After Action Report
City Communications Coverage Test

Cupertino
ARES/RACES

1. Overview

Description: City Communications Coverage Test
Event Date: 21-July-2012
Report Date: 27-July-2012
CARES Event: CUP-12-14T
RACES Event: CUP-12-14T
Control: Cupertino ARES/RACES
Report Revision: 1.3, **FINAL**
Submitted by: Jim Oberhofer KN6PE

Requirements for Reporting
Completing an After Action Report is part of the required SEMS reporting process. The Emergency Services Act, Section 8607 (f) mandates that the Office of Emergency Services (OES) in cooperation with involved state and local agencies complete an After Action Report within 120 days after each declared disaster. Section 2450 (a) of the SEMS Regulations states that, "Any city, city and county, or county declaring a local emergency for which the governor proclaims a state of emergency, and any state agency responding to that emergency shall complete and transmit an after action report to OES within ninety (90) days of the close of the incident period as specified in the California Code of Regulations, section 2900(j)."

CARES will follow this requirement for reporting the results and recommendations for this Training Event.

i. Introduction and Background

Terms

ARC: Fixed position shipping containers strategically placed throughout the City by Cupertino OES that contain emergency supplies for the purpose of supporting community-based search and rescue, and first aid.

CARES: Cupertino Amateur Radio Emergency Service, ARES/RACES organization supporting the City of Cupertino.

CERT: Community Emergency Response Teams

Introduction
The City of Cupertino is deploying a Communications Van as a replacement for its fixed ARES/RACES Radio Room. This vehicle offers the city new capabilities in supporting the City EOC response mission, as well as enhances the overall ARES/RACES response. During an activation, the van will be moved from its storage location to the EOC parking lot at City Hall.

To ensure we understand the communications performance of the Van in its deployed position at the EOC, this exercise was designed to understand the radio coverage from key locations throughout the city relative to the Van.

The expected outcome was to identify where we have reception problems and determine a mitigation plan as necessary.

The City of Cupertino authorized the drill with training activation number CUP-12-14T. This report covers the activities undertaken by responding CARES members and the findings from this test. This report will be used by the CARES EC Staff to evaluate next steps, as well as input to the Cupertino Disaster Council.

ii. Type / Location of Event / Drill / Exercise

Event Type: City of Cupertino, City Volunteer Training Activation
Event Identifier: CUP-12-14T
Event Name: City Communications Coverage Test
Location: City of Cupertino

iii. Description of the Event / Drill / Exercise

The objectives of this test were:

1. Activate the Communication Van in a standard response configuration at the EOC.
2. Document the voice communications quality (signal strength, readability) between the Communication Van and Field Responders deployed to all City ARC sites, and other sites.
3. Identify areas where there are coverage gaps, and develop plans to mitigate each gap.

Event resources came from the following organizations:

1. Cupertino ARES/RACES: Responsible for staffing the City's Communication Van, net control positions, and field communications resources. Ten (10) CARES members participated in the test.

Name	Call Sign	Assignment
Chris Capener	AI6CC	Monta Vista ARC, Stevens Creek Dam
Stuart Chessen	KF6RZR	Cupertino High School
Lloyd Dickman	AF6XM	Garden Gate ARC
Ken Ericksen	KI6SYY	DeAnza ARC
Gerd Goette	KI6WEJ	Seven Springs ARC, Blackberry Farm
Allan Gontang	KD6QPP	Comm Van Ops
Phil Harris	WA2KDX	Comm Van Ops
Bill Klein	KD6TQJ	Foothill Expressway and I280
Jim Oberhofer	KN6PE	Rover, Regnart Canyon
Skip Stevens	WA6VFD	Hyde Middle School ARC

2. CERT: Responsible opening the Arks where needed to support the communications test.

Once the test was initiated, CARES, did the following:

1. Established the Resource Net for initial drill check-ins.
2. Member check-ins. CARES members checked into the CARES Emergency Net on TAC-1.
3. CARES Field Responders were dispatched to ARC sites to perform the test.
4. The CERT Coordinator and CARES Coordinator handled unlocking the ARCS when necessary.
5. At each ARC, the CARES Field Responder made contact with the Communications Van with their personal HT. Different antennas were tested (HT's rubber duck, ARC J-Pole, Mag Mount) at different power levels. When a mobile radio was available, this configuration was also tested.
6. Test coordination was performed from the Communications Van. All test results were logged.
7. At the end of the test, CARES Field Responders were released from the Activation.

