency
  - $(2f_1-f_2)$, $(2f_2-f_1)$, $(2f_1+f_2)$, $(2f_2+f_1)$
  - The first two are of most interest because they are near the two transmitters (or may land close to other nearby receivers)
  - The last two are typically out of band (beware of VHF/UHF)
    - Won't affect our other receivers
    - Could affect other radio services at a shared transmitter site if not filtered, but not so important for an isolated ham radio event
- Bonus: Spreadsheet also calculates 3rd harmonics

Intermod Calculator Spreadsheet (beta)



Intermod calculator

File Edit View Insert Format Data Tools Add-ons Help All changes saved in Drive

	A	B	C	D	E	F	G	H	I	J	K
1	Instructions: Put three simplex or output frequencies into bold cells E4, G4 and I4 (f1, f2, f3 [MHz]), then add repeater offset +/- [MHz] or zero for simplex, input will be calculated										
2											
3					**f1 output**	f1 input	**f2 output**	f2 input	**f3 output**	f3 input	
4	**Frequencies**				**145.170**	144.570	**147.500**	147.500	**442.500**	447.500	
5	**repeater offset**				**-0.600**		**0.000**		**5.000**		
6											
7	Products category	3rd order	Intermod	ABS(intermod)							
8	interesting	f1+f2-f3	-149.830	149.830	4.660	5.260	2.330	2.330	-292.670	-297.670	
9	interesting	-f1+f2+f3	444.830	444.830	299.660	300.260	297.330	297.330	2.330	-2.670	
10	interesting	f1-f2+f3	440.170	440.170	295.000	295.600	292.670	292.670	-2.330	-7.330	
11	**very interesting**	**2f1-f2**	**142.840**	**142.840**	**-2.330**	**-1.730**	**-4.660**	**-4.660**	**-299.660**	**-304.660**	
12	**very interesting**	**2f1-f3**	**-152.160**	**152.160**	**6.990**	**7.590**	**4.660**	**4.660**	**-290.340**	**-295.340**	
13	**very interesting**	**2f2-f1**	**149.830**	**149.830**	**4.660**	**5.260**	**2.330**	**2.330**	**-292.670**	**-297.670**	
14	**very interesting**	**2f2-f3**	**-147.500**	**147.500**	**2.330**	**2.930**	**0.000**	**0.000**	**-295.000**	**-300.000**	
15	interesting	2f3-f1	739.830	739.830	594.660	595.260	592.330	592.330	297.330	292.330	
16	interesting	2f3-f2	737.500	737.500	592.330	592.930	590.000	590.000	295.000	290.000	
17	**3rd harmonics**	**3f1**	**435.51**	**435.510**	**290.340**	**290.940**	**288.010**	**288.010**	**-6.990**	**-11.990**	
18	**3rd harmonics**	**3f2**	**442.5**	**442.500**	**297.330**	**297.930**	**295.000**	**295.000**	**0.000**	**-5.000**	
19	**3rd harmonics**	**3f3**	**1327.5**	**1327.500**	**1182.330**	**1182.930**	**1180.000**	**1180.000**	**885.000**	**880.000**	
20	outliers	2f1+f2	437.840	437.840	292.670	293.270	290.340	290.340	-4.660	-9.660	
21	outliers	2f1+f3	732.840	732.840	587.670	588.270	585.340	585.340	290.340	285.340	
22	outliers	2f2+f1	440.170	440.170	295.000	295.600	292.670	292.670	-2.330	-7.330	
23	outliers	2f2+f3	737.500	737.500	592.330	592.930	590.000	590.000	295.000	290.000	
24	outliers	2f3+f1	1030.170	1030.170	885.000	885.600	882.670	882.670	587.670	582.670	
25	outliers	2f3+f2	737.500	737.500	592.330	592.930	590.000	590.000	295.000	290.000	
26											
27								red=closer than 0.015 MHz			
28								green=further than 0.025 MHz			

Net Control Update

Net Control Classes Changes For 2020

- More material will be moved to pre-study homework
  - We don’t need to spend class time to review every slide
  - There will time for Q&A on the homework material at start of each class before the Quiz
- Allowing more time for in class exercises

Training Program Update

Practice vs Experience

- Practice is getting you ready for your performance
- Practice is the dress rehearsal
- Experience is doing the performance many times in varying situations and conditions
- Many operators do not get the practice needed to be good communicators when they move on to the performance part (real event) of being a radio operator
- Some cities try and provide the practice, but most operators need more practice

Pop-up Packet Practice

- Very successful short half-day event to get some practice
- An opportunity to test equipment in a deployed environment
- Half day Morning activity in a park or parking lot
- Participation is quick and easy.
  - Travel to the location
  - Set up your station, send/receive a few messages (~ 1 hour)
  - Pack up your station - Be home for lunch
- No AC Power. No Generators. Should be able to run 1 hour on batteries.
- Mentors available to assist
- Opportunities for P3 & P2 evals and MAC Credit

NEW! Net Control Pop-Up Practice

- Modeled on Intro to NC activity at Countywide Exercise
- Can be held indoors - no weather concerns
- Short event, just a couple of hours
- Mentor intensive

NEW! Message Passing Pop-Up Practice

- Message Passing Pop-Up Practice
- Can be held indoors – no weather concerns
- Short event, just a couple of hours
- Can provide more individual feedback than allowed on Message Passing Net
- Mentor intensive

Experience

- County Quarterly Drills (city or county positions)
- Net Control for City Nets
- Net Control for SPECS & SVECS Nets
- Hospital Net
- Various Drills and Exercises – city and county
- Countywide Communications exercise
- Numerous Public Service Events
  - Festivals, Parades, Fourth of July, Foot and Bike races/rides

We can use your help

- 22 Instructor led classes
- Mentors needed for Pop-up events
- You will learn more by teaching or mentoring

- If you are willing and qualified, we can use your help
  - Instructor qualifications shown on web site
  - https://www.scc-ares-races.org/training.html
  - (Scroll down to “Instructors” section)

Message Passing Update

Michael Fox, N6MEF

Revised 11-Dec-2019

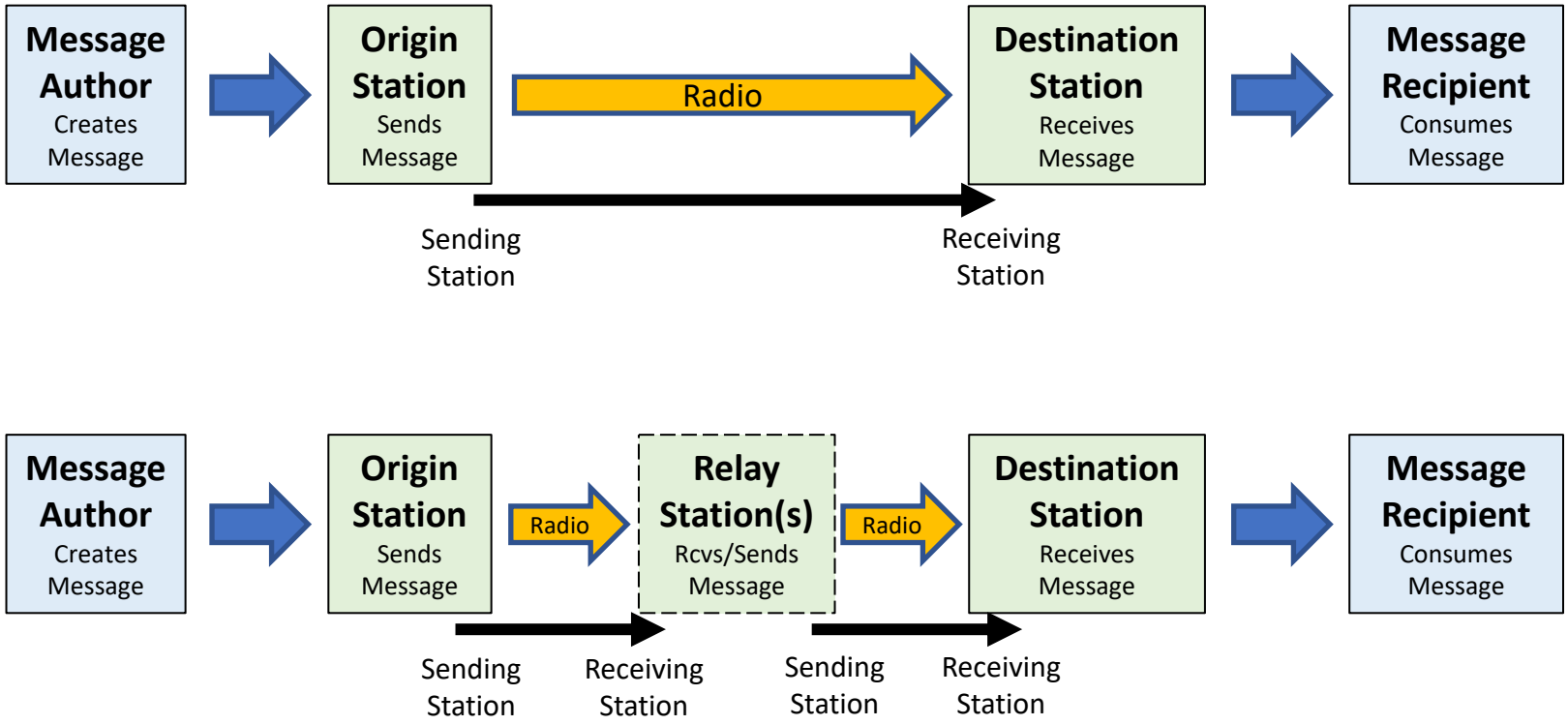
New This Year

- General Procedures
  - Roles
  - Message Numbers
  - Message Prioritization
  - 3rd Party Written Messages
  - Radio Routing Information
  - Radio Routing Slip
  - Form Routing Cheat Sheet
- Voice Procedures
  - Consistent procedures
  - ARRL NTS vs. ARES/RACES
  - New Prowords: Symbol(s), Mixed Group Symbol(s)

General Procedures

Applies to voice and data messages

Message Handling Roles - Graphical



Key Terms: Origin, Destination

Message Numbers

- ICS-213 Message form still has three message numbers. Ugh.
  - Ambiguous terms: sender, receiver
  - We hope to have that updated in the first part of 2020.

MESSAGE FORM ▸ Use Ballpoint Pen–Press Hard; Print Clearly (See back for instructions)	When Receiving Msg: [2] Sender's Msg Nbr	Message Number	When Sending Msg: [3] Receiver's Msg Nbr

- All new forms have only two message numbers
  - Origin Message Number
  - Destination Message Number

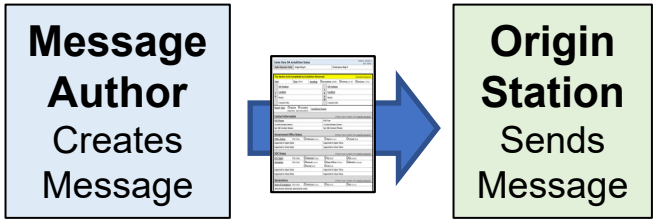
Radio Operator Only:	Origin Msg #:	Destination Msg #:

Message Prioritization

- "Severity" is no longer part of message prioritization
  - Also removed from all forms except ICS-213 Message

- Messages are handled in priority order, according to:
  - Handling order
  - Date
  - Time

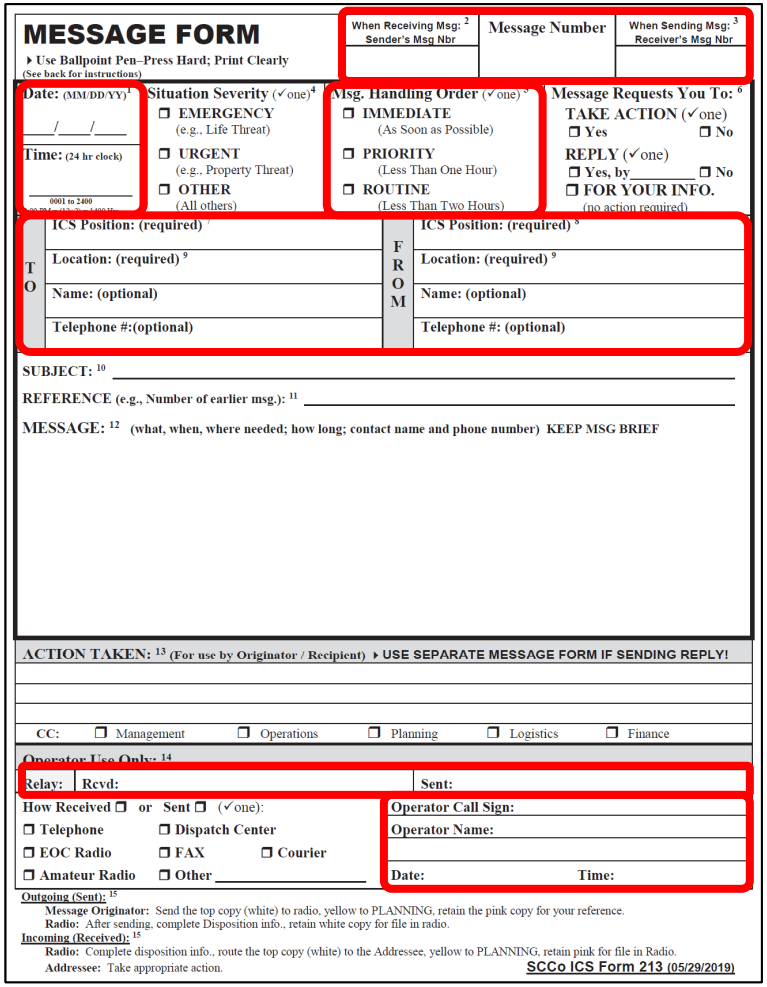
3rd Party Written Messages



- 3rd party written messages <u>always</u> use an appropriate form
  - General messages on ICS-213; resource requests on EOC-213RR; etc.
- If the message is not on the appropriate form:
  - Best: Ask the author to use the correct form
    - If they don't have one, provide it to them
  - Else: Transcribe the message to the form, asking the author to clarify as you go
    - Clarify spelling, other details
  - Last Resort: Staple to an appropriate form only if necessary
    - Papers can become detached, separated
    - Staples, paper clips, and odd paper sizes can cause problems when scanning/copying

Radio Routing Information

- Written messages must have routing information that a radio operator needs to send, deliver, and track a message
  - Message Numbers
  - Date, Time
  - Handling Order
  - To/From
  - Radio Operator Info
- Some forms contain these fields
  - Example: ICS-213 SCCo
- Some don't



MESSAGE FORM

▸ Use Ballpoint Pen–Press Hard; Print Clearly
(See back for instructions)

When Receiving Msg: [2] Sender's Msg Nbr | Message Number | When Sending Msg: [3] Receiver's Msg Nbr

Date: (MM/DD/YY)[1] ___/___/___
Time: (24 hr clock) ____ 0001 to 2400

Situation Severity (✓one)[4]
❒ EMERGENCY (e.g., Life Threat)
❒ URGENT (e.g., Property Threat)
❒ OTHER (All others)

Msg. Handling Order (✓one)[5]
❒ IMMEDIATE (As Soon as Possible)
❒ PRIORITY (Less Than One Hour)
❒ ROUTINE (Less Than Two Hours)

Message Requests You To: [6]
TAKE ACTION (✓one) ❒ Yes ❒ No
REPLY (✓one) ❒ Yes, by_____ ❒ No
❒ FOR YOUR INFO. (no action required)

TO: ICS Position: (required)[7] | Location: (required)[9] | Name: (optional) | Telephone #:(optional)

FROM: ICS Position: (required)[8] | Location: (required)[9] | Name: (optional) | Telephone #: (optional)

SUBJECT: [10] _____

REFERENCE (e.g., Number of earlier msg.): [11] _____

MESSAGE: [12] (what, when, where needed; how long; contact name and phone number) KEEP MSG BRIEF

ACTION TAKEN: [13] (For use by Originator / Recipient) ▸ USE SEPARATE MESSAGE FORM IF SENDING REPLY!

CC: ❒ Management ❒ Operations ❒ Planning ❒ Logistics ❒ Finance

Operator Use Only: [14]
Relay: | Rcvd: | Sent:

How Received ❒ or Sent ❒ (✓one):
❒ Telephone ❒ Dispatch Center
❒ EOC Radio ❒ FAX ❒ Courier
❒ Amateur Radio ❒ Other _____

Operator Call Sign:
Operator Name:
Date: Time:

Outgoing (Sent): [15]
Message Originator: Send the top copy (white) to radio, yellow to PLANNING, retain the pink copy for your reference.
Radio: After sending, complete Disposition info., retain white copy for file in radio.
Incoming (Received): [15]
Radio: Complete disposition info., route the top copy (white) to the Addressee, yellow to PLANNING, retain pink for file in Radio.
Addressee: Take appropriate action.

SCCo ICS Form 213 (05/29/2019)

Fillable PDF Forms for 3rd Party Messages

Created by SCCo ARES/RACES

- General Use
  - ICS-213 Message
  - WebEOC OA Municipal Status
  - WebEOC OA Shelter Status
- Hospital
  - EMResource HAvBed Report
  - WebEOC Medical Facility Status
- RACES
  - RACES Mutual Aid Request

Contain Radio Routing Info

Created by Others

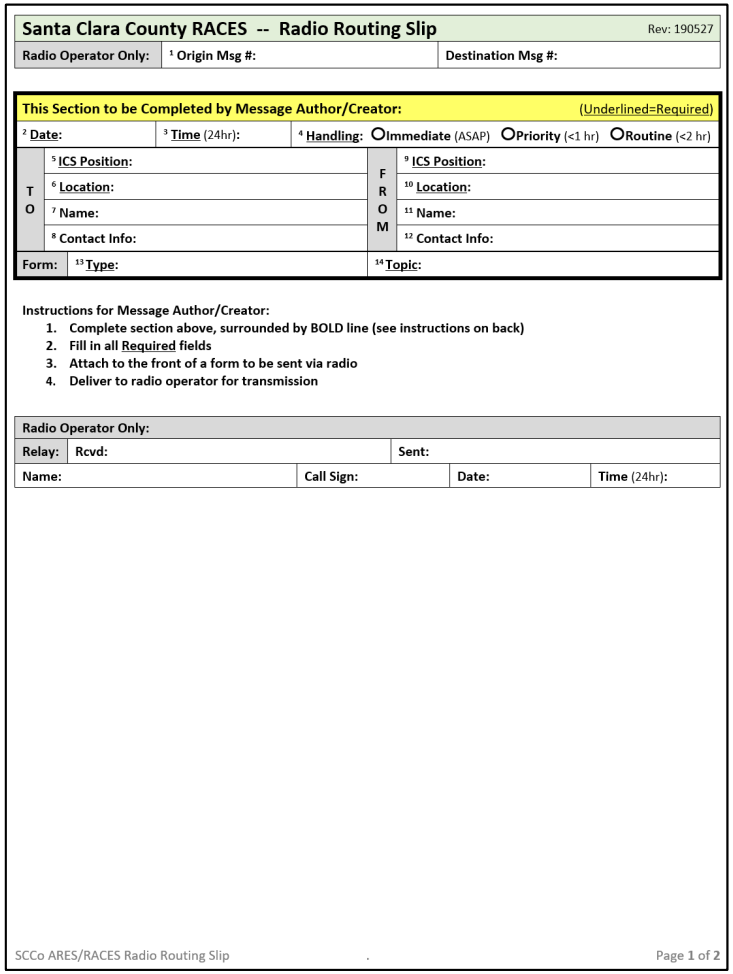
- General
  - EOC-213RR Resource Request
  - Allied Health Facility Status
- Hospital
  - Medical Resource Request
- Any other form …

Do NOT Contain Radio Routing Info

What info do we need?
Where can we write it?
How can we execute consistently?

