Amateur Radio for Emergency Managers

Santa Clara County ARES/RACES

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Amateur Radio in Santa Clara County

• Santa Clara County
  • ~1.8M people
  • ~ 8,000 amateur radio licenses
  • Many “eyes and ears”
  • Most people know someone who is an amateur radio operator

• SCCo ARES/RACES
  • A group within amateur radio focused on emergency comms systems, procedures, equipment
  • About 350 weekly check-ins
  • Weekly nets, monthly classes, quarterly drills, public service
EOC Operations

- #1 disaster response issue:
  - Poor communications

- A key role & responsibility of an Emergency Operations Center is:
  - Information Collection, Evaluation, Dissemination
Amateur Radio in EOC Operations

Amateur Radio can help:

- **Communications**
  - Create the capability where it don’t normally exist
  - Provide backup capability where existing systems have failed

- **Information collection and dissemination**
How We Think of Communications

• Follows the SEMS / NIMS model

• Assumptions
  • Connectivity will be there when needed
  • Communications systems and services (voice, data, video, ...) will be there when needed
Reality Is More Complicated

Connectivity (Land Lines, Mobile, Cable, WiFi, ...)

Services:
- Phone
- E-mail
- Files
- WebEOC
- Other

- Perhaps little or no connectivity
- Possibly limited bandwidth
- Broadband
- Redundant Broadband

DOC
Local EOC
OA EOC
Region/State EOC
Possible Connectivity Problems

- Connectivity may not be available at some locations
  - Ex: Parks and other field locations
- Connectivity can fail at any time, even without a local disaster
  - Ex: Equipment, human error, hacking, terrorism, ...
Possible Service Problems

Services:
- Phone
- E-mail
- PCs
- WebEOC
- Other

Connectivity (Land Lines, Mobile, Cable, WiFi, ...)

- Connectivity at the service provider can fail
- Systems that provide the services can fail
- May have nothing to do with our own local situation
  - Ex: Equipment, human error, hacking, terrorism, ...

Perhaps little or no connectivity
Possibly limited bandwidth
Redundant Broadband

Field
DOC
Local EOC
OA EOC
Region/State EOC
Amateur Radio Can Help

• When communications at a field site doesn’t normally exist …
• Or, when existing systems are degraded or disabled …
• Amateur radio doesn’t replace these systems
• But it can help fill in some of the gaps
 Amateur Radio Provides Voice AND Data Communications

When most people think of “amateur radio”, they think of voice communications ...

Today, we use a mixture of voice and data communications ...

In Santa Clara County, we leverage data communications for increased speed, accuracy and alignment with served agency needs
“When All Else Fails”

• 2016 Loma Fire
  • Commercial power failed
  • Generator at radio site failed
  • Roads closed; no access to bring backup generator
  • Internet service provider networks failed
  • Most private communications systems failed

• Santa Clara County ARES/RACES network continued to run
  • Provided temp, humidity, smoke sensor info to other site tenants
  • Used to send/receive Internet email while ISP networks were down
2017 Wine Country Fires

**Mendocino:**
- Fire destroyed AT&T cable between Ukiah and Willits
- Loss of E-911, cellular, landline, cable and most broadband services
- Cash only; no ATM machines, credit card readers, ...
- Sheriff Allman: relying on amateur radio for hospital communications

**In Napa and Sonoma:**
- Electrical service cut off during initial wind storm
- Widespread loss of cell service and other communications
- Loss of communications at hospitals, shelters, ...

**Amateur Radio Response:**
- Local radio amateurs deployed to EOCs, medical centers, nursing homes, Red Cross shelters, high schools, ...
- Coordinated delivery of food, bedding, shelter supplies, donations
Amateur Radio in EOC Operations

Amateur Radio can help:

- Communications
  - Create the capability where it don’t normally exist
  - Provide backup capability where existing systems have failed

- Information collection and dissemination
Information Collection

Information needs to be collected from places that lack communications.

Amateur Radio
- Can provide communications at schools, shelters, hospitals, neighborhoods and for groups such as CERT, Red Cross, CADRE, and others.
- Report on situation, collect status, make requests.
Example: Earthquake Damage Reports
Earthquake Damage Reports

- Santa Clara County amateur radio operators are trained how to send in damage reports using the Modified Mercalli Scale
- Quickly establishes a county-wide picture of where and how much damage has occurred
Example:
Schools / Local EOC
Example: Schools / Local EOC

- Schools report to school district; school districts report to city EOC
  - Status (damage, injuries, ...), resource requests, H&W
- Amateur Radio:
  - School districts to city EOC (primary or backup)
  - Schools to school districts (backup)
Example:
Neighborhoods / Local EOC