Performance against Objectives:

1. Activate the Communication Van in a standard response configuration

Results: **SATISFACTORY**. The vehicle was deployed from its storage location to the EOC. Due to a CERT Graduation also occurring at the EOC, the Van was parked 200 feet from its desired response location. All Communications systems operated correctly.

2. Document the voice communications quality

Results: **SATISFACTORY**. All test scenarios, including radio, antenna, and power settings, were recorded.

3. Identify areas where there are coverage gaps, and develop plans to mitigate

Results: **SATISFACTORY**. Only one severe coverage problem was uncovered. Some reduced power level coverage gaps were identified.

The test ran for 3 hours, with an additional 1 ½ hours for van-specific activities.

iv. Chronological Summary of Event / Drill / Exercise

CARES ran this test under activation number CUP-12-14T – Van Training. The following is a compilation and summary or the activities as reported on ICS-214s that were submitted after the test. All times listed here are in local time. The following is a very high level summary.

Time	Description, Notes, Comments
0719	Allan KD6QPP and Phil WA2KDX arrive at the Van storage site.
0754	Van arrives at the EOC.
0820	CARES Net established; First field check-ins
0827	AI6CC: assigned to Monta Vista ARC, on site at 0838, opened up, ran the test.
0828	KI6WEJ: assigned to Springs ARC, on site, opened up, ran the test.
0830	AF6XM: assigned to Garden Gate ARC, arrives at the ARC site; ran the test.
0845	KN6PE: assigned as Rover. Unlocked Hyde ARC Site for WA6VFD
0845	WA6FD: assigned to Hyde ARC, on site, ran the test.
0858	KN6PE: deployed to Garden Gate; Unlocked ARC Site for AF6XL
0945	KI6WEJ: secured Springs ARC, on site.
0948	KI6WEJ: deployed to Black Berry Farm, on site, ran the test.
1001	AF6XM: Test complete; departing Garden Gate ARC for home
1003	AI6CC: secured Monta Vista ARC, deployed to the Stevens Creek Dam
1010	AI6CC: Arrived at Stevens Creek Dam, ran the test.
1015	KI6WEJ: secured from Black Berry Farm.
1024	AI6CC: stopped at McClellan Ranch Park, ran the test.
1025	KN6PE: begins Regnart Canyon coverage test
1038	AI6CC: returned to the Comm Van.
1045	KN6PE: ends Regnart Canyon coverage test, returns to Comm Van
1045	CARES Net secured
1245	Van returned to storage; vehicle and generator refueling occurred. Shut Down.

v. Response at SEMS Levels (as appropriate):

Include a summary, conclusions, the field response, and other local, operational area, regional, state or federal response.

The CARES Field Response was sufficient to understand the state of 2 meter simplex and 440 repeater communications coverage at specific locations throughout the city.

In general, communications is achievable all locations with some type of radio/power/antenna configuration. There was only one location where there was no 2 meter or 440 repeater coverage. The following table summarizes the contacts by location and radio-type/power/antenna configuration. See the Key below.