Radio Routing Slip

- Use when sending or receiving a form that does not contain radio routing info
  - A place to write the missing fields
  - Ensures consistency of operations
- NOT a substitute for an ICS-213 Message Form
  - Do NOT write a message on the Radio Routing Slip



Santa Clara County RACES -- Radio Routing Slip Rev: 190527

Radio Operator Only:	[1] Origin Msg #:	Destination Msg #:

This Section to be Completed by Message Author/Creator: (Underlined=Required)

[2] Date:	[3] Time (24hr):	[4] Handling: ○Immediate (ASAP) ○Priority (<1 hr) ○Routine (<2 hr)

TO	[5] ICS Position:	FROM	[9] ICS Position:
	[6] Location:		[10] Location:
	[7] Name:		[11] Name:
	[8] Contact Info:		[12] Contact Info:
Form:	[13] Type:		[14] Topic:

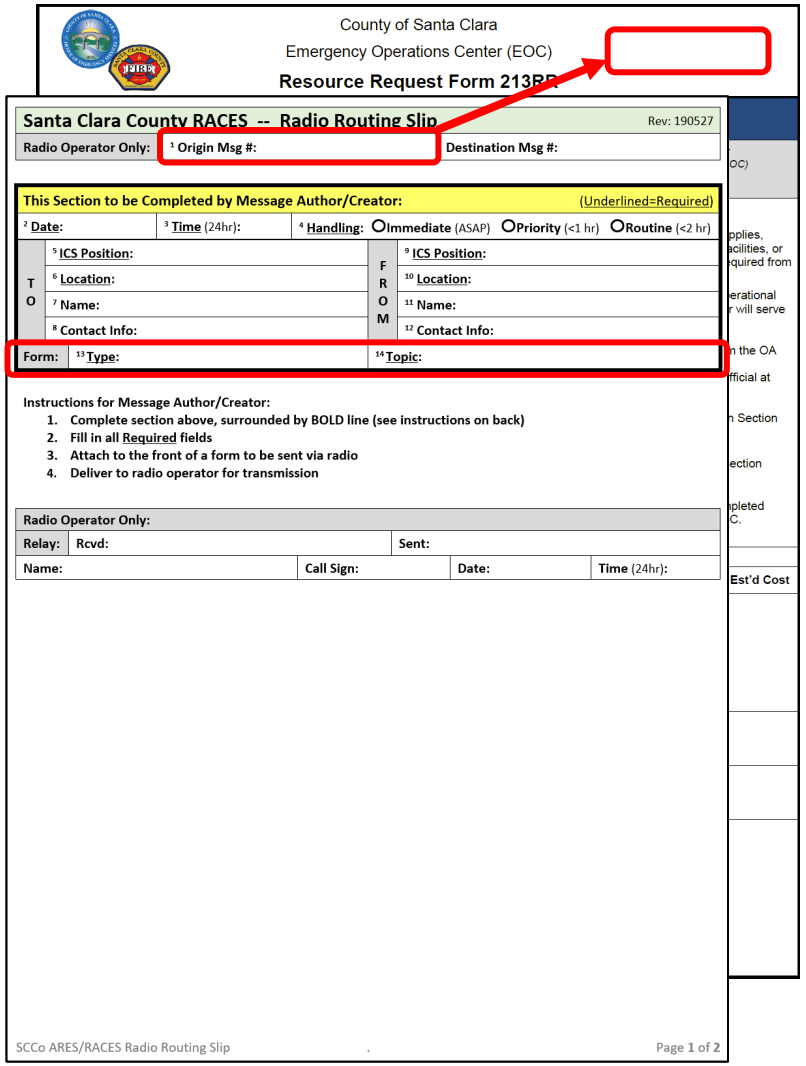
Instructions for Message Author/Creator:
1. Complete section above, surrounded by BOLD line (see instructions on back)
2. Fill in all Required fields
3. Attach to the front of a form to be sent via radio
4. Deliver to radio operator for transmission

Radio Operator Only:			
Relay:	Rcvd:	Sent:	
Name:	Call Sign:	Date:	Time (24hr):

SCCo ARES/RACES Radio Routing Slip . Page 1 of 2

Connecting Form and Routing Slip

- Attach routing slip to the front of the form being sent/received
  - Staples, …
- Write Origin Msg Nbr on the top right of the agency's form
  - Helps you find the corresponding Routing Slip if it becomes detached
- Write Form Type / Topic on the Routing Slip
  - Helps you find the corresponding form if it becomes detached



County of Santa Clara
Emergency Operations Center (EOC)
Resource Request Form 213RR

Santa Clara County RACES -- Radio Routing Slip Rev: 190527

Radio Operator Only: [1] Origin Msg #: Destination Msg #:

This Section to be Completed by Message Author/Creator: (Underlined=Required)

[2] Date: [3] Time (24hr): [4] Handling: Immediate (ASAP) Priority (<1 hr) Routine (<2 hr)

TO	FROM
[5] ICS Position:	[9] ICS Position:
[6] Location:	[10] Location:
[7] Name:	[11] Name:
[8] Contact Info:	[12] Contact Info:

Form: [13] Type: [14] Topic:

Instructions for Message Author/Creator:
1. Complete section above, surrounded by BOLD line (see instructions on back)
2. Fill in all Required fields
3. Attach to the front of a form to be sent via radio
4. Deliver to radio operator for transmission

Radio Operator Only:

Relay: Rcvd:	Sent:		
Name:	Call Sign:	Date:	Time (24hr):

SCCo ARES/RACES Radio Routing Slip Page 1 of 2

Announcing a Message

- **Step 1:** Announce quantity and handling order; wait for "go"
  - Examples
    - "Net Control, I have 2 Priority messages for you"
    - "Net Control, I have 1 Immediate and 1 Routine message for you"
  - The receiving station will prioritize vs. other messages that may be waiting. When ready, will say: "go ahead" or "ready to copy"
- **Step 2:** Announce message type before sending; wait for "go"
  - Let the receiver know what's coming so they can prepare the right form (and routing slip, if used)
    - "Message type is ICS-213"
    - "Message type is 213RR with Routing Slip"
    - "Message type is informal" (ex. unstructured, non-form-type messages)
  - The receiving station readies the right form (and routing slip, if needed), then: "go ahead" or "ready to copy"
- **Step 3:** Send the message

Form Routing Cheat Sheet

What If Message Author Doesn't Know?

- The author of a 3rd party message may not know the proper Handling Order or TO address info
  - They usually enter their data into an online system
  - The "system" handles it from there
  - Not sure which "ICS Position" should get the message (varies by form)
- They may not know how quickly it should be sent
- Radio operators may not know either

[2] Date:	[3] Time (24hr):	[4] Handling: O Immediate (ASAP) O Priority (<1 hr) O Routine (<2 hr)

TO	[5] ICS Position:	FROM	[9] ICS Position:
	[6] Location:		[10] Location:
	[7] Name:		[11] Name:
	[8] Contact Info:		[12] Contact Info:

Recommended Routing Cheat Sheet (cont.)

- Provides recommended routing based on agency input
- Handling may be conditional upon other fields in form
- To Location may be conditional upon activation status
- ICS Unit > Branch > Section are identified to cover different staffing levels

Form Type	Handling		To Location	To ICS Position
General EOC				
ICS-213 Message Form	**If "Severity" is:**	**Then "Handling" is:**	Author defined	Author defined
	Emergency	Immediate (ASAP)		
	Urgent	Priority (<1 hr)		
	Other	Routine (<2 hrs)		
EOC-213RR Resource Request	**If "Priority" is:**	**Then "Handling" is:**	County EOC	Planning Section
	Now	Immediate (ASAP)		
	High (0-4 hrs)	Immediate (ASAP)		
	Medium (5-12 hrs)	Priority (<1 hr)		
	Low (12+ hrs)	Routine (<2 hrs)		
OA Municipal Status	Immediate (ASAP)		County EOC	Situation Analysis Unit Else: Planning Section
OA Shelter Status	Priority (<1 hr)		For city-managed: City EOC For county-managed: County EOC	Mass Care & Shelter Unit Else: Care and Shelter Branch Else: Operations Section

Voice Procedures

The “[Broken] Telephone Game”

- Actual conference call during a functional exercise
  - Message: how to look up status of open resource requests
  - Message contents: URL, username, password, role
  - Includes: symbols, upper/lowercase
- High quality conference bridge; no problem hearing
- But, receiving party was unable to successfully copy

A Common Procedure Is Essential

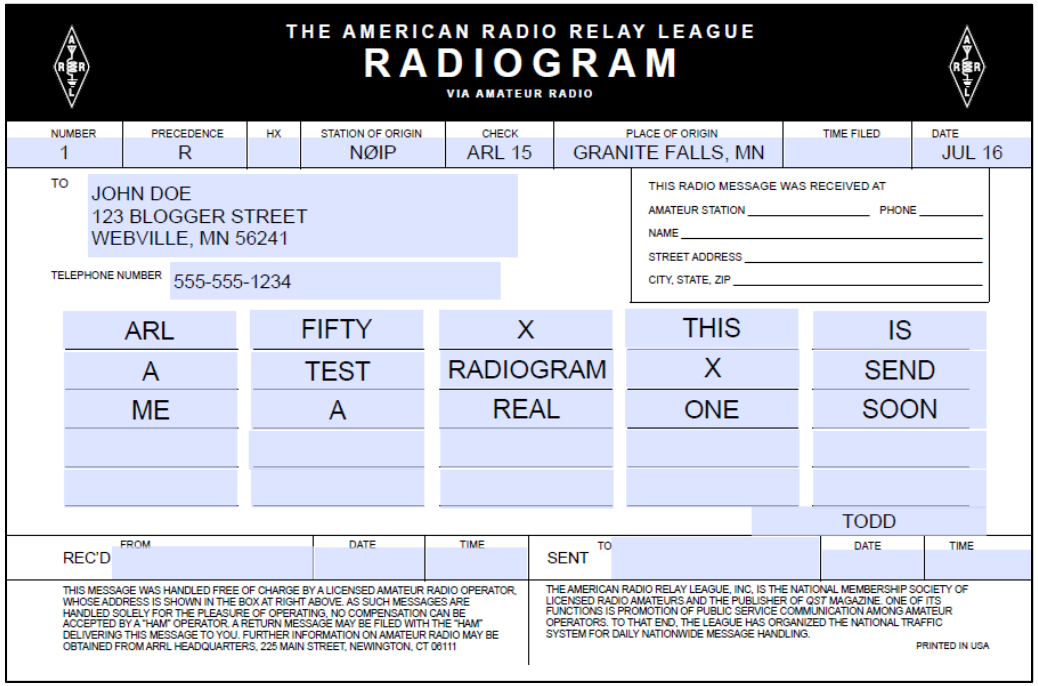
(Pick a Procedure. Any Procedure. Then Stick To It!)

- Which one you pick doesn't really matter
- But everyone must use the same procedure or:
  - Delays
  - Problems

We Start With ARRL NTS Procedures

- Most widely used procedure for amateur radio msg passing
- Defines use of ITU Phonetics:
  - Letters: O = “OSS-cah”; P = “pah-PAH”; Q = keh-BECK; …
  - Numbers: 3 = “tree”; 5 = “fife”; 9 = “niner”; …
- Defines use of Prowords
  - Control: Roger, Break, Stand By, Continue, …
  - Clarification: I Spell, I Say Again
  - Introductory: Figure(s), Mixed Group, Internet Address, …
- But …
  - Only covers about 80% of what we need for 3rd party messages
  - The remaining 20% are very significant gaps

ARRL NTS Radiograms vs. 3rd Party Written Msgs



THE AMERICAN RADIO RELAY LEAGUE

RADIOGRAM

VIA AMATEUR RADIO

NUMBER	PRECEDENCE	HX	STATION OF ORIGIN	CHECK	PLACE OF ORIGIN	TIME FILED	DATE
1	R		NØIP	ARL 15	GRANITE FALLS, MN		JUL 16

TO
JOHN DOE
123 BLOGGER STREET
WEBVILLE, MN 56241

TELEPHONE NUMBER 555-555-1234

THIS RADIO MESSAGE WAS RECEIVED AT
AMATEUR STATION _____ PHONE _____
NAME _____
STREET ADDRESS _____
CITY, STATE, ZIP _____

ARL	FIFTY	X	THIS	IS
A	TEST	RADIOGRAM	X	SEND
ME	A	REAL	ONE	SOON

TODD

REC'D FROM | DATE | TIME

SENT TO | DATE | TIME

THIS MESSAGE WAS HANDLED FREE OF CHARGE BY A LICENSED AMATEUR RADIO OPERATOR, WHOSE ADDRESS IS SHOWN IN THE BOX AT RIGHT ABOVE. AS SUCH MESSAGES ARE HANDLED SOLELY FOR THE PLEASURE OF OPERATING, NO COMPENSATION CAN BE ACCEPTED BY A "HAM" OPERATOR. A RETURN MESSAGE MAY BE FILED WITH THE "HAM" DELIVERING THIS MESSAGE TO YOU. FURTHER INFORMATION ON AMATEUR RADIO MAY BE OBTAINED FROM ARRL HEADQUARTERS, 225 MAIN STREET, NEWINGTON, CT 06111

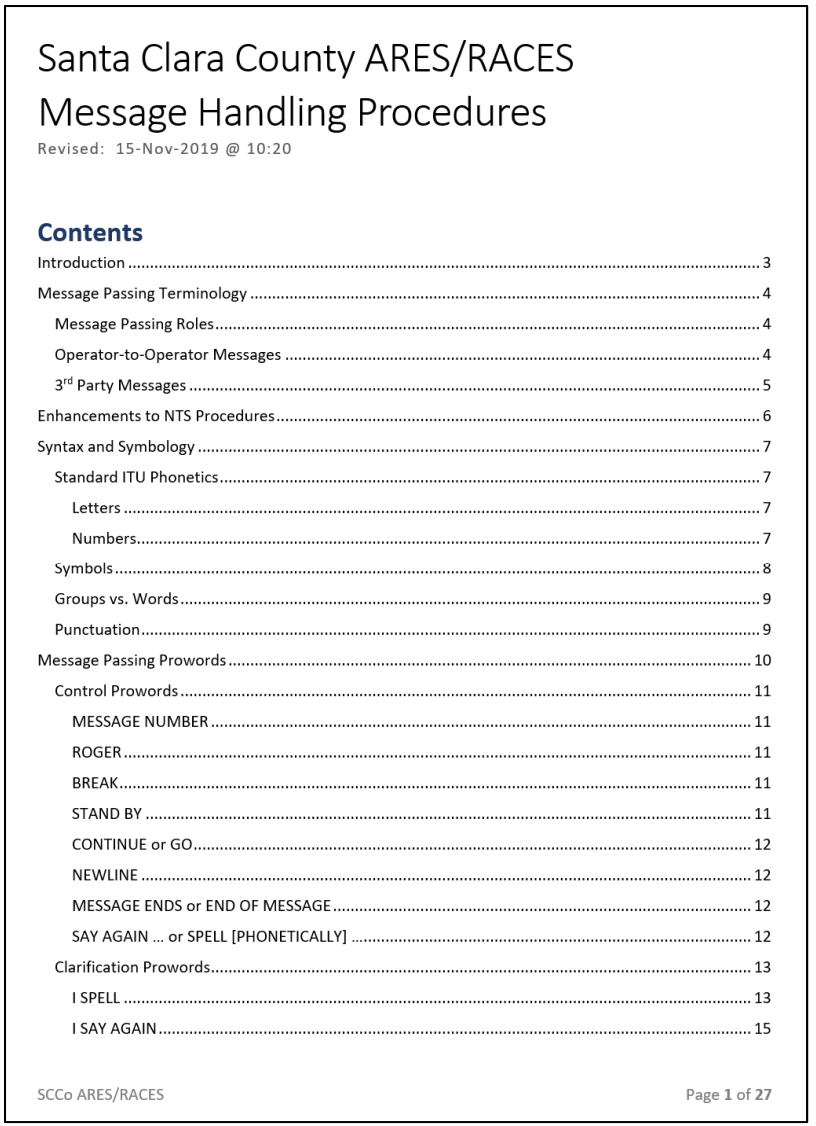
THE AMERICAN RADIO RELAY LEAGUE, INC. IS THE NATIONAL MEMBERSHIP SOCIETY OF LICENSED RADIO AMATEURS AND THE PUBLISHER OF QST MAGAZINE. ONE OF ITS FUNCTIONS IS PROMOTION OF PUBLIC SERVICE COMMUNICATION AMONG AMATEUR OPERATORS. TO THAT END, THE LEAGUE HAS ORGANIZED THE NATIONAL TRAFFIC SYSTEM FOR DAILY NATIONWIDE MESSAGE HANDLING.

PRINTED IN USA

- They don't match how 3rd parties write messages
  - "X" to indicate a period. "QUERY" for a question mark.
  - Assumes all uppercase. Rules do not account for mixed case.
  - Rules do not account for: punctuation, symbols, formatting, …

Our Message Handling Procedures

- Uses ARRL NTS procedures except when they …
  - Don't match how 3rd parties write
    - Punctuation, mixed case, …
  - Don't address 3rd party content
    - Mixed case, symbols, format, …
- Added rules are similar to NTS
  - "symbol(s)" vs. "figure(s)"
  - "mixed group symbol(s)" vs. "mixed group figure(s)"
- Lots of examples
- Work in progress



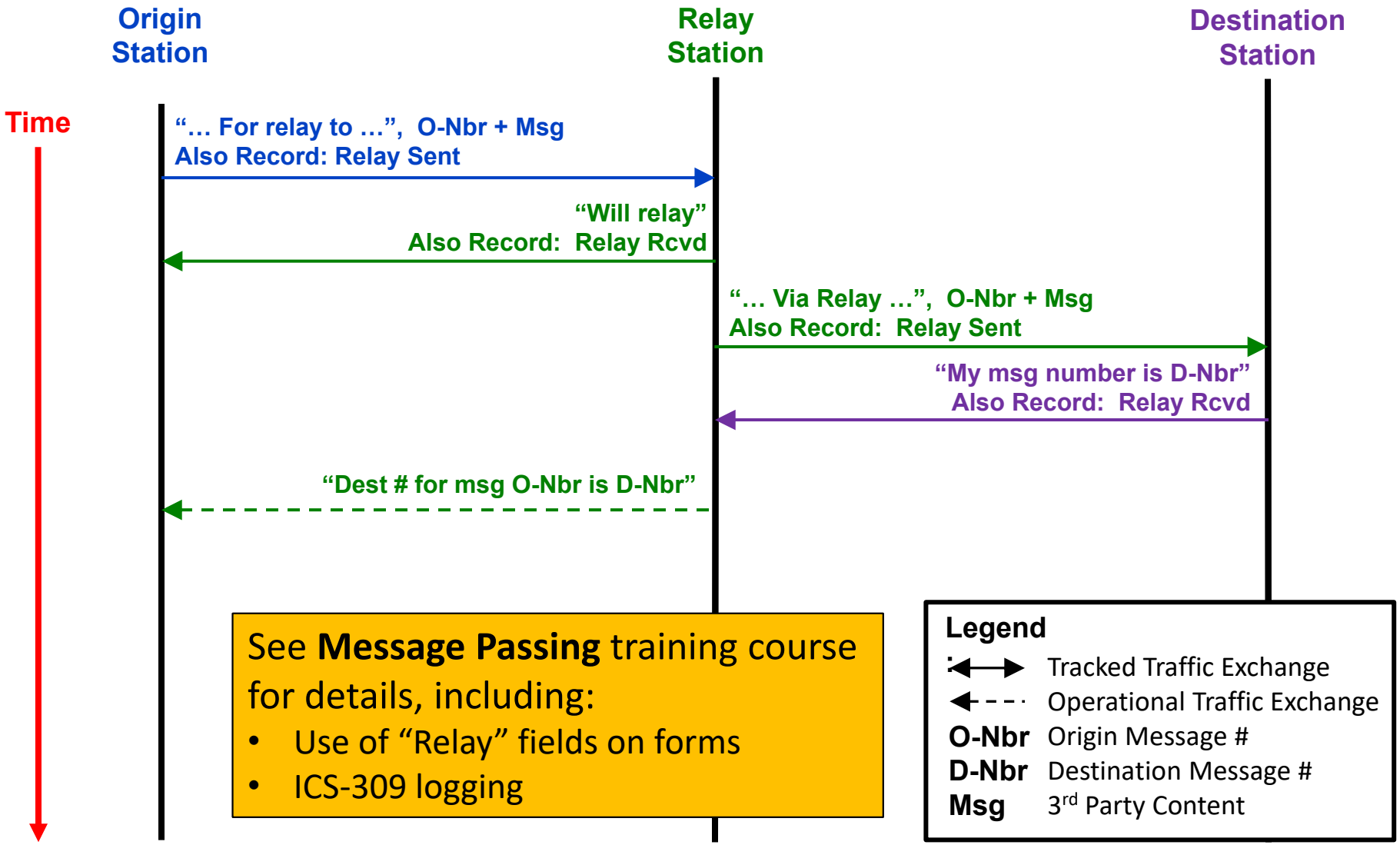
Santa Clara County ARES/RACES
Message Handling Procedures
Revised: 15-Nov-2019 @ 10:20

Contents

Relaying Messages

We now have a procedure and data fields to handle relaying any number of hops

Relay – 2 Hops



Message Passing Training

- The data is clear: our training works
  - Those who actively participate in our training do well
  - Others … not so much!

- Message Passing Practice Net
  - Monthly, with live feedback
- Message Passing Classroom
  - Interactive; lots of examples
- New in 2020: Message Passing Pop-up Practice

Packet Update

Jim Oberhofer, KN6PE

Revised 11-Dec-2019

Pop-Up Packet Practice

2019 Pop-up Packet!

Were you there?