Mountain View CERT and ARES/RACES (Amateur Radio)
Example: Neighborhoods / Local EOC

• Community Emergency Response Teams report to neighborhood command posts; CP reports to city EOC
  • Damage assessment
• Amateur Radio: neighborhood CP to EOC
CERT Collects Neighborhood Data

CERT DAMAGE ASSESSMENT FORM

<table>
<thead>
<tr>
<th>INCIDENT #</th>
<th>TIME By</th>
<th>LOCATION</th>
<th>FIRE</th>
<th>HAZARD</th>
<th>BUILDING Damage</th>
<th>PEOPLE</th>
<th>ROAD</th>
<th>X</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>11801.2</td>
<td>5:30</td>
<td>825 Foa</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>Apart, wing collapsed</td>
</tr>
<tr>
<td>21803.6</td>
<td>6:03</td>
<td>254 Dona</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>31804.9</td>
<td>9:12</td>
<td>125 Church</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td>0</td>
<td>Tree across Church</td>
</tr>
<tr>
<td>41805.4</td>
<td>1:35</td>
<td>135 Mercy</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>Power line down</td>
</tr>
<tr>
<td>51807.8</td>
<td>7:52</td>
<td>152 Bush</td>
<td>10</td>
<td></td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>Thick smoke</td>
</tr>
<tr>
<td>61809.6</td>
<td>9:21</td>
<td>212 Bush</td>
<td>10</td>
<td></td>
<td></td>
<td>0</td>
<td></td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>71310.4</td>
<td>1:37</td>
<td>372 Bryant</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td>0</td>
<td>Chimney Fell</td>
</tr>
<tr>
<td>81311.3</td>
<td>1:03</td>
<td>631 Oak</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>91313.9</td>
<td>9:23</td>
<td>288 Villa</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td>0</td>
<td>3 Townhouses down</td>
</tr>
<tr>
<td>101315.1</td>
<td>1:18</td>
<td>118 Elena</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td>0</td>
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<tr>
<td>1320</td>
<td></td>
<td></td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Radio Priority 1 - Life Threatening or growing, and Priority 2 - Property/Fire incidents immediately as you find them.
** Immediate Medical = life threatening; others are delayed/minor

Use "F" for Unknown. Put an "X" in the OTHER column for descriptions that don’t fit elsewhere.
Summary Data Ready to Transmit

<table>
<thead>
<tr>
<th>Date: (MM/DD/YY)</th>
<th>05/15/11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time: (24 hrs)</td>
<td>1320</td>
</tr>
<tr>
<td></td>
<td>0001 to 2400</td>
</tr>
<tr>
<td></td>
<td>2:00 PM = (2+12)=1400 Hrs.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Situation Severity</th>
<th>Select One</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMERGENCY</td>
<td>(e.g., Life Threat)</td>
</tr>
<tr>
<td>URGENT</td>
<td>(e.g., Property Threat)</td>
</tr>
<tr>
<td>OTHER</td>
<td>(All Others)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Message Handling Order</th>
<th>Select One</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMMEDIATE</td>
<td>(As Soon As Possible)</td>
</tr>
<tr>
<td>PRIORITY</td>
<td>(Less Than One Hour)</td>
</tr>
<tr>
<td>ROUTINE</td>
<td>(More Than One Hour)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ICS Position</th>
<th>Planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Mountain View EOC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>From</th>
<th>Planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Old Mtn. View CERT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Subject</th>
<th>Damage Summary for Old Mtn. View CERT</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Reference</th>
<th>(e.g., Number of earlier msg)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Fire &amp; Hazard</th>
<th>Building</th>
<th>People</th>
<th>Roads</th>
<th>Neighborhood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fires</td>
<td>Gas Leak</td>
<td>Water Leak</td>
<td>Electrical</td>
<td>Chemical</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Message</th>
<th>(what, when, where needed; how long; contact name and phone number) KEEP MSC BRIEF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apartment building 23 W. Dana I=8, D=20, T=60, one wing collapsed</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Action Taken</th>
<th>(For use by Originator / Recipient)</th>
<th>USE SEPARATE MESSAGE FORM IF SENDING REPLY!</th>
</tr>
</thead>
</table>
Summary Displayed in Mountain View EOC