- 25 packet ops setup their personal packet stations in the parking lot across from County EOC and operated as if they just deployed to the field.
- This was a nice opportunity to practice in the field, share best practices, see what worked and did not work, and get ideas for refining your own packet go-kit!

2019 Pop-up Packet

Weekly Packet “Practice”

2019… by the numbers (through 3-Dec-2019)

	Monday	Tuesday	’19 ttl	’18 ttl	Chg
Total Practice Messages sent	1230	1614	2844	2116	+34%
% Practice Messages sent	43.2%	56.8%	100.0%		
% Correct all the time	94.1%	93.3%	93.7%	93.2%	+0.5%
Average # of Participants / Night	25	33	29	25.5	+13%

Weekly Packet "Practice"

- See the *"Standard Packet Check-In/Out Message"* App Note under… https://www.scc-ares-races.org/data/packet/index.html#app-notes

- See the *Practice Message, Subject* section under… https://www.scc-ares-races.org/data/packet/weekly-packet-practice.html#Message

Outpost & PackItForms

Review

What's in the box?

SCCo Integrated Packet Installer:

- Outpost Packet Message Manager
  - GUI-based interface for managing packet communications
  - Makes using packet as simple as using e-mail
- PacFORMS
  - HTML-based forms for use with Outpost
  - Since 2007, simplified forms-based data entry, reduced network bandwidth
- PackItForms
  - Next generation HTML-based forms for use with Outpost
  - Started in Los Altos; expanded to all county forms

What’s new with Outpost

Outpost v3.3 c065
SCCo Installer v145C – July 2019

By the numbers

- 3 New Features
- 26 Defects
- 27 Enhancements
- 47 SCCo Submitted
- 56 Total changes

These were related to

- 17 – Add-on/API
- 8 - Message Handling
- 6 – Send/Receive
- 5 – Scripting
- 3 – Printing
- … plus another 17 various changes

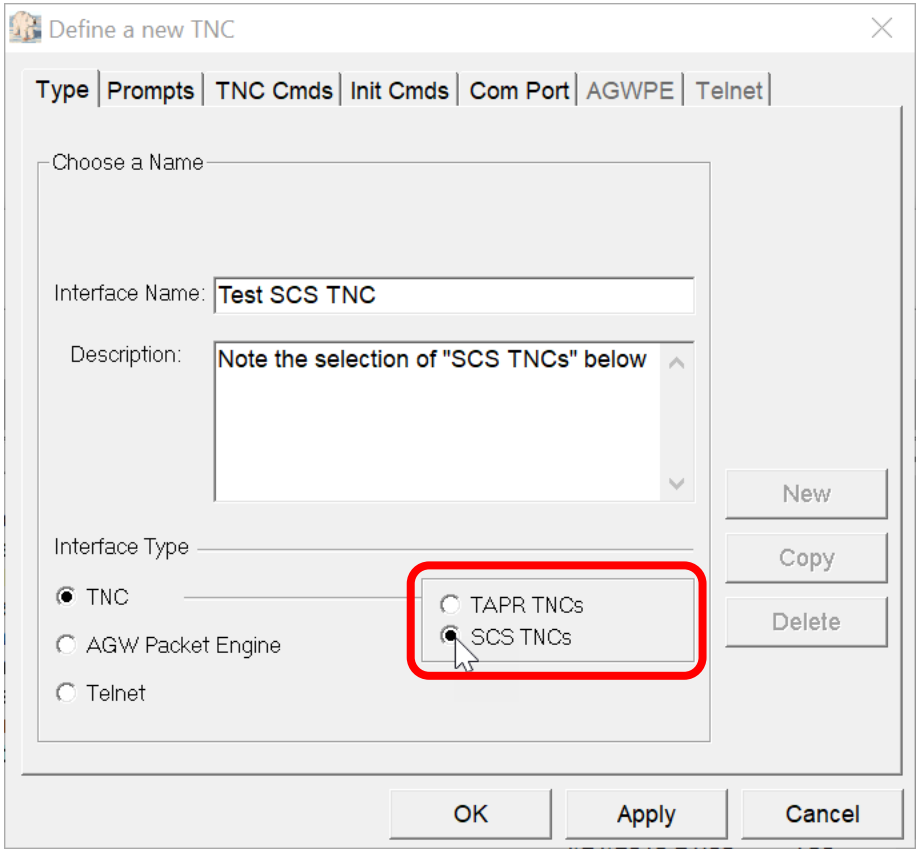
See the details up on the SCCo ARES/RACES website…

https://www.scc-ares-races.org/data/packet/client-software.html

5. Support for SCS Tracker DSP TNC

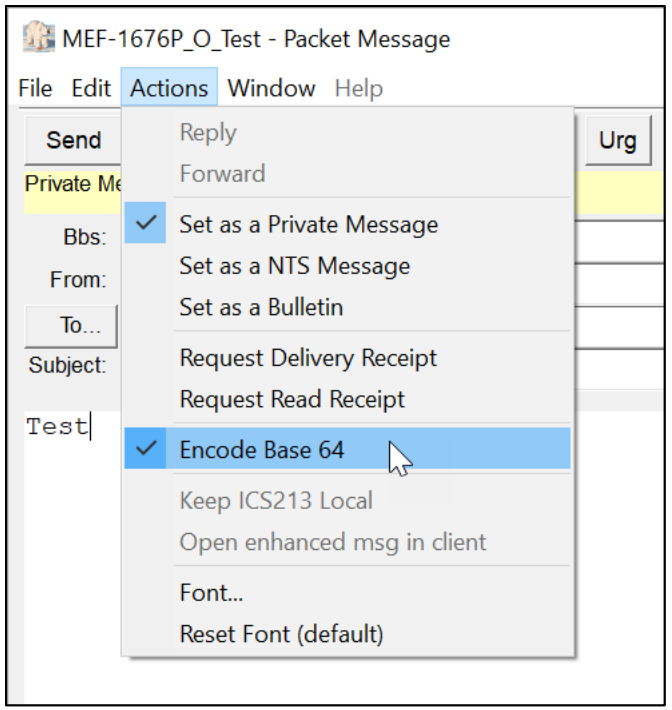
Setup > Interface

- SCS TNCs behave differently than TNCs that use the TAPR standard (Kantronics, Timewave, MFJ, …)
  - They are also about 1.5x as expensive!
- Outpost can now support the SCS Tracker / DSP TNC
- Helps ensure Outpost is usable no matter what TNC is in use



4. Base64 Encode/Decode

- Initial encode/decode implementation
  - Action > Encode Base64
- Outpost will
  - Encode before sending to, decode after receiving from BBS
  - Displays sent or received message to user as plain text
  - Approximately 33% increase in message size!
- Current Usage
  - Preserve non-printable and other characters that would not normally be useable in a packet system
  - Prevent unintended “newlines” inserted by BBS
  - Add-ons can request encoding/decoding via API
- Future:
  - Part of workflow to handle more complex message types



3. JNOS MD5 Authentication for Telnet

- TNC uses AX.25 (packet) protocol
  - Only call sign is used to connect to BBS
  - All transmissions are in clear text; easily intercepted by someone listening
- If TCP/IP network is available, Outpost can use Telnet protocol
  - Same BBS commands as TNC/Radio, but network speed is usually faster
  - Telnet logins require passwords
    - **login:** w6xrl4
    - **Password:**
  - Telnet uses clear text, including the password
    - Exposing passwords might give bad actor a clue about other passwords you use
    - Can be snooped locally, but county WiFi backbone uses encryption

3. JNOS MD5 Authentication for Telnet

- MD5 Authentication is now automatic in Outpost
  - No security for message data; but helps avoid snooping on passwords
  - Not encryption; does not “obscure meaning” [47 CFR § 97.113(a)(4)]
  - Server (JNOS) and client (Outpost) have a shared secret: user’s password
  - Server (JNOS) sends a “challenge” along with password prompt
    - **login:** w6xrl4
    - **Password [5cbe627b] :**
  - Client (Outpost) calculates and sends response (not password) in clear text
  - Server (JNOS) determines if response is correct; if so, user is connected
  - A new challenge is calculated at each login

2. New Subject Line Format

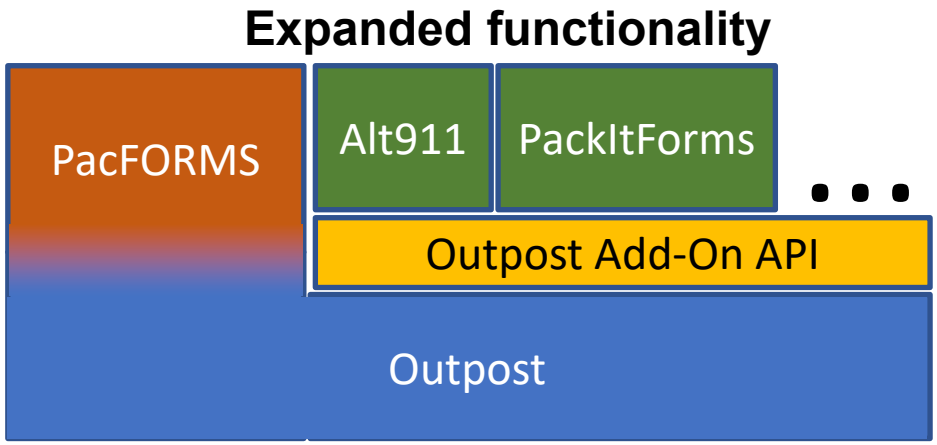
- Implements new Subject Line format:
  - <MsgNbr>_<H>_<Subject>
  - where <H> is the handling order: I, P, R (Immediate, Priority, Routine)
- Red font and "!!" Urgent marker if Handling Order = Immediate
  - Previously, red emphasis was based on Severity field

In Tray

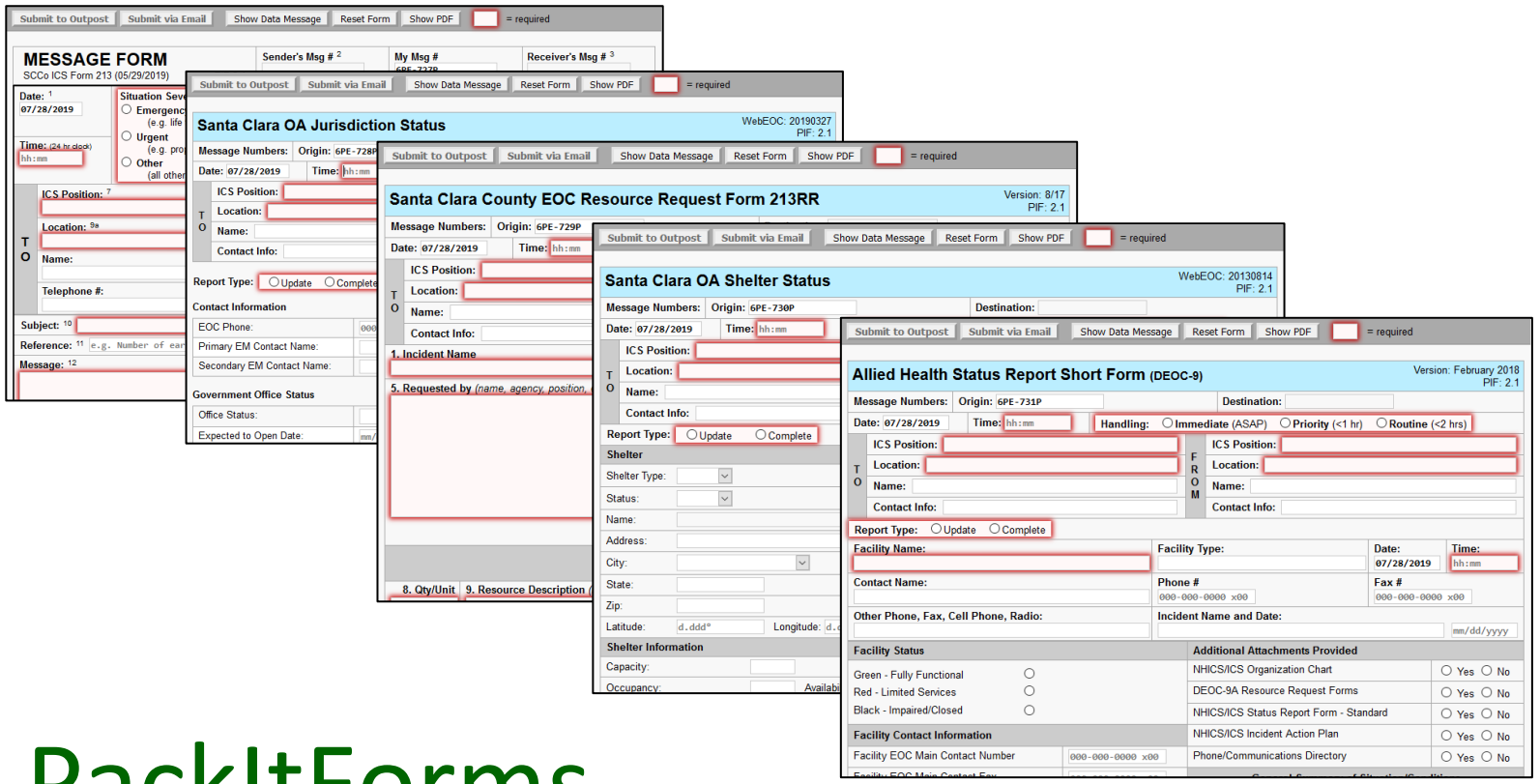
U	Type	From	To	BBS	Local ID	Subject	Date/Time	Size
!!		n6mef@...	N6MEF	N6MEF-3	MEF-1492P	MEF-1490P_I_MuniStat_Santa Clara	4/10/2019 16:51	4,331
		n6mef@...	n6mef@n6m...	N6MEF-3		DELIVERED: MEF-1490P_I_MuniStat_Santa Clara	4/10/2019 16:51	125

1. Improvements/Expansion of API

(Application Program Interface)



- Speed improvements (submit) and greatly expanded functionality
- New Edit before sending workflow:
  - Submit to Outpost > Re-open form > Edit > Re-Submit to Outpost > Send

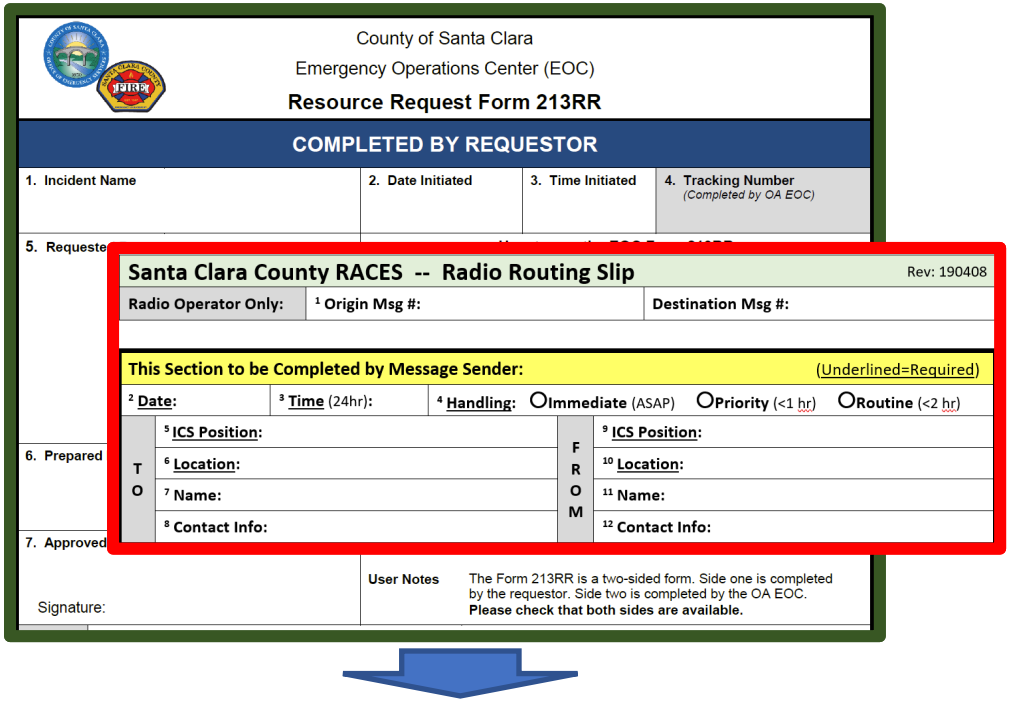


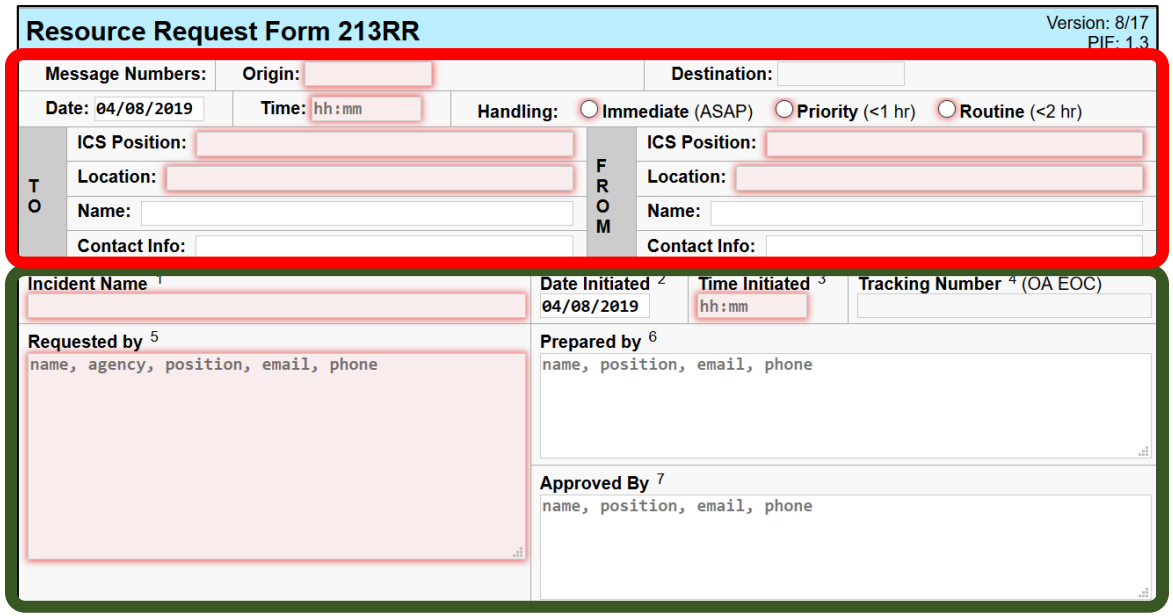
PackItForms

Next Generation Form Handling

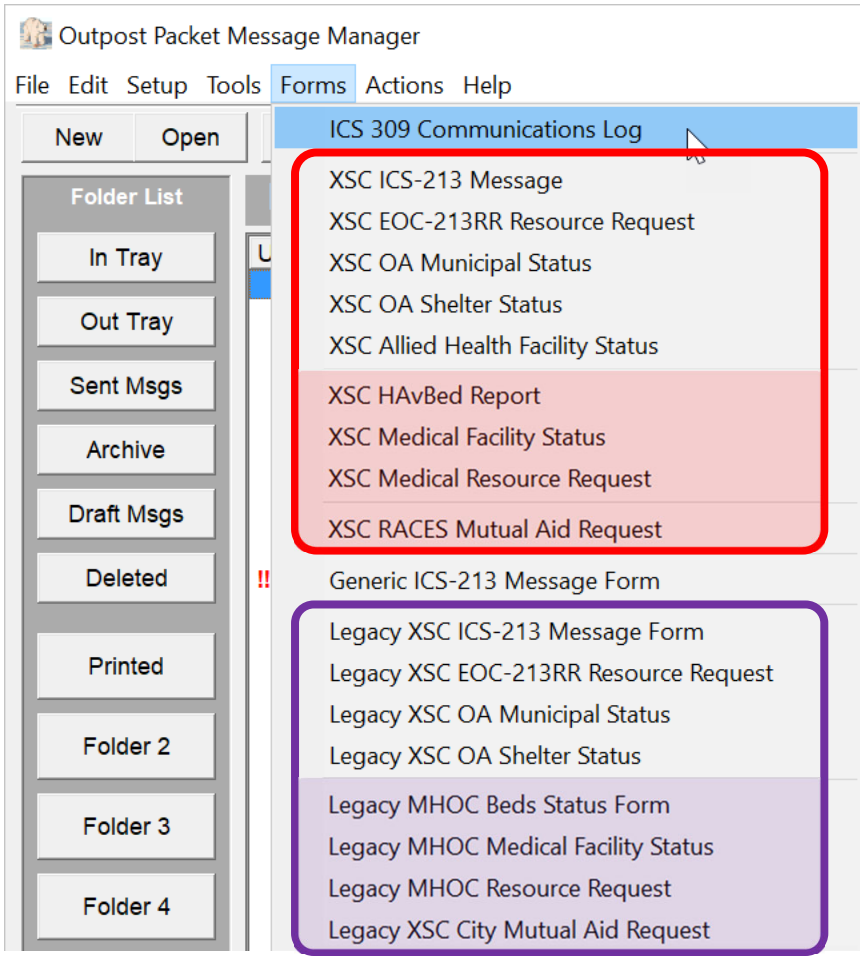
PackItForms

- Next generation of forms for packet radio transmission
  - Keith Amidon, KJ6PUO
  - Peter Amidon, KJ6PUN
  - John Kristian, W6JMK
- Consistent with
  - Agency forms + Radio Routing Slip
  - New PDF forms
- Includes same routing fields
  - Same position
  - Same required fields





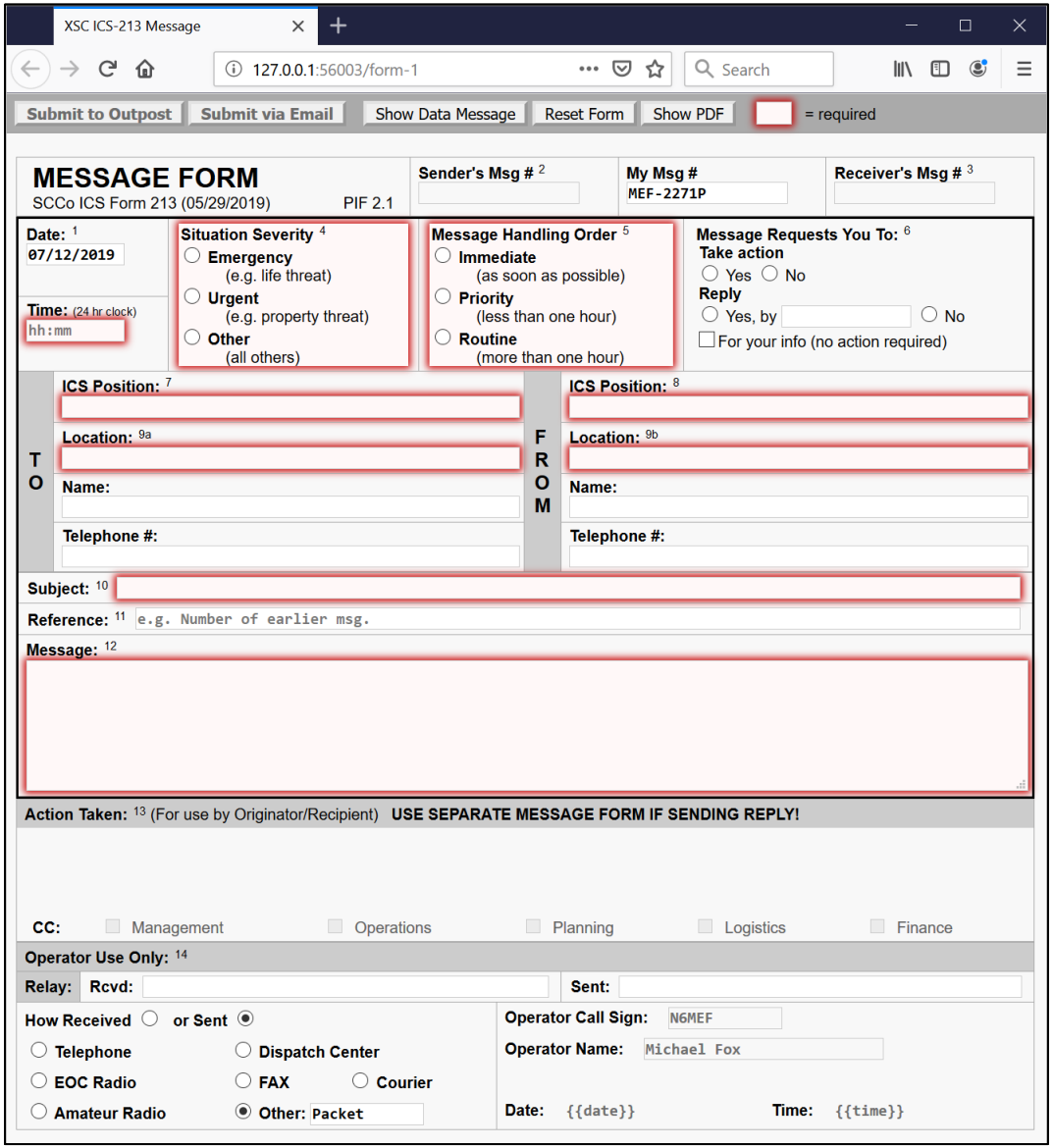
Outpost Forms Menu



- For backward compatibility both PackItForms and PacFORMS are included
- Shown: Installer with Hospital and RACES Mutual Aid forms
- PackItForms (highlighted here in red)
- PacFORMS (highlighted here in purple)
- Public installer does not contain (shown shaded)
  - Medical/Heathcare forms
  - RACES Mutual Aid forms

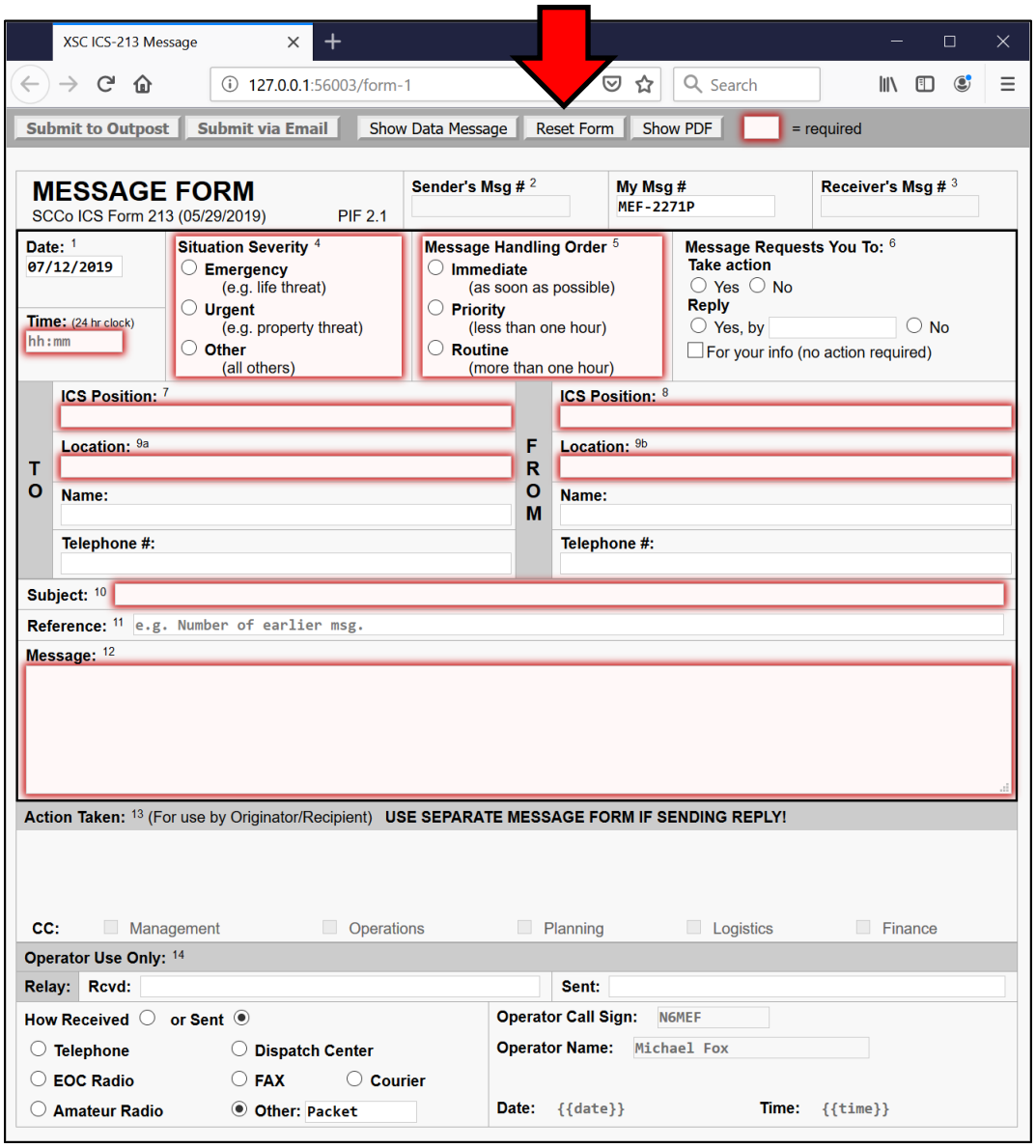
10. Required Field Indication

- Required fields are shown with red highlighting
  - Disappears when valid data is entered into each field
  - Easy to tell what fields need to be filled in
- As long as at least one required field is not filled:
  - Submit buttons are disabled
  - Button bar at top is grey



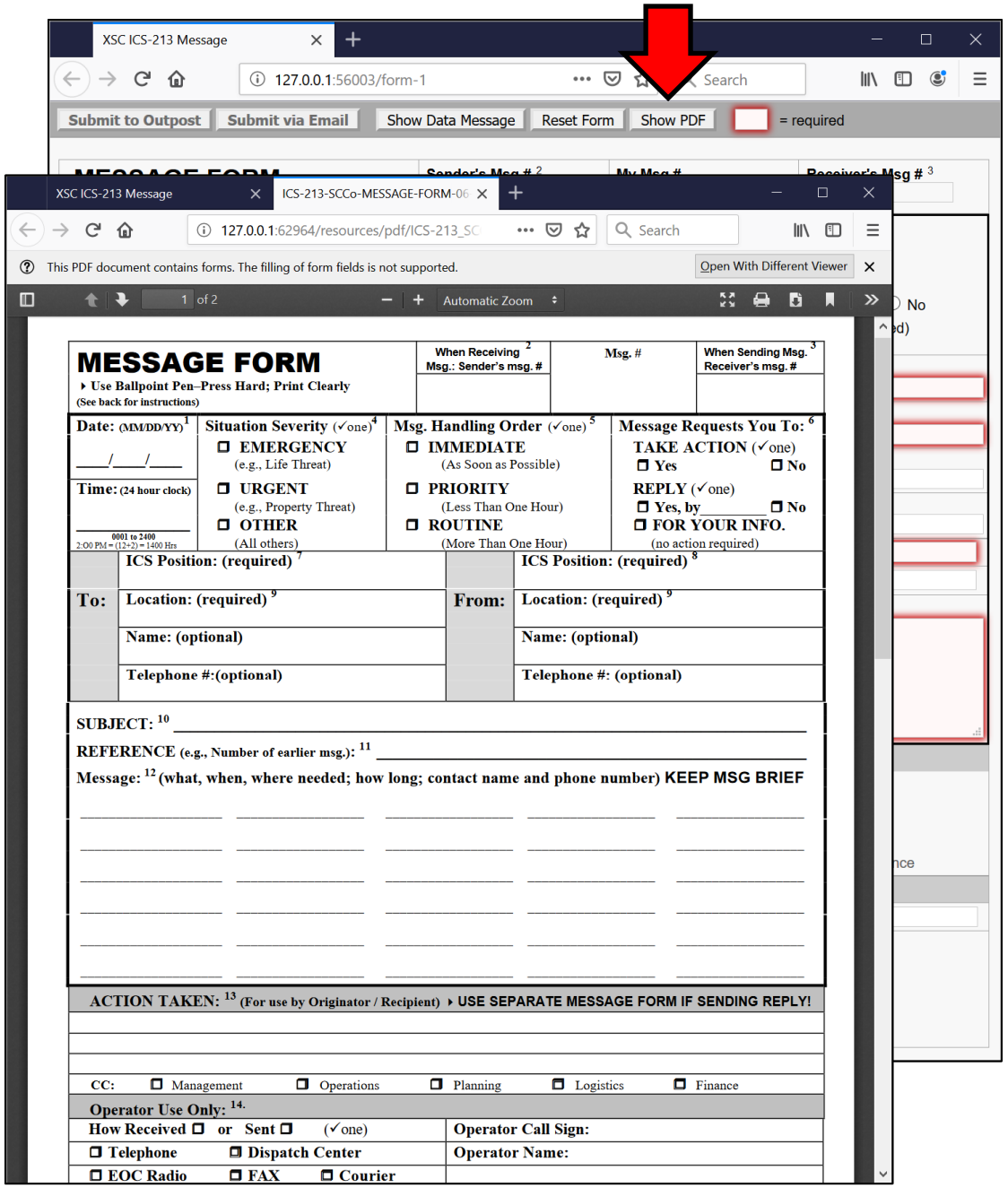
9. Reset Form Button

- Resets form to default values
- Use to “start over” without losing message number and other default values, such as date



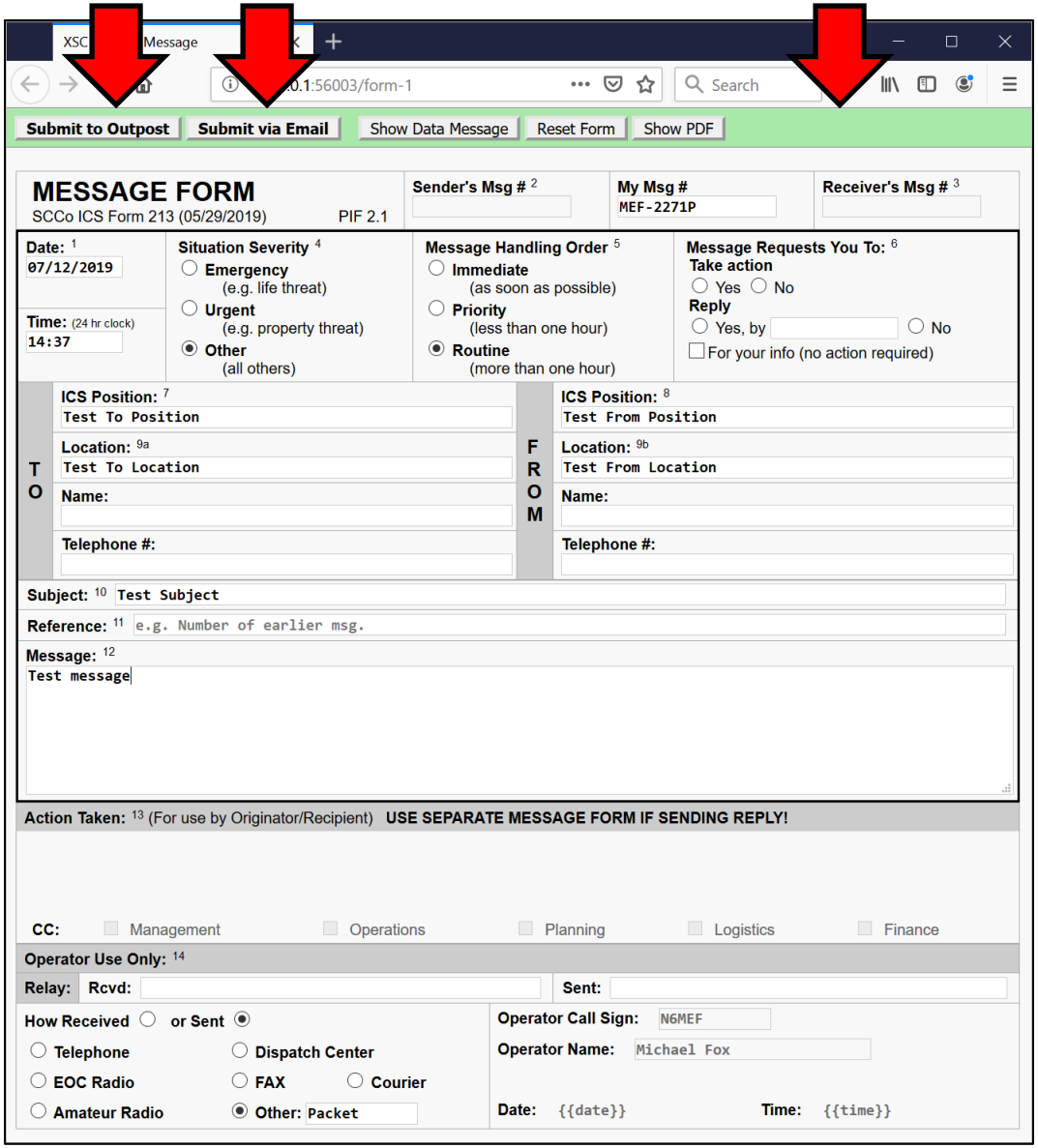
8. Show PDF

- Opens another browser tab
- Displays PDF version of form
  - Can be opened and printed



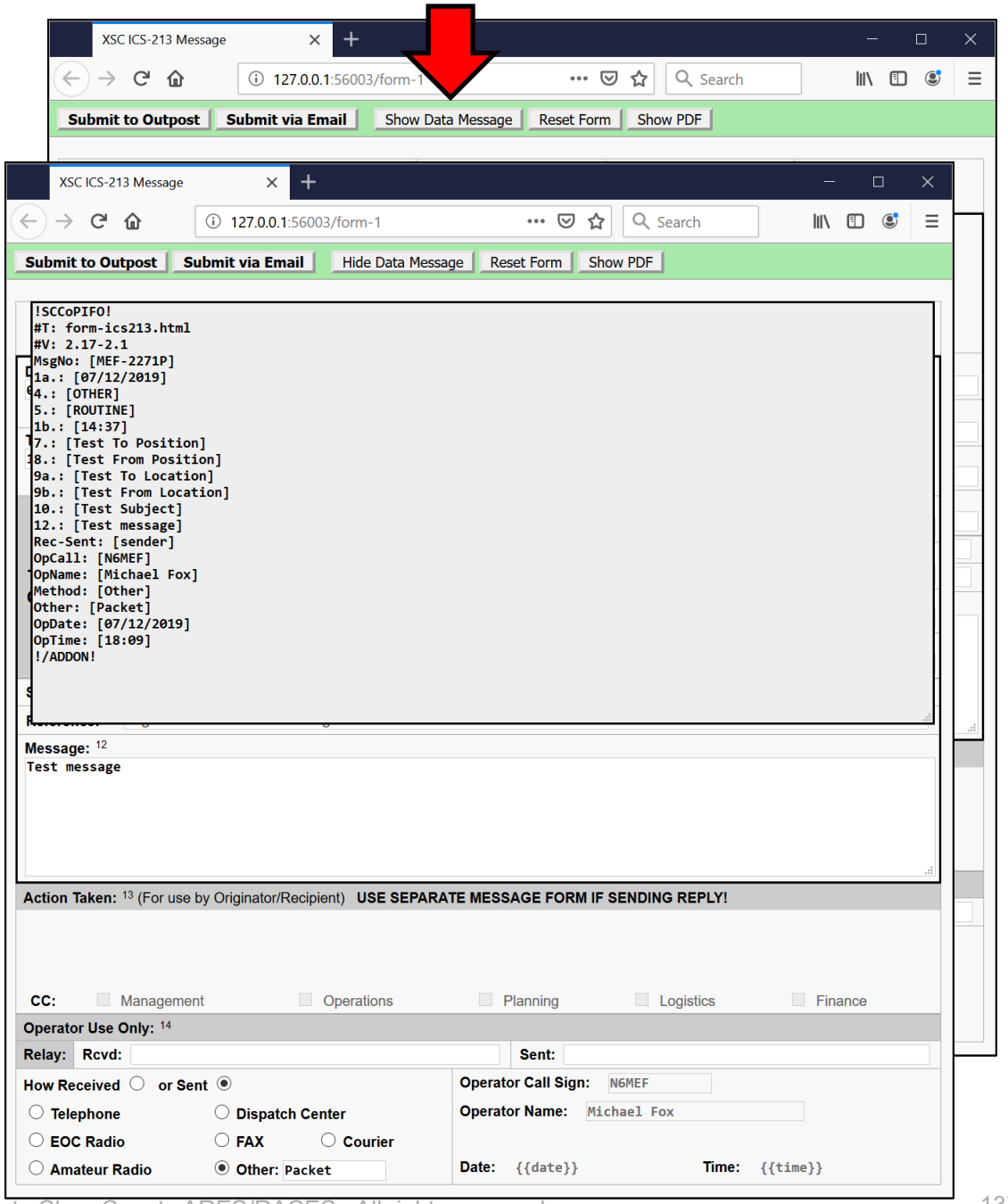
7. Ready to Submit Indication

- Button bar at top turns green when all required fields contain valid data
- Submit buttons enabled
  - Submit to Outpost
  - Submit via Email