<table>
<thead>
<tr>
<th>Location</th>
<th>Fires</th>
<th>Gas Leaks</th>
<th>Water Leaks</th>
<th>Electrical</th>
<th>Chemical</th>
<th>Light</th>
<th>Building Moderate</th>
<th>Heavy</th>
<th>Immediate</th>
<th>People Delayed</th>
<th>Trapped</th>
<th>Morgue</th>
<th>Access</th>
<th>No Access</th>
<th>Neighborhood % Surveyed</th>
<th>Report Time</th>
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</thead>
<tbody>
<tr>
<td>Ada Park</td>
<td>-</td>
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<tr>
<td>Appletree Area</td>
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<td>The Crossings</td>
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<td>Cuesta Park</td>
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<td>Dutch Haven</td>
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</tr>
<tr>
<td>Monta Loma</td>
<td>-</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>7</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>10%</td>
<td>1319</td>
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<tr>
<td>Mountain View Gardens</td>
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<td>North Whisman</td>
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</tr>
<tr>
<td>Old Mt. View</td>
<td>6</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>8</td>
<td>26</td>
<td>67</td>
<td>103</td>
<td>11</td>
<td>5</td>
<td>3</td>
<td>20%</td>
<td>1320</td>
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<tr>
<td>Rex Manor</td>
<td>2</td>
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<td>4</td>
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<td>2</td>
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<td>1312</td>
</tr>
<tr>
<td>Saint Francis Acres</td>
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<tr>
<td>Shady Ridge</td>
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<tr>
<td>Sylvan Park</td>
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<tr>
<td>Wagon Wheel</td>
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</tbody>
</table>
Example: Hospitals, Allied Health

Various health-specific forms or other messages
Example: Hospitals, Allied Health

- Medical info is reported to MHJOC; municipal issues are reported to the city EOC; OA EOC supports both
  - Bed status, facility status, resource requests, municipal issues
- Amateur Radio:
  - Hospital to (MHJOC or City EOC) to OA EOC
  - Support for Allied Health facilities is new
Example:
City EOC / County EOC

EOC 213RR Resource Request or other messages
Example: City EOC / County EOC

**Scenario:**
- City EOC needs to send a Resource Request form to the County EOC
- Connectivity to WebEOC not available at one or both ends

City EOC radio operator sends form

County EOC radio operator receives form

Transmit via radio from anywhere in the county

Print Form
Example:
Alternate 911
Under development for: Cupertino, Los Altos Hills, Saratoga
Alternate 911

[Diagram showing a process flow involving Dispatch, DOC, EOC, Law, Fire, EMS Issues, Local Gov Issues, Amateur Radio Equipped and Staffed, and Fire Station or Ark Location.]
Information Dissemination

After analysis, synthesis, information can be distributed to field resources and the public.

Amateur Radio
- Can be used to distribute information to schools, shelters, hospitals and groups such as CERT, Red Cross, CADRE, and others.
- Press releases and public service announcements can be distributed to the general public.
Example: Disseminating info to field responders
Information Dissemination: Field

• Situational awareness, common operating picture, resource status, prioritization, analysis, support, ...

• Amateur radio: each SEMS level

Amateur radio operators are trained in message passing techniques (voice and data) which help deliver the message correctly and quickly
Example: Distributing Information to the Public
Distributing Public Info

PIO

Broadcast Media

Social Media

What about those who don’t have access or where communications systems are damaged?

• Schools
• Shelters
• Neighborhoods
• ... wherever needed
Example:
Beyond the Op Area
Example: Beyond the Op Area

• Communications outside of our operational area is also important
  • Who
    • Other Operational Areas
    • Region and State
    • Elsewhere
  • Why
    • Situational awareness
    • Common operating picture
    • Resource sharing
    • Coordination
    • …

• Amateur radio can compliment existing communications paths or act as backup during failures
EOC Readiness: Amateur Radio

Two related but separate questions:

• Is your EOC ready for Amateur Radio?

• Is Amateur Radio ready at your EOC?
Readiness Assessment

• Each city/OA has a Chief Radio Officer
  • Manages amateur radio emergency comms efforts
  • Best single point of contact for EOC staff

• Equipment & facilities
  • Do sufficient radios, antennas, computers, etc. exist for simultaneous operations on standard nets?
  • Do you have sufficient space allocated? Accessible to/from EOC?
  • We have standardized recommendations for city EOCs, hospitals, ...

• Personnel
  • Do you have a sufficient number of amateur radio operators and are they sufficiently trained?
  • Are you helping to recruit, encouraging participation, training?
  • We have a comprehensive training and credentialing program

• Procedures
  • Do you have EOC procedures for utilizing amateur radio?
  • Do your training, documentation, exercises include amateur radio?
Summary

• Amateur radio can help at the EOC with
  • Information collection and dissemination
  • Communications
    • Where it doesn’t normally exist
    • Backup where existing systems are degraded or failed

• Amateur radio in Santa Clara County
  • Standards for people, procedures, equipment
  • Robust and active training and exercise schedule
    • Weekly nets, monthly classes, quarterly drills
    • Public service events (races, parades, ...)
  • Each jurisdiction should assess readiness, encourage participation

• For more information:
  • https://www.scc-ares-races.org