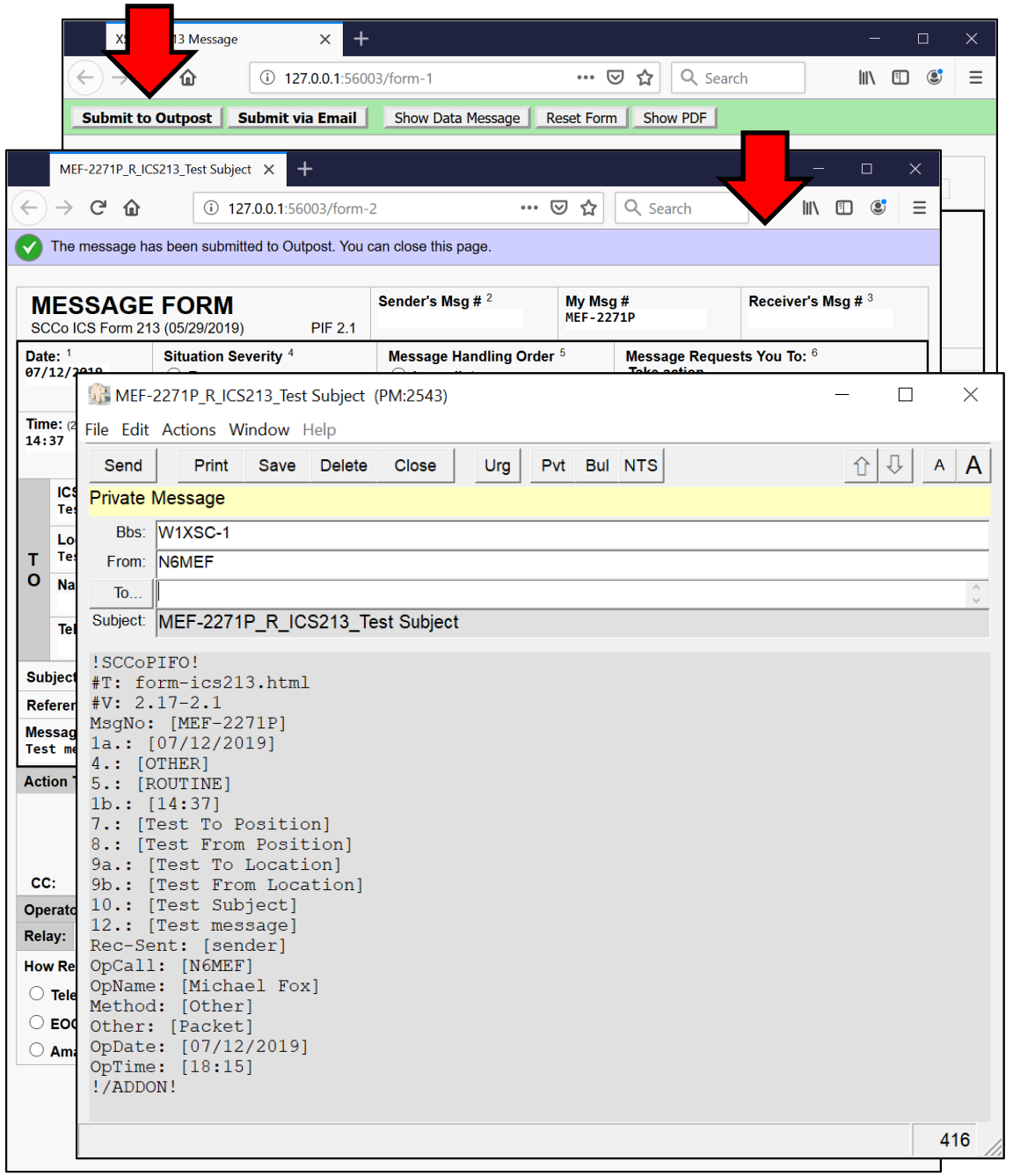
6. Show/Hide Data Message

- Show Data Message
  - Changes to “Hide Data Message” when pressed
  - Displays the text message that will be submitted to Outpost or E-mail
  - Could also be used to copy to some other application
- Hide Data Message
  - Removes the overlay text window



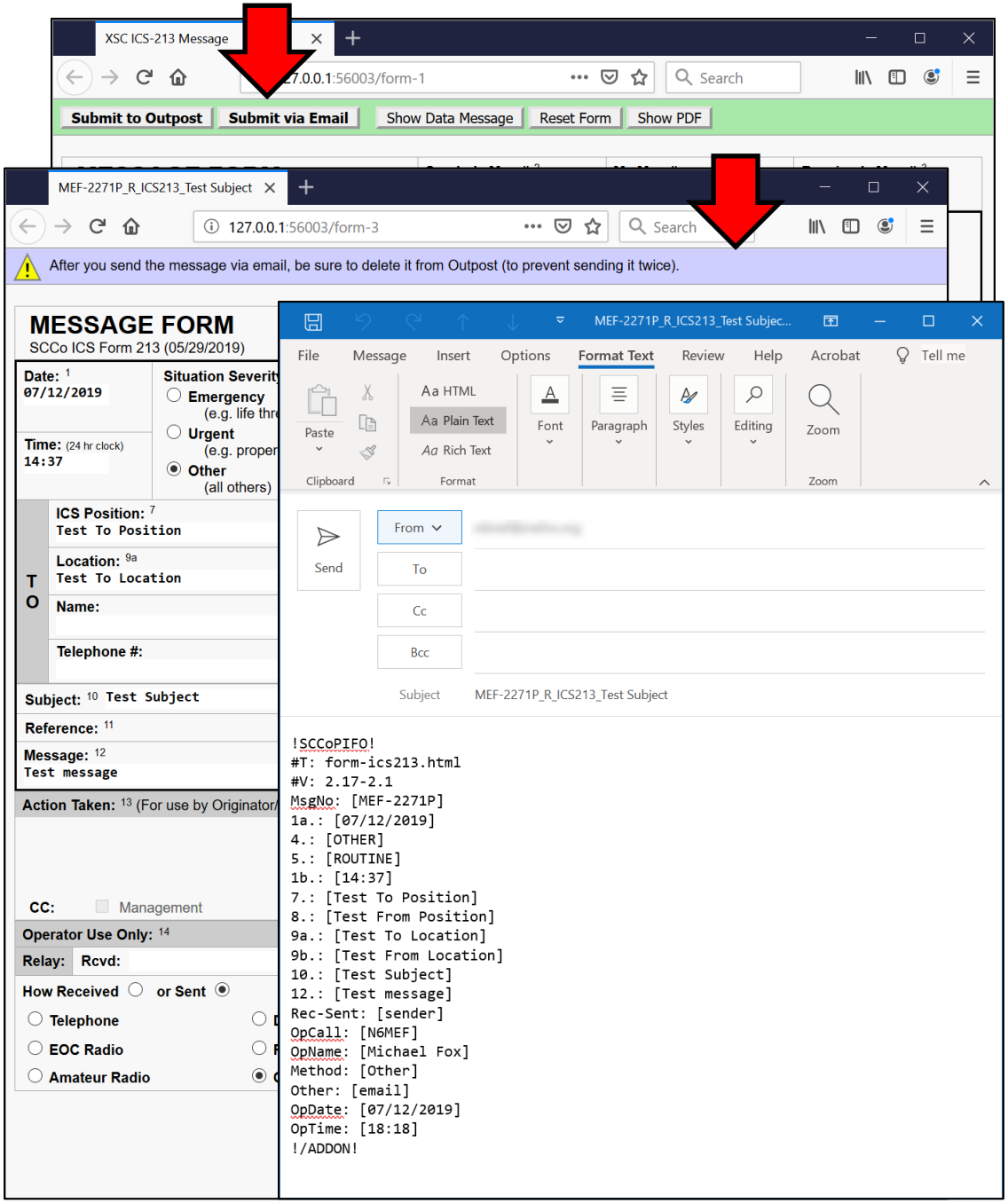
5. Submit to Outpost

- Sends form data to Outpost
- Purple confirmation banner
  - Message successfully submitted
- Outpost displays text message window
- Ready for To: address



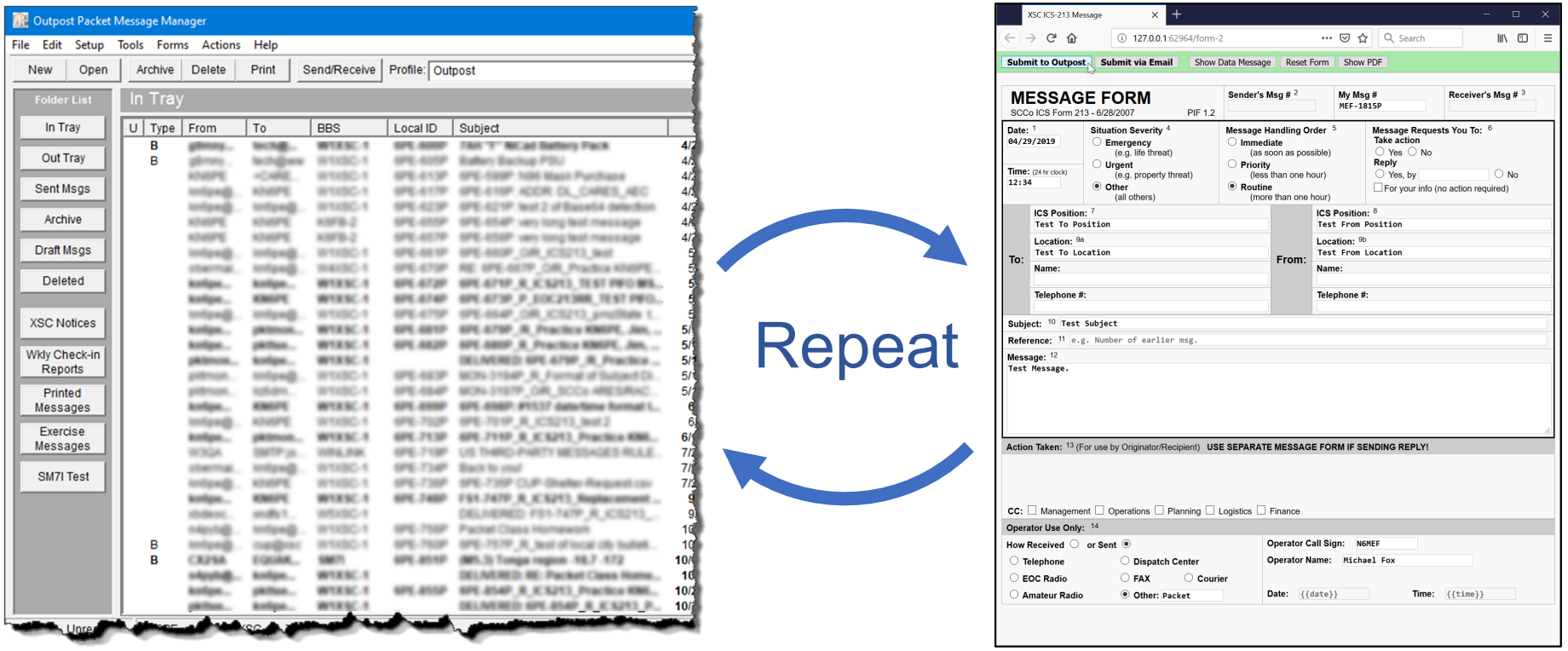
4. Submit via E-mail

- Purple confirmation banner
  - Includes warning to delete message from Outpost to avoid sending a duplicate
- Launches default e-mail app as defined in MS Windows
- Subject and body are filled in
- Be sure to set Plain Text mode!



3. Updating a Previously Submitted Form

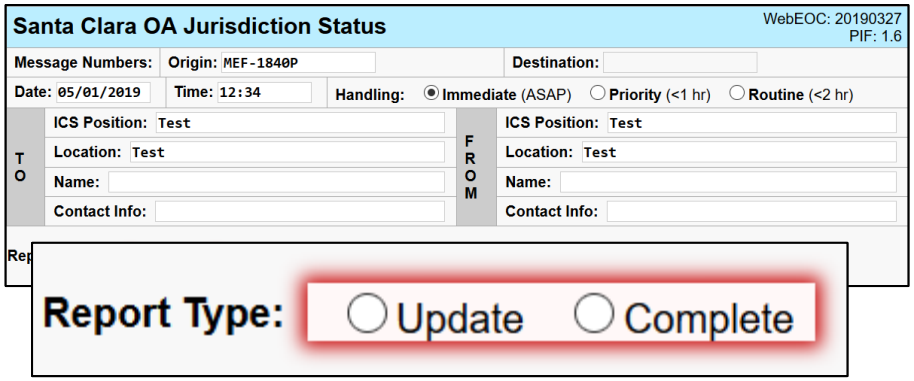
- Outpost & PackItForms supports reopening, editing, and resubmitting a previously submitted form



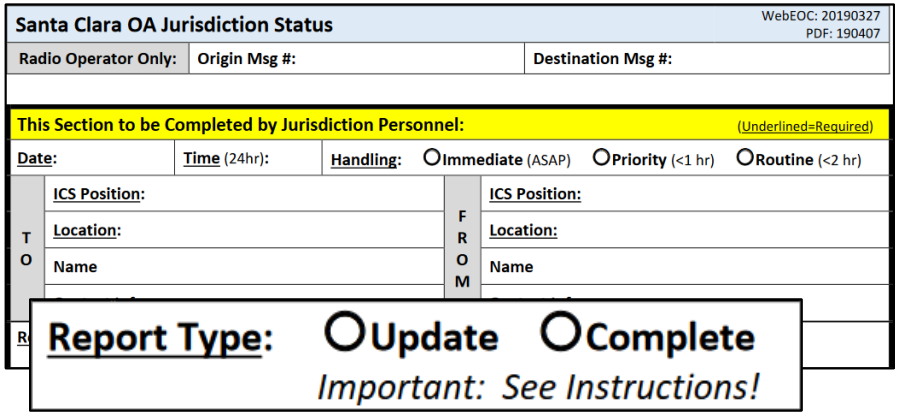
2. Update vs. Complete Report

- Some forms have a “Report Type” option
  - Municipal Status, Shelter Status, Medical Facility Status, Allied Health Status

PackItForm

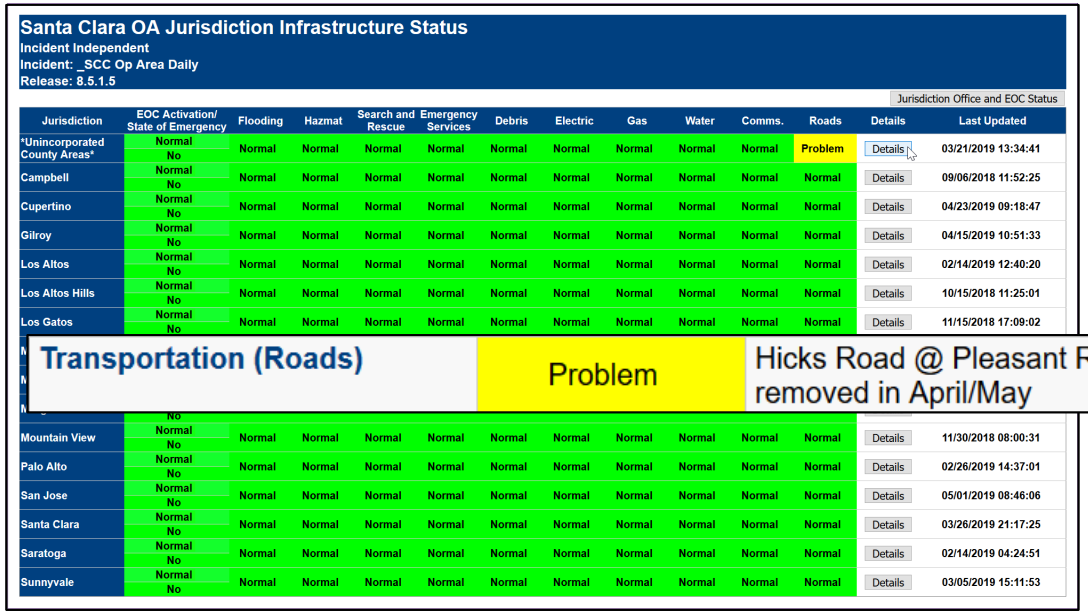


PDF



2. Update vs. Complete Report

- These forms are very long, with many fields, some of which may contain text that lasts for months

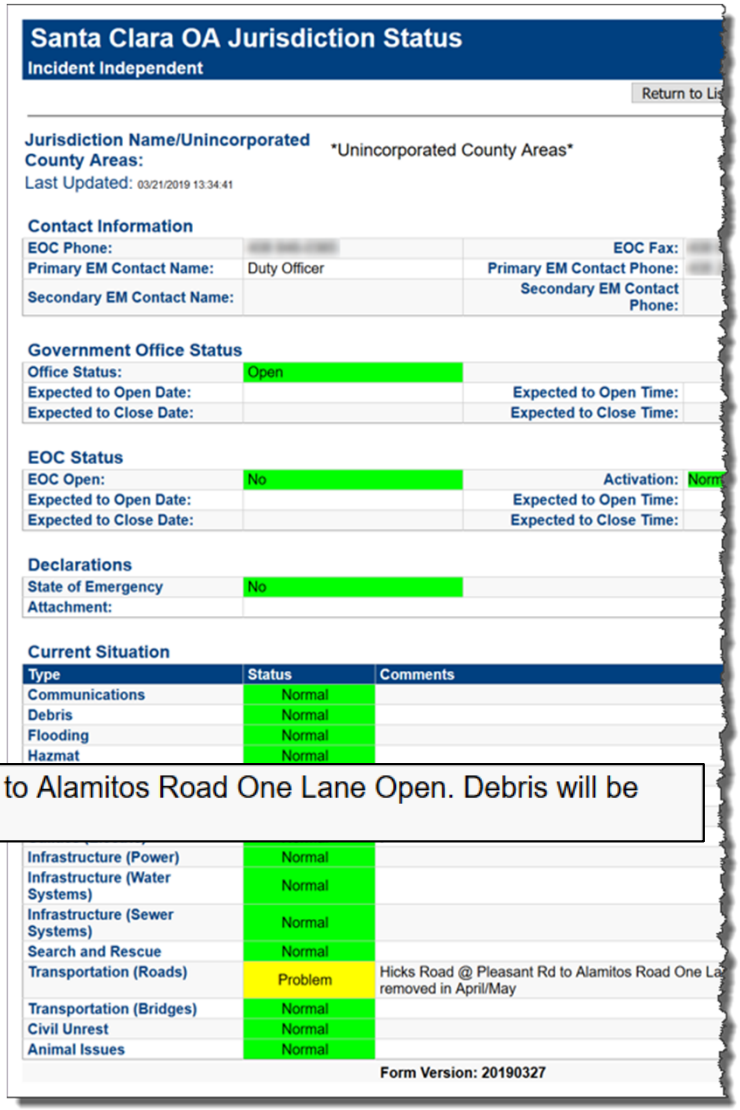


Santa Clara OA Jurisdiction Infrastructure Status
Incident Independent
Incident: _SCC Op Area Daily
Release: 8.5.1.5

Jurisdiction Office and EOC Status

Jurisdiction	EOC Activation/ State of Emergency	Flooding	Hazmat	Search and Rescue	Emergency Services	Debris	Electric	Gas	Water	Comms.	Roads	Details	Last Updated
Unincorporated County Areas	Normal / No	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Problem	Details	03/21/2019 13:34:41
Campbell	Normal / No	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Details	09/06/2018 11:52:25
Cupertino	Normal / No	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Details	04/23/2019 09:18:47
Gilroy	Normal / No	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Details	04/15/2019 10:51:33
Los Altos	Normal / No	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Details	02/14/2019 12:40:20
Los Altos Hills	Normal / No	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Details	10/15/2018 11:25:01
Los Gatos	Normal / No	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Details	11/15/2018 17:09:02
Mountain View	Normal / No	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Details	11/30/2018 08:00:31
Palo Alto	Normal / No	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Details	02/26/2019 14:37:01
San Jose	Normal / No	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Details	05/01/2019 08:46:06
Santa Clara	Normal / No	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Details	03/26/2019 21:17:25
Saratoga	Normal / No	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Details	02/14/2019 04:24:51
Sunnyvale	Normal / No	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Details	03/05/2019 15:11:53

Transportation (Roads)	Problem	Hicks Road @ Pleasant Rd to Alamitos Road One Lane Open. Debris will be removed in April/May



Santa Clara OA Jurisdiction Status
Incident Independent

Return to Li

Jurisdiction Name/Unincorporated County Areas: *Unincorporated County Areas*
Last Updated: 03/21/2019 13:34:41

Contact Information

EOC Phone:		EOC Fax:	
Primary EM Contact Name:	Duty Officer	Primary EM Contact Phone:	
Secondary EM Contact Name:		Secondary EM Contact Phone:	

Government Office Status

Office Status:	Open		
Expected to Open Date:		Expected to Open Time:	
Expected to Close Date:		Expected to Close Time:	

EOC Status

EOC Open:	No	Activation:	Norm
Expected to Open Date:		Expected to Open Time:	
Expected to Close Date:		Expected to Close Time:	

Declarations

State of Emergency	No
Attachment:	

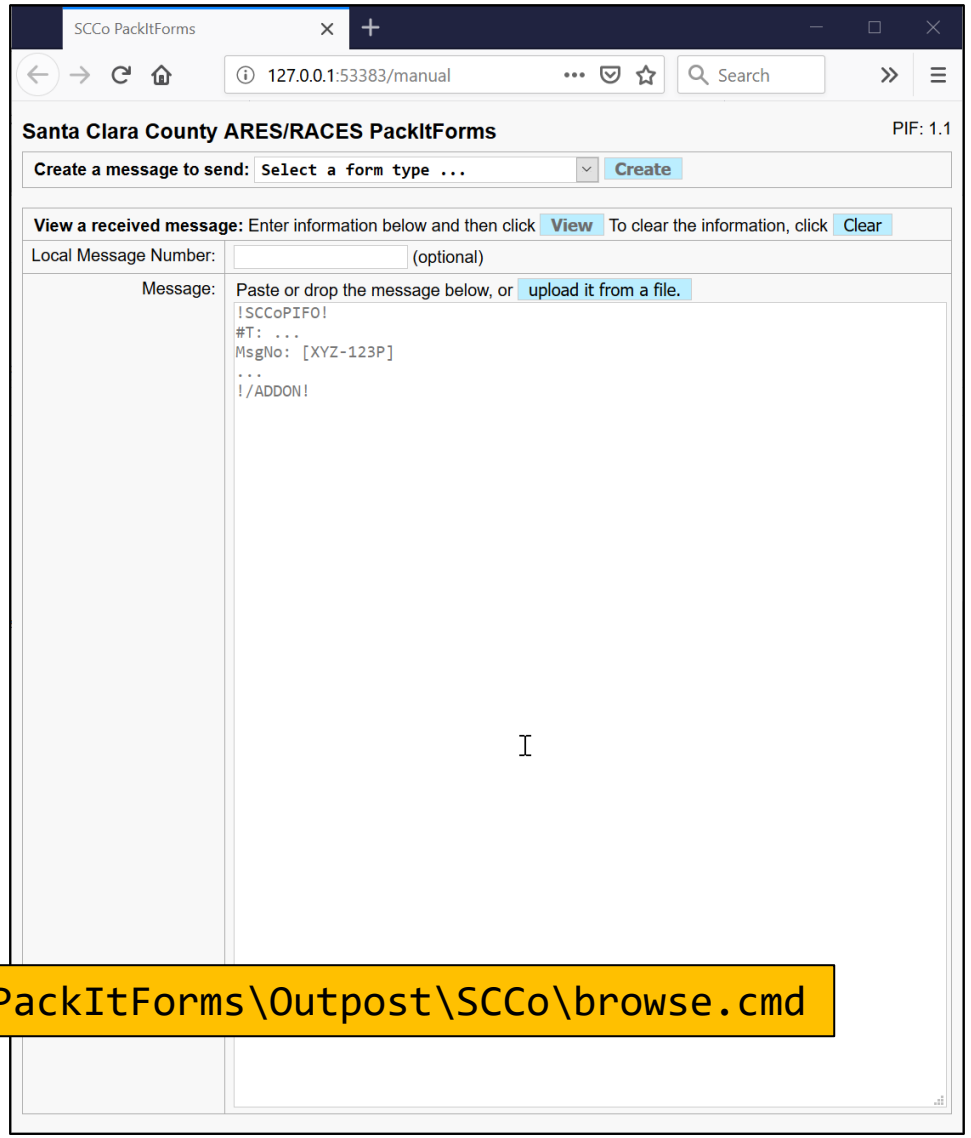
Current Situation

Type	Status	Comments
Communications	Normal	
Debris	Normal	
Flooding	Normal	
Hazmat	Normal	
Infrastructure (Power)	Normal	
Infrastructure (Water Systems)	Normal	
Infrastructure (Sewer Systems)	Normal	
Search and Rescue	Normal	
Transportation (Roads)	Problem	Hicks Road @ Pleasant Rd to Alamitos Road One La removed in April/May
Transportation (Bridges)	Normal	
Civil Unrest	Normal	
Animal Issues	Normal	

Form Version: 20190327

1. Standalone Mode

- Create or read PackItForms without Outpost
- Scenario
  - Need to send forms via packet
  - You don't have your packet computer (or don't want to leave it)
  - A PC is available. But you don't have Windows admin rights
- Solution
  - Run PackItForms installer (no admin rights)
  - Run browse.cmd



What's new for 2020?

- Maintenance release planned
  - Adds suggested changes to PackItForms
  - Fixes reported bugs; more enhancements to Outpost
- Pop-up Packet Exercise
  - Date… tbd
- Slight packet class schedule change
  - Packet Type IIIA 1-Aug-2020 **!!! One month early !!!**
  - Packet Type IIIB 3-Oct-2020
  - Packet Type II 7-Nov-2020

For More Information

- Support
  - See the Santa Clara County ARES/RACES web site packet page
    - https://www.scc-ares-races.org/data/packet/index.html
  - Join the packet discussion group
- Practice
  - Send a message during the weekly packet net, either or both days
    - https://www.scc-ares-races.org/data/packet/weekly-packet-practice.html
    - Automated feedback to help you improve, verify you've got it right
  - Participate as a packet operator at drills and other events

Network Update

Michael Fox, N6MEF

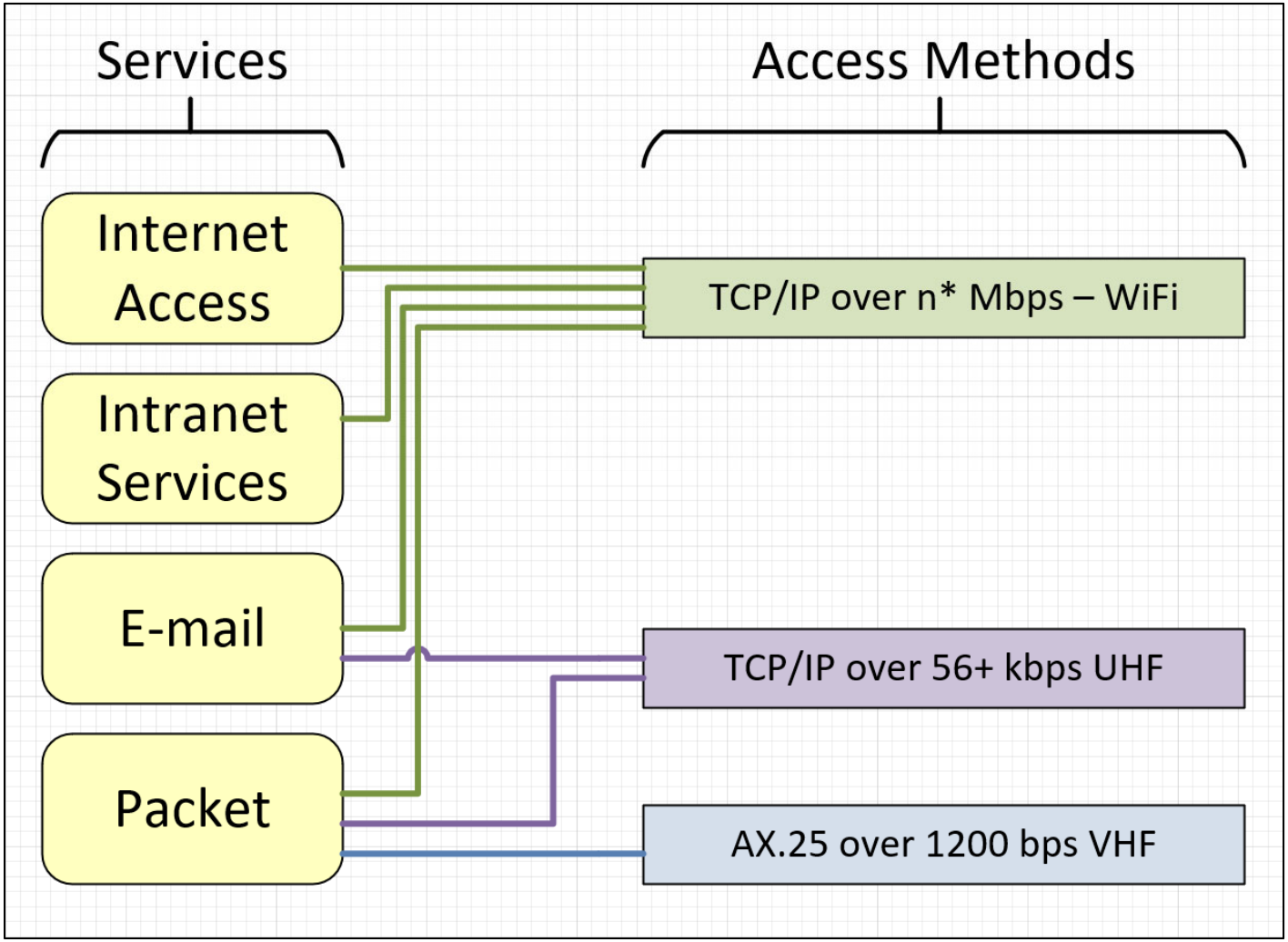
Revised 11-Dec-2019

Services

Zero service outages since 2009!

- Packet BBS (Bulletin Board System)
  - Four standard packet BBSs (JNOS), support standard packet access
  - Bi-directional e-mail gateway
- E-mail
  - Four standard e-mail servers, support standard POP/SMTP clients
- Intranet
  - Multi-megabit connectivity between jurisdictions/agencies
- Internet
  - Four independent gateways to the public Internet

Services vs. Access Methods

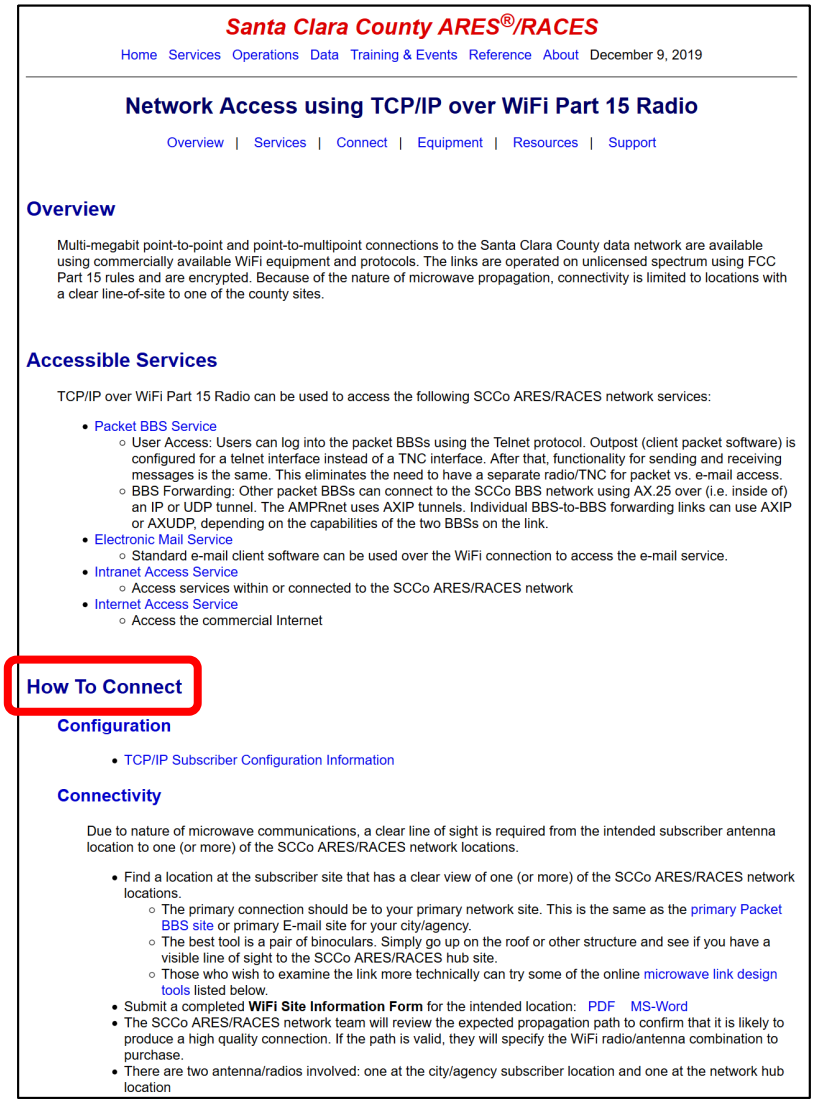


UHF TCP/IP Radio Status

- Bench testing showed promise
  - Able to handle extra “chattiness” of Internet e-mail
  - Could handle attachments up to 1 MB
  - Significant middle step for those without line of sight for WiFi
- Field testing was not successful
  - First vendor did not have the technology to support different signal strengths on a single channel
    - Picking least common denominator speed is bad for most sites
  - Second vendor could not sustain modulation rate at 50 kHz channels
    - Field SEs came out and duplicated bad results; no explanation
- One more vendor to try (that we know of)

WiFi Deployment Status

- WiFi access points installed at San Jose (W1XSC) and Palo Alto (W3XSC)
- San Jose access points will cover most hospitals and some cities
- By the end of this year, recommended configurations to all hospitals and those cities that have submitted connection requests



Santa Clara County ARES®/RACES

Home Services Operations Data Training & Events Reference About December 9, 2019

Network Access using TCP/IP over WiFi Part 15 Radio

Overview | Services | Connect | Equipment | Resources | Support

Overview

Multi-megabit point-to-point and point-to-multipoint connections to the Santa Clara County data network are available using commercially available WiFi equipment and protocols. The links are operated on unlicensed spectrum using FCC Part 15 rules and are encrypted. Because of the nature of microwave propagation, connectivity is limited to locations with a clear line-of-site to one of the county sites.

Accessible Services

TCP/IP over WiFi Part 15 Radio can be used to access the following SCCo ARES/RACES network services:

- Packet BBS Service
  - User Access: Users can log into the packet BBSs using the Telnet protocol. Outpost (client packet software) is configured for a telnet interface instead of a TNC interface. After that, functionality for sending and receiving messages is the same. This eliminates the need to have a separate radio/TNC for packet vs. e-mail access.
  - BBS Forwarding: Other packet BBSs can connect to the SCCo BBS network using AX.25 over (i.e. inside of) an IP or UDP tunnel. The AMPRnet uses AXIP tunnels. Individual BBS-to-BBS forwarding links can use AXIP or AXUDP, depending on the capabilities of the two BBSs on the link.
- Electronic Mail Service
  - Standard e-mail client software can be used over the WiFi connection to access the e-mail service.
- Intranet Access Service
  - Access services within or connected to the SCCo ARES/RACES network
- Internet Access Service
  - Access the commercial Internet

How To Connect

Configuration

- TCP/IP Subscriber Configuration Information

Connectivity

Due to nature of microwave communications, a clear line of sight is required from the intended subscriber antenna location to one (or more) of the SCCo ARES/RACES network locations.

- Find a location at the subscriber site that has a clear view of one (or more) of the SCCo ARES/RACES network locations.
  - The primary connection should be to your primary network site. This is the same as the primary Packet BBS site or primary E-mail site for your city/agency.
  - The best tool is a pair of binoculars. Simply go up on the roof or other structure and see if you have a visible line of sight to the SCCo ARES/RACES hub site.
  - Those who wish to examine the link more technically can try some of the online microwave link design tools listed below.
- Submit a completed **WiFi Site Information Form** for the intended location: PDF MS-Word
- The SCCo ARES/RACES network team will review the expected propagation path to confirm that it is likely to produce a high quality connection. If the path is valid, they will specify the WiFi radio/antenna combination to purchase.
- There are two antenna/radios involved: one at the city/agency subscriber location and one at the network hub location

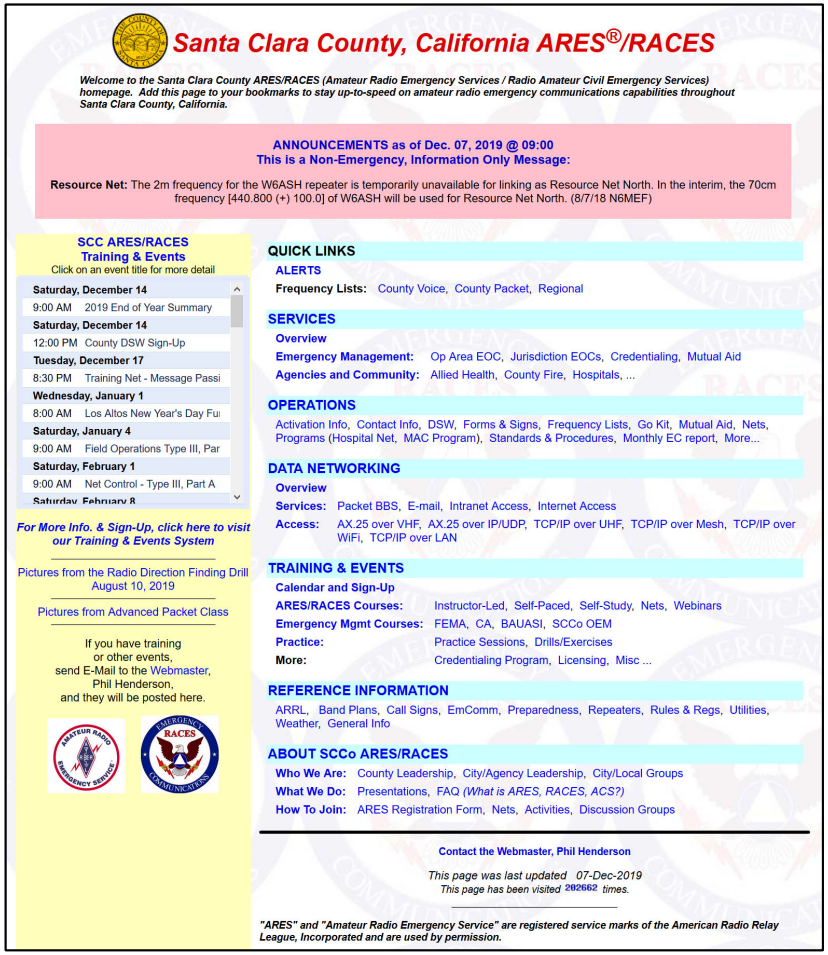
https://www.scc-ares-races.org/data/access/tcpip-wifi/tcpip-wifi-access.html

Intranet Services

- Jurisdictions / agencies can create services and make them available to others within the network
  - Web sites
  - File sharing servers
  - Applications
  - …
- Services that become popular, benefit most/all subscribers, and are supported, may be moved to the network core

Example Intranet Service:
Clone of SCCo ARES/RACES Website

External Web Site



Internal Clone

For more info:

https://www.scc-ares-races.org/data

Join our discussion groups: packet, email, tcpip, mesh

Disaster Service Worker Volunteer Program

Michael Fox, N6MEF

Revised 11-Dec-2019

Disaster Service Worker (DSW) Volunteer

"… any natural person registered by an accredited Disaster Council … for the purpose of engaging in disaster service … without pay or other consideration."

What's In It For You?

- Workers Compensation coverage by State Compensation Insurance Fund
  - … but it's not a windfall; have your own insurance
- Limited liability protection when acting within scope of assignment and training
  - … but we're not lawyers and this is not legal advice
- Many activities require it in order to participate

When am I covered as a DSW Volunteer?

- When **registered** …
- … and when **activated** and assigned by an **accredited authority** …
- … and while performing your duties
  - … according to approved **training** plan
  - … while under **supervision**

The Two Most Common Questions

- *I registered for DSW with a different organization (CERT, animal rescue, fire, …). Does that cover me with your group?*
  - No. You must be registered with the proper classification. In our case: "Communications"

- *I registered for DSW in a different jurisdiction. Does that cover me with your group?*
  - No. Only the jurisdiction that registered you can activate you. (County DSWs can be activated by the county and assigned to a local jurisdiction for mutual aid support.)

DSW for Amateur Radio Operators

- Get registered
  - With your local jurisdiction
  - With the county (for county events and mutual aid)
- Attend training
- Accept only assignments that you're trained to do
- Wait for proper activation
- Perform assignments according to training
- Stay in contact with net control at all times
- If injured: notify supervisor immediately

DSW for Amateur Radio Leaders

Same as DSW for Amateur Radio Operators, plus …

- Know how the program works
- Maintain registration information properly
- Define a training plan; get it approved
  - Training events require pre-approval for coverage
- Know the claims procedure before your event
  - Bring the proper forms with you to the event
- Review with jurisdiction's Emergency Manager

For more info:

https://www.scc-ares-races.org/dsw

Credentialing Program Update

Michael Fox, N6MEF

Revised 11-Dec-2019

Environment and Purpose of Credentialing

- Credentialing in technical fields (usually called certification) has been used for 20+ years to verify an individual's ability
- SCCo ARES/RACES has had a credentialing program for Mutual Aid Communicators since 2009
- Credentialing is becoming more prevalent in Emergency Management, especially where mutual aid may be utilized
- The State of California has a credentialing program for EOC positions
- Served agencies are increasingly aware of credentialing and are expecting to build credentialed teams
- We can better support our served agencies by expanding our credentialing program to all operators (not just MACs)

Comparison of MAC Program Design vs. new State of CA EOC Credentialing

	State of CA	SCCo Credentialing Program
Started	Recently	2009 (MAC Program)
Roles	46 EOC positions	Field, Net Control, Packet, Shadow, HF*
Types	III, II, I	V, IV, III, II, I
ICS/SEMS Training	Yes	Yes
Position-specific training	Yes	Yes
Knowledge testing	Yes	Yes
Experience required	Yes	Yes
Performance evaluation	Yes	Yes
Time-bounded	Yes	Yes
Recertification	Yes	Yes

* HF Credential is TBD

Before:

SCCo ARES/RACES MAC Qualifications

Resource	Field Comms	Net Control	Packet	Shadow	HF (future)
Type I	Field Comm I	Net Control I	Packet I	Shadow I	HF I
Type II	Field Comm II	Net Control II	Packet II	Shadow II	HF II
Type III	Field Comm III	Net Control III	Packet III	Shadow III	HF III
Type IV	Mutual Aid Communicator				
Type V	Licensed Amateur Radio Operator w/DSW (no credential)				

After:

SCCo ARES/RACES Technical Credentials

Resource	Field Comms	Net Control	Packet	Shadow	HF (future)
Type I	Field Comm I	Net Control I	Packet I	Shadow I	HF I
Type II	Field Comm II	Net Control II	Packet II	Shadow II	HF II
Type III	Field Comm III	Net Control III	Packet III	Shadow III	HF III
Type IV	Type IV Communicator				
Type V	Licensed Amateur Radio Operator w/DSW (no credential)				

Comparison of Capabilities by Credential Type

Capability	Type V	Type IV	Type III	Type II
Equipped for up to 12 Hr shift	Unknown	**Yes**	**Yes**	**Yes**
Respond anywhere in jurisdiction	Unknown	**Yes**	**Yes**	**Yes**
Basic Net Usage Procedures	Unknown	**Yes**	**Yes**	**Yes**
Simple Damage/status reports	Unknown	**Yes**	**Yes**	**Yes**
Handle low traffic levels	Unknown	**Yes**	**Yes**	**Yes**
3rd Party Traffic	Unknown	Unknown	**Yes**	**Yes**
Low-to-medium traffic levels	Unknown	Unknown	**Yes**	**Yes**
Manage problems	Unknown	Unknown	**Yes**	**Yes**
Equipped w/ mobile radio, ant	Unknown	Unknown	Unknown	**Yes**
Two Nets, Cross band	Unknown	Unknown	Unknown	**Yes**
Medium-to-high traffic levels	Unknown	Unknown	Unknown	**Yes**

Comparison of Assignments by Credential Type

Assignments	Type V	Type IV	Type III	Type II
Basic Net Usage, Status Reports • Parades, festivals, races • Checkpoints, flood watch • Damage surveys • CERT team support (simple rpts)	Unknown	**Yes**	**Yes**	**Yes**
3rd Party Traffic (Low/Med) • CERT team support (complex rpts) • Schools, shelters • Jurisdiction EOC (smaller) • Hospitals • Allied health facilities • Fire stations	Unknown	Unknown	**Yes**	**Yes**
3rd Party Traffic (Med/High), 2 nets • Med Health Joint Ops Ctr (MHJOC) • Jurisdiction EOC (larger) • County EOC	Unknown	Unknown	Unknown	**Yes**

Advancement Timelines

- Progress at your own pace

- Most people will be able to achieve the following
  - First year: Type IV
  - Second year: At least one Type III
  - Third year: Another Type III and/or Type II
  - Fourth year: Another Type III and/or Type II and/or Type I

- In fact, most ***active*** amateur radio operators have already completed 90% of the Type IV credential!

Agency-specific Endorsements

Builds on minimum technical credentials

Adds agency-specific requirements

Purpose

- Served agencies rely on us to send them resources who are technically capable of supporting their needs
- These agencies may also have their own, additional requirements for operating within their facilities
  - Training (such as agency- or facility-specific procedures)
  - Administrative (such as security)
  - … other
- Endorsements identify resources that have the required RACES credentials *AND* meet the additional, agency-specific requirements

Agency-specific Endorsements

- Mutual Aid Communicator
  - Type IV Communicator, plus …
  - Background check (County Sheriff)
  - Agree to deploy outside home city
  - (Note: Existing MACs will be converted)

- County Fire Station Radio Operator
  - Field Type III and Packet Type III (County ARES/RACES)
  - Background check (County Sheriff)
  - Additional fire station operations training (County Fire)

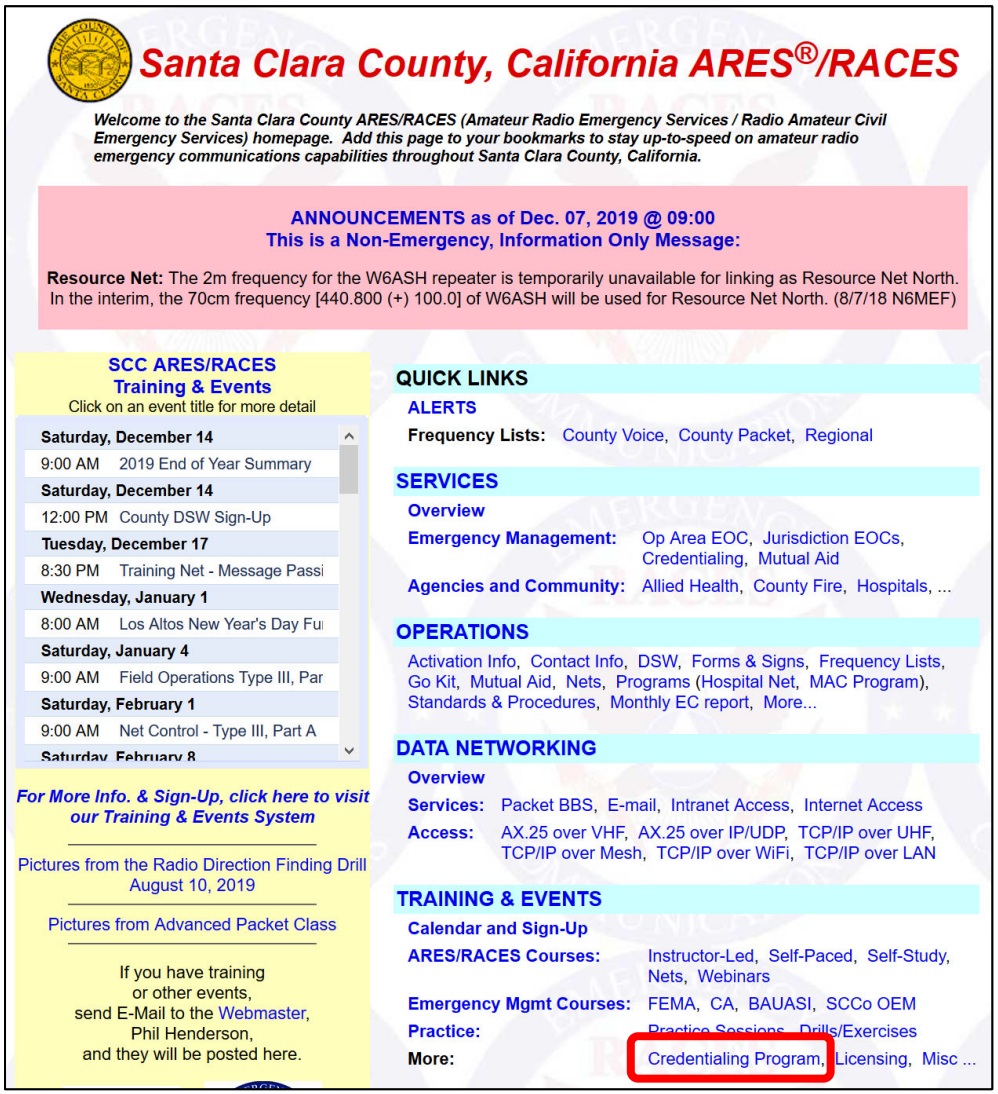
Agency-specific Endorsements

- County EOC Radio Operator
  - Net Control Type III or Packet Type III
  - Additional training
  - Background check (County Sheriff)

- County EOC RACES Unit Leader
  - County EOC Radio Operator, plus …
  - Net Control Type II and Packet Type II
  - “Core 100” Emergency Management training
    - Same training required of employees working in county EOC

Credentialing Program

(https://www.scc-ares-races.org/credentials)



Santa Clara County, California ARES®/RACES

Welcome to the Santa Clara County ARES/RACES (Amateur Radio Emergency Services / Radio Amateur Civil Emergency Services) homepage. Add this page to your bookmarks to stay up-to-speed on amateur radio emergency communications capabilities throughout Santa Clara County, California.

ANNOUNCEMENTS as of Dec. 07, 2019 @ 09:00
This is a Non-Emergency, Information Only Message:

Resource Net: The 2m frequency for the W6ASH repeater is temporarily unavailable for linking as Resource Net North. In the interim, the 70cm frequency [440.800 (+) 100.0] of W6ASH will be used for Resource Net North. (8/7/18 N6MEF)

SCC ARES/RACES Training & Events
Click on an event title for more detail

Saturday, December 14
9:00 AM 2019 End of Year Summary
Saturday, December 14
12:00 PM County DSW Sign-Up
Tuesday, December 17
8:30 PM Training Net - Message Passi
Wednesday, January 1
8:00 AM Los Altos New Year's Day Fu
Saturday, January 4
9:00 AM Field Operations Type III, Par
Saturday, February 1
9:00 AM Net Control - Type III, Part A
Saturday, February 8

For More Info. & Sign-Up, click here to visit our Training & Events System

Pictures from the Radio Direction Finding Drill August 10, 2019

Pictures from Advanced Packet Class

If you have training or other events, send E-Mail to the Webmaster, Phil Henderson, and they will be posted here.

QUICK LINKS

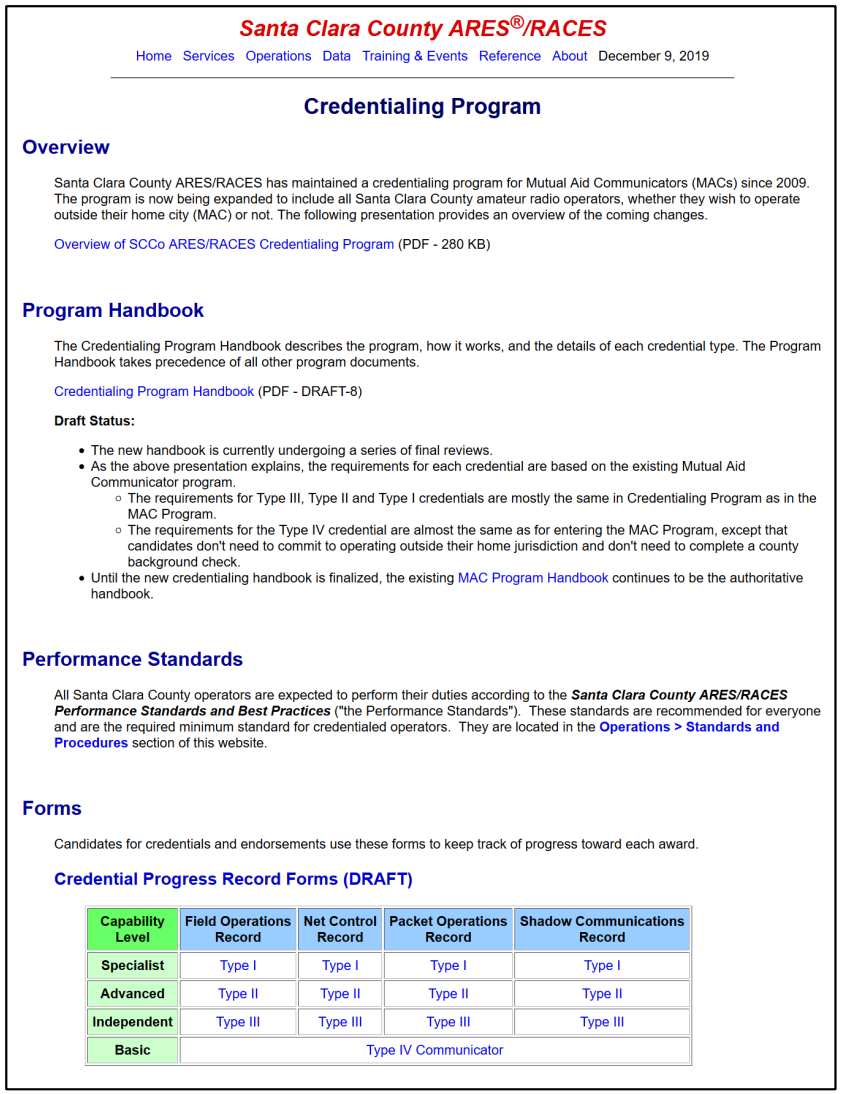
ALERTS
Frequency Lists: County Voice, County Packet, Regional

SERVICES
Overview
Emergency Management: Op Area EOC, Jurisdiction EOCs, Credentialing, Mutual Aid
Agencies and Community: Allied Health, County Fire, Hospitals, ...

OPERATIONS
Activation Info, Contact Info, DSW, Forms & Signs, Frequency Lists, Go Kit, Mutual Aid, Nets, Programs (Hospital Net, MAC Program), Standards & Procedures, Monthly EC report, More...

DATA NETWORKING
Overview
Services: Packet BBS, E-mail, Intranet Access, Internet Access
Access: AX.25 over VHF, AX.25 over IP/UDP, TCP/IP over UHF, TCP/IP over Mesh, TCP/IP over WiFi, TCP/IP over LAN

TRAINING & EVENTS
Calendar and Sign-Up
ARES/RACES Courses: Instructor-Led, Self-Paced, Self-Study, Nets, Webinars
Emergency Mgmt Courses: FEMA, CA, BAUASI, SCCo OEM
Practice: Practice Sessions, Drills/Exercises
More: Credentialing Program, Licensing, Misc ...



Santa Clara County ARES®/RACES

Home Services Operations Data Training & Events Reference About December 9, 2019

Credentialing Program

Overview

Santa Clara County ARES/RACES has maintained a credentialing program for Mutual Aid Communicators (MACs) since 2009. The program is now being expanded to include all Santa Clara County amateur radio operators, whether they wish to operate outside their home city (MAC) or not. The following presentation provides an overview of the coming changes.

Overview of SCCo ARES/RACES Credentialing Program (PDF - 280 KB)

Program Handbook

The Credentialing Program Handbook describes the program, how it works, and the details of each credential type. The Program Handbook takes precedence of all other program documents.

Credentialing Program Handbook (PDF - DRAFT-8)

Draft Status:

- The new handbook is currently undergoing a series of final reviews.
- As the above presentation explains, the requirements for each credential are based on the existing Mutual Aid Communicator program.
  - The requirements for Type III, Type II and Type I credentials are mostly the same in Credentialing Program as in the MAC Program.
  - The requirements for the Type IV credential are almost the same as for entering the MAC Program, except that candidates don't need to commit to operating outside their home jurisdiction and don't need to complete a county background check.
- Until the new credentialing handbook is finalized, the existing MAC Program Handbook continues to be the authoritative handbook.

Performance Standards

All Santa Clara County operators are expected to perform their duties according to the ***Santa Clara County ARES/RACES Performance Standards and Best Practices*** ("the Performance Standards"). These standards are recommended for everyone and are the required minimum standard for credentialed operators. They are located in the **Operations > Standards and Procedures** section of this website.

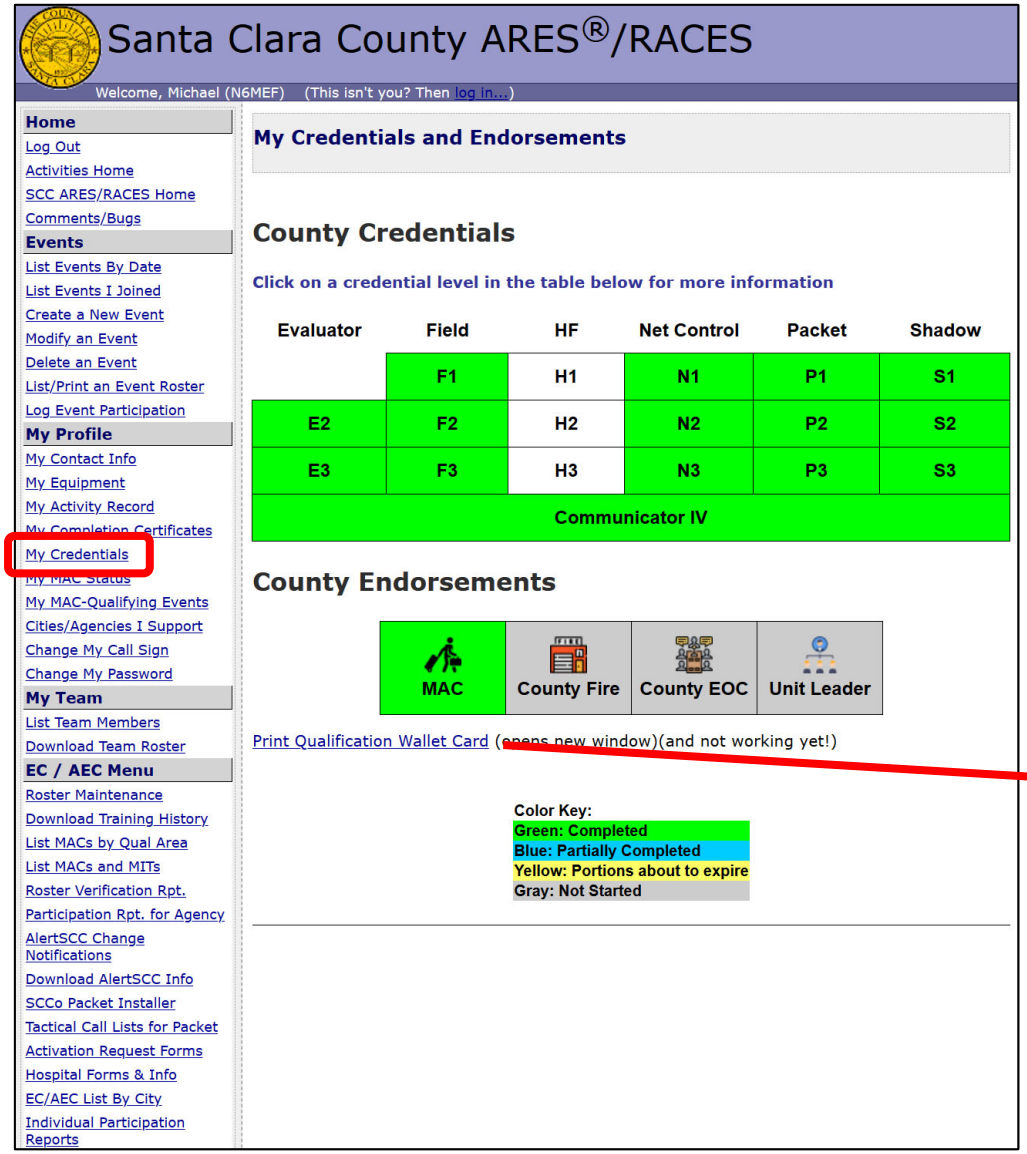
Forms

Candidates for credentials and endorsements use these forms to keep track of progress toward each award.

Credential Progress Record Forms (DRAFT)

Capability Level	Field Operations Record	Net Control Record	Packet Operations Record	Shadow Communications Record
Specialist	Type I	Type I	Type I	Type I
Advanced	Type II	Type II	Type II	Type II
Independent	Type III	Type III	Type III	Type III
Basic	Type IV Communicator			

“My Credentials” (Personal achievement record)



You must be logged into the Training and Events database to see your credential records.

Herman Munster W6XRL4 Santa Clara County ARES/RACES	
Credentials:	
Evaluator	E2
Field Comms	F1
HF Comms	H2
Net Control	N3
Packet Comms	P2
Shadow Comms	S1
Endorsements:	
Mutual Aid Comm	MAC
Fire Station Radio Oper	FRO
EOC Radio Operator	ERO
EOC RACES Unit Lead	RUL
Expires: Jan 31, 20##	

Program Roll-out

- First Type IV credential records already submitted!
- Currently finishing up work on the tracking database
  - Thanks to Jim Clark, N6JRC, in Los Altos
- Go Live anticipated by January 1

For more info:

https://www.scc-ares-races.org/credentials

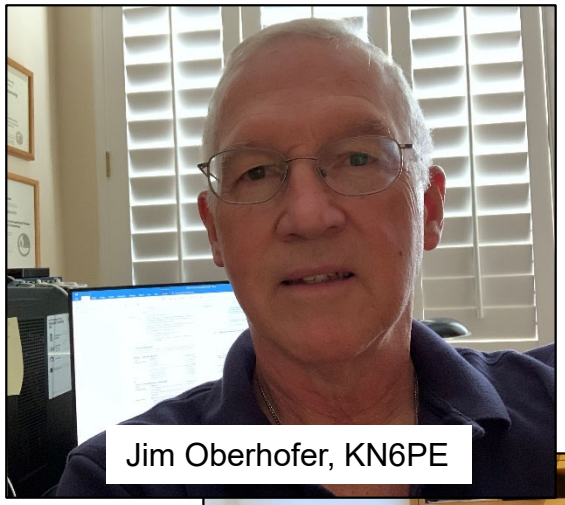
Recognition and Wrap-up

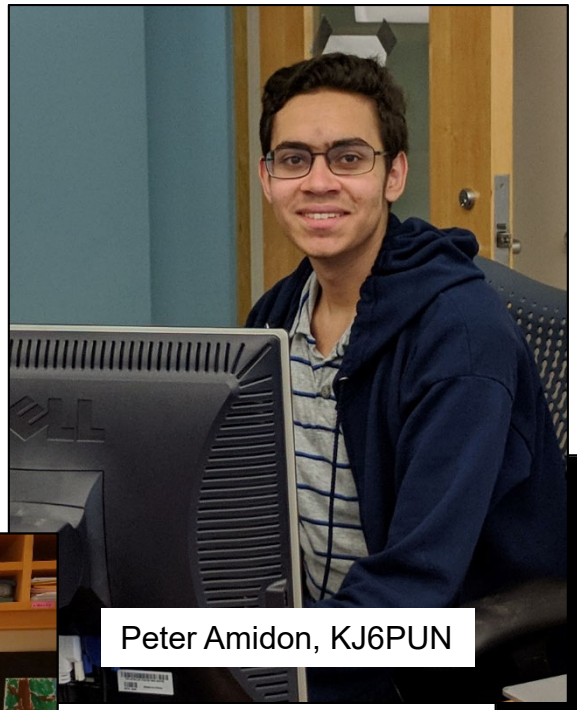
Volunteer of the Year Award

2019 Mick McDonald Volunteer of the Year Award

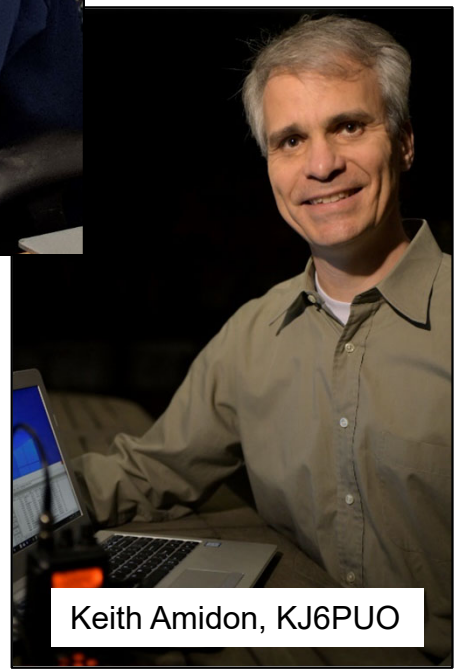
- Awarded annually by the Santa Clara County Emergency Managers Association
- Honors those volunteers who exemplify dedication and commitment to their community
- Each agency in the EMA nominates someone for the award
- This year, the SCCo Office of Emergency Management award goes to the team that developed our next generation form handling software (Outpost/PackItForms)
  - EOC and healthcare personnel get functionality that is closely aligned with their needs
  - Amateur radio operators get more capability and an easier to use interface.

2019 Mick McDonald Volunteer of the Year Award


Jim Oberhofer, KN6PE


Peter Amidon, KJ6PUN


John Kristian, W6JMK


Keith Amidon, KJ6PUO

Special Recognition

Special Recognition

Phil Henderson, KF6ZSQ

Thank you for more than a dozen years of innovation in packet radio!

Help Tell Our Story

Help your Emergency Management team and other agencies understand what we can do for them

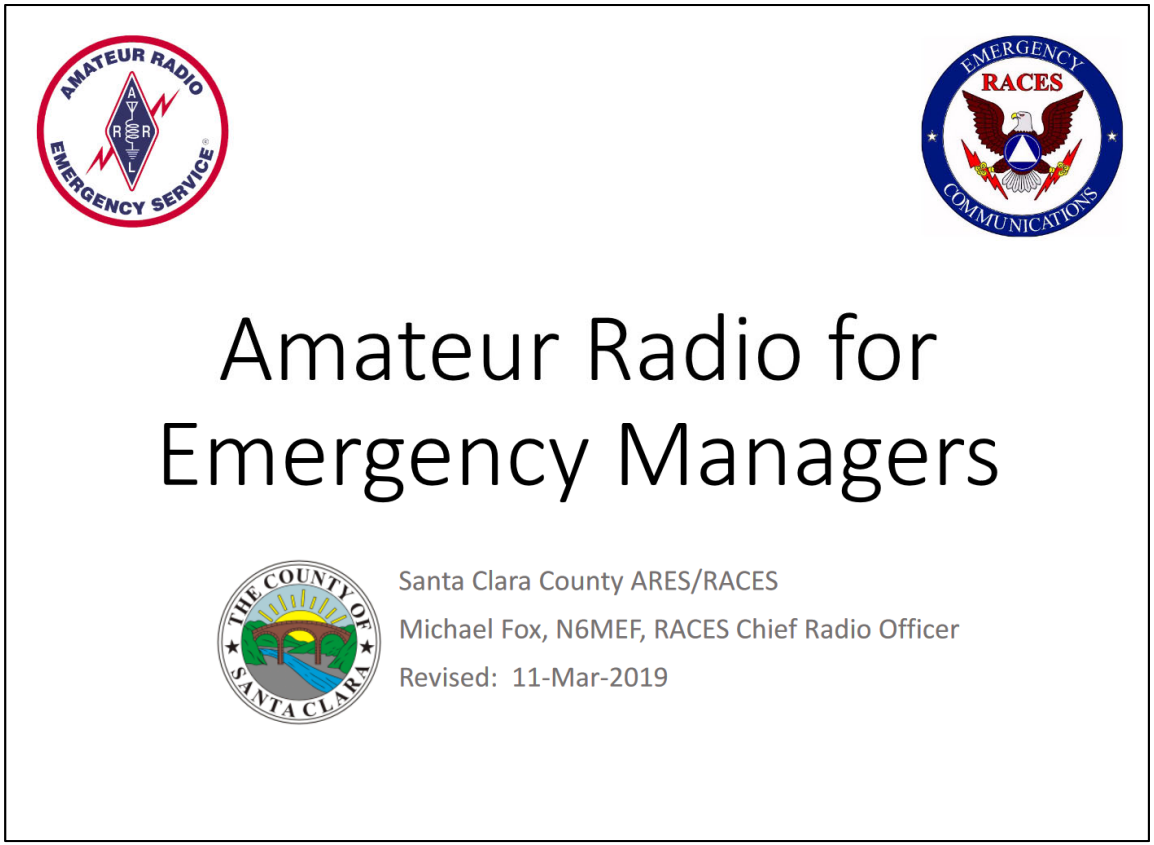
What We Know Doesn't Matter!

- Let's say your house is on fire
  - Do you want someone who can put on turnout gear, drive a truck, connect hoses, and operate ladders?
  - No. You want someone who can put out the fire!

- Avoid focusing on the underlying tasks & technologies
  - Requires served agency to guess how you can help them
  - If they aren't radio operators, they may not figure it out

- Focus your message on what we can do <u>for them</u> (the agency)
  - Solve a problem that THEY have
  - On THEIR terms, within THEIR workflow, using THEIR terminology

Last Year:
Amateur Radio for Emergency Managers



Focuses on what we can do for our served agencies

Additional Ideas

- Intergovernmental Advisory Committee to the FCC issued several Advisory Recommendations on Nov 7, 2019
  - https://www.fcc.gov/document/fcc-issues-advisory-committee-public-safety-and-telehealth-reports

- Two of the recommendations identify amateur radio as a key resource:
  - Multilingual Alerts Report (2019-5)
  - Disaster Resiliency Report (2019-3)

- From the recommendations …

IAC to FCC: Amateur (ham) Radio Capability

- Available for emergency communications support to any public service agency; bridge interoperability gaps
- Deploy to a wide variety of locations:
  - Auxiliary command posts, emergency operations centers, emergency shelters, evacuation sites, fire stations, medical facilities, mobile disaster vehicles, police stations, public works sites, and volunteer intake centers
- Create communications links between similar agencies across political boundaries
- Establish comm outside the existing coverage areas of public service, commercial systems

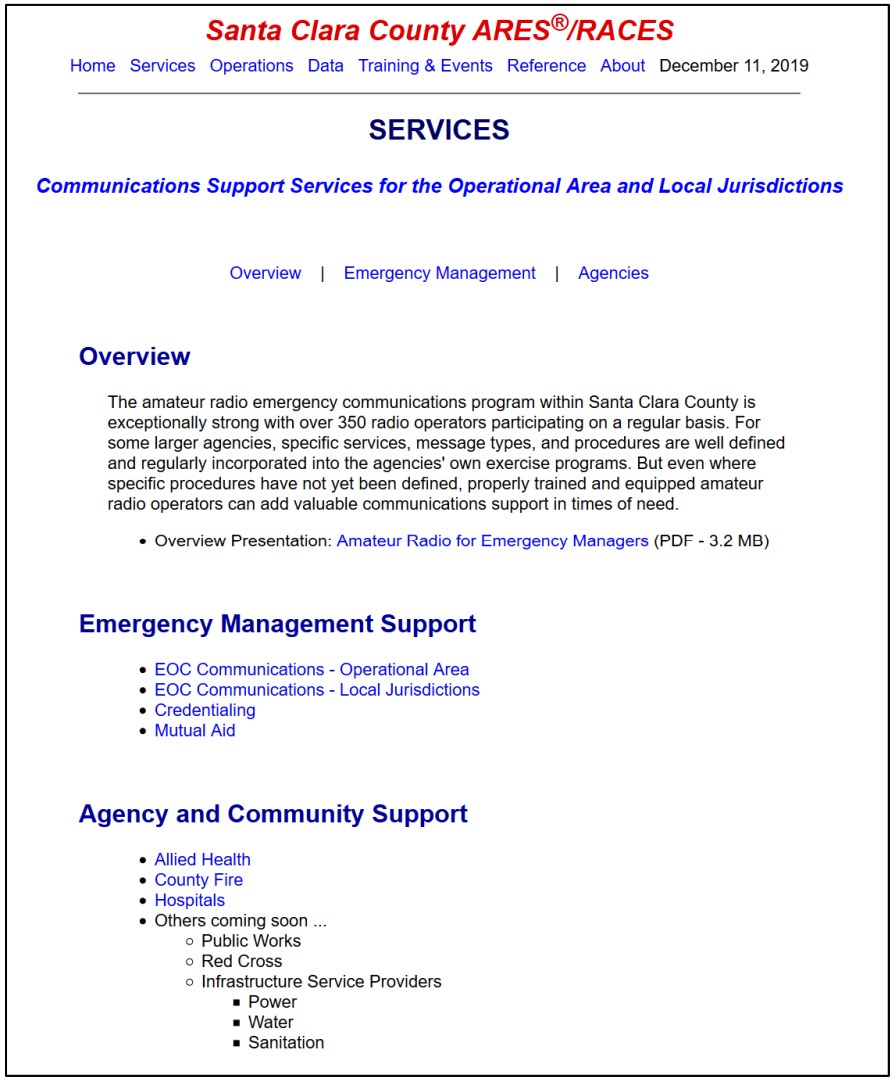
IAC to FCC: Amateur (ham) Radio Capability (2)

- "Shadow" critical public officials, emergency mgmt personnel
- Monitor crucial infrastructure; provide periodic reports
- Provide periodic situation reports from observation posts
- Identify which hospitals have the available capacity to accept injured after an event
- Provide continuing communication support through ham radio after an event
  - After damage is done, and there is still no power or phone service, ham radio operators have provided on-going coordination of delivery of water and food to the survivors for weeks, as well as providing communications to families outside the disaster area.

New “Services” Web Pages

(https://www.scc-ares-races.org/services)

- Intended audience is our served agencies
- What we can do for them
- What we need from them
- Work in progress …



Santa Clara County Office of Emergency Management

Dana Reed, Director

David Flamm, Deputy Director

Thank You!

Please complete the Course Evaluation and leave on the sign-in table

If you have questions or feedback about this or other training activities, you can join our Training discussion group.
https://scc-ares-races.groups.io/g/training
This is a moderated group.

See you at a training class or exercise next year!

Appendixes

Cross-band Repeating

Updated Radio Reference Sheets

General Settings

- Set Transmit Power Level
- Set Frequency
- Set Offset or enable/disable Auto Repeater Offset
- Turn on Tone or ToneSquelch
- Set Left and Right side of radio (if applicable), use memory channels
- Set RF or Audio Squelch
- Turn speaker volume down
- Unplug or disable microphone, if applicable

Kenwood TM-D710 and TM-V71A

- Instructions in PDF on Disk
  - Cross-band (K Type)-E.PDF
- Multiple Menu Modes
  - Menu Mode 403 for Cross-band
  - Menu Mode 404 for TX HOLD
  - Menu Mode 406 for TX ID
  - Menu Mode 405 for entering Repeater ID
- In Cross-band mode, 3 min TX timer is locked on.
- Turning off does not cancel Cross-band
- Must turn off and press [Tone] + Power on to reset
- auto-ID function

(instructions verified by Steve KC6RSC)

Icom IC-2730H

- Instructions from county drill by Neil K2LL, see details on addendum sheet
  - http://icom.custhelp.com/ci/fattach/get/2822/0/filename/IC-2730+Cross-Band+Repeat+Addendum.pdf
- Exclusive operation: enable cross-band features, then turn on and off. Once enabled cross-band will stay enabled until radio is reset.
- To enable
  - Power off, press both “main band” and “moni” plus power on. If successful the EXMENU > OTHERS > RPT M menu will be enabled.
  - Recommended to turn on time-out timer (TOT) to 3 minutes or less
- To turn on
  - set left and right sides of the radio to be the two different channels. Ensure they are on different bands.
  - Menu > EXMENU > OTHERS > RPT M > START
  - Press the MW button
  - Rotate tuning knob to “YES”, then press MW button again.
  - You will see “rPt” on both sides of the display
- To turn off
  - Press Menu. You will see “EXIT?”. Rotate tuning knob to show “YES”, then press MW button.
- “Locked Band” or “One Way”:
  - This radio doesn’t support one way cross-band repeating. To fake it, program the remote side to listen for a PL tone it won’t receive.

Yaesu FTM-350R

- Disable APRS by turning the APRS modem OFF (Set E05)
- Set frequency and squelch for left and right, VHF/UHF
- To Activate
  - Turn OFF
  - Hold the button left of the yellow power button
  - Press Power button
  - Select Special Menu 11 XBAND-RPTR with left dial
  - Rotate left dial to ON, press left dial (radio will reboot itself)
- To disable,
  - Turn OFF
  - Hold the button left of the yellow power button
  - Press Power button
  - Select Special Menu 11 XBAND-RPTR with left dial
  - Rotate left dial to OFF, press left dial (radio will reboot itself)

Yaesu FTM-400DR/XRD/DE/XDE

- Disable APRS by turning the APRS modem OFF
- Set frequency and squelch for top and bottom
- Disconnect microphone, turn volume down
- To Activate
  - Turn OFF
  - Hold the DISP, F, and GM buttons
  - Hold Power button, release when radio turns on
  - X-Repeater message is displayed
- To disable,
  - Turn OFF
  - Hold the DISP, F, and GM buttons
  - Hold Power button, release when radio turns on
  - X-Repeater message is not displayed

Yaesu FT-8800

- First set up VHF* on Left and UHF* on Right
  - * Either band may be on either side
  - Freq, squelch type, squelch freq
  - Override repeater offset
- Press SET
  - Rotate main dial to menu 45 (X-RPT)
- Press main dial knob will show X-start
- Press main dial knob again to activate
- To exit press SET

Alinco DR-635 and DR-735

- (Instructions verified by Thomas KK6FPP)
- Details on http://www.alinco.com/pdffiles/Tech/Crossband/dr635_XBND.pdf
- Turn the power on while holding the BAND key pressed.
- ★ and R icons appear on the screen. Repeat the same sequence to exit from the XBR mode.

Your Radio could be listed here

- Send e-mail describing verified procedure to Andreas Ott, K6OTT, <andreas@naund.org>

Intermod Calculations

IMD Concerns for Field Sites

- Primarily concerned with odd orders (non-linear effects)
  - Few other transmitters nearby
- Most important odd order is the 3rd order since it's magnitude will be largest
  - For each combination of f_1 and f_2 (omitting math here)
    - $2f_1-f_2$, $2f_2-f_1$ are of concern
  - If a third signal is present
    - $f_1+f_2-f_3$, $f_1-f_2+f_3$, $f_2+f_3-f_1$ are of concern
  - Other combinations mostly out of band
- Next most important would be 5th order. After that, the amplitude is usually too low to matter.

IMD Concerns for Shared Sites, like EOCs

- Need to worry about both odd and even orders, since what's out of band for us may be in band for fire, police, cellular, satellite, etc.
  - Odd orders like a field site
    - For each combination of f_1 and f_2

      $2f_1-f_2$, $2f_2-f_1$ are of concern
    - If a third signal is present

      $f_1+f_2-f_3$, $f_1-f_2+f_3$, $f_2+f_3-f_1$

      $(2f_1 – f_2)$, $(2f_1 – f_3)$, $(2f_2 – f_1)$, $(2f_2 – f_3)$,

      $(2f_3 – f_1)$, $(2f_3 – f_2)$

      are of concern
  - Even orders, too, because lots of services are involved
    - You may interfere with them

      $f_1 + f_2$, $2f_1 + 2f_2$, f_1-f_2, $2f_1 - 2f_2$

Intermodulation Products: 2 Transmitters

- To simplify, ignore the cos() and focus on the frequency terms
- Calculating for two frequencies is simple (albeit tedious)
- For two transmitters, the four 3rd order products are:
  - $(2f_1-f_2)$, $(2f_2-f_1)$, $(2f_1+f_2)$, $(2f_2+f_1)$
  - The first two are of most interest because they are near the two transmitters (and may land close to other nearby transmitters)
  - The last two are typically out of band
    - Won't affect our other transmitters
    - Could affect other radio services at a shared transmitter site if not filtered, but not so important for an isolated ham radio event

Intermodulation Products – 3 Transmitters

- For 3rd order: $|k_1| + |k_2| + |k_3| = 3$
- For three transmitters, the nine 3rd order products are:
  - $(f_1 + f_2 + f_3)$, $(f_1 + f_2 – f_3)$, $(f_2 + f_3 – f_1)$
  - $(2f_1 – f_2)$, $(2f_1 – f_3)$, $(2f_2 – f_1)$, $(2f_2 – f_3)$, $(2f_3 – f_1)$, $(2f_3 – f_2)$
- Fun right?
- Now, imagine trying to calculate for the most common IMD issues:
  - 2-TX 3rd Order, 3-TX 3rd Order, 2-TX 5th Order
  - Check out intermod calculators
    - Search for online calculators and/or downloadable software
- Recommendation:
  - Whenever possible, calculate the 2-TX 3rd order products and avoid those frequencies: $(2f_1 – f_2)$, $(2f_2 – f_1)$
  - Use an IMD calculator to select the best frequencies to use at an event

End