Contact Summary by location and configuration

Site	Contact confirmed with: <Radio>, <Pwr level>, <antenna>, <band>	No Contact
ARC, DeAnza	HT, Lo-Hi Pwr; RD, 2 meter HT, Lo-Hi Pwr; Mag Mount, 2 meter HT, Lo-Hi Pwr; J-Pole, 2 meter	
ARC, Garden Gate	HT, Lo-Hi Pwr, RD, 2 meters HT, Lo-Hi Pwr, J-Pole, 2 meters HT, Lo-Hi Pwr, Mag Mount, 2 meters HT, Lo-Hi Pwr, RD, 440 rptr HT, Lo-Hi Pwr, Mag Mount, 440 rptr Mobile, Lo-Hi Pwr, Trunk Mount, 2 meters Mobile, Lo-Hi Pwr, Trunk Mount, 440 rptr	
ARC, Hyde	HT, Lo-Hi Pwr, RD, 2 meters HT, Lo-Hi Pwr, Mag Mount, 2 meters	
ARC, Monta Vista	HT, Lo-Hi Pwr; RD, TAC 1 HT, Lo-Hi Pwr; J-Pole, TAC 1 HT, Hi Pwr; RD, TAC 2 HT, Hi Pwr; Mag Mount, TAC 2 Mobile, Lo-Hi Pwr; J-Pole antenna, 2 meter HT, Hi Pwr, RD, 440 repeater	HT, Low Pwr, RD, TAC 2 HT, Low Pwr, Mag Mount, TAC 2
ARC, Seven Springs	HT, Lo-Hi Pwr, RD, 2 meters HT, Lo-Hi Pwr, J-Pole, 2 meters HT, Lo-Hi Pwr, Mag Mount, 2 meters	HT, Hi Pwr, RD, 440 repeater
Blackberry Farm	HT, Hi Pwr, RD, TAC 2 HT, Lo-Hi Pwr, Mag Mount, TAC 1 HT, Hi Pwr, Mag Mount, 440 repeater	HT, Low Pwr, RD, TAC 2 HT, Hi Pwr, RD, 440 repeater
Cupertino HS	HT, Lo-Hi Pwr, RD, 2 meter HT, Lo-Hi Pwr, RD, 440 rptr	
McClellan Ranch	HT, Hi Pwr, RD, 2 meter HT, Lo Pwr, RD, 440 rptr Mobile, Lo Pwr, Mag Mount, 2m	HT, Low Pwr, RD, 2 meter
Regnart Canyon	HT, Lo-Hi Pwr, RD, 2 meter (location-specific) Mobile, Mid Pwr, Window Mount, 2 meter Mobile, Mid Pwr, Window Mount, 440 rptr	No contact at Fremont Open district access; was able to get a cell signal.
Stevens Creek Dam	HT, Hi Pwr, RD, 2 meter Mobile, Lo-Med Pwr, Mag Mount, 2m	HT, Low Pwr, RD, 2 meter HT, Lo-Hi Pwr, RD, 440 rptr
Foothill & I280	HT, Lo-Hi Pwr, RD, 2 meter	

Key:

HT	HandiTalkie
RD	Rubber Duck Antenna, standard on HTs
Mag Mount	Magnetic-based antenna, operating from the top of an ARC.
J-Pole	Part of the ARC antenna kit, operating at a height of ~15 feet
Pwr	Power level, depends on the radio and radio type. The following are average power levels that were reported. Power settings vary from radio to radio, HT: Low = ~0.5 w Med = ~1-2 w High = ~5 w Mobile: Low = ~10 w Med = ~25-35 w High = 35-50w
2 meter	Two meter band: TAC 1 = 147.570 TAC 2 = 146.460
440 repeater	W6TDM Repeater, 440.150+, PL=100.0

vi. Interacting Systems, Agencies, and Programs:
Include mutual aid systems (law enforcement, fire/rescue, medical, etc.); cooperating entities (utilities, American Red Cross, Sheriff's Office, City Departments, etc.); telecommunications and media interactions.

Communications Systems
All CARES Frequencies were used as part of this test. All systems performed as expected.

CARES TAC 1 was operated on a shorter mast antenna than CARES TAC 2 (higher gain). We believe this is the cause of the difference between the signal reports from Seven Springs ARC and Monta Vista ARC.

vii. Improvements, Conclusions, Recommendations:
As applicable, include a description of actions taken, assignments, associated costs or budget, timetable for completion or correction, and follow-up responsibility.

The following is a summary of the key Conclusions and Recommendations.

Observations, Conclusions

- The Communications Van can provide good communications coverage throughout the City of Cupertino.
- Most locations could maintain contact with the Communications Van at a Low Power setting with the stock "rubber duck" antenna. HT communications at High Power is required at Monta Vista ARC, Blackberry Farm, McClellan Ranch, and Stevens Creek Dam.
- Power levels aside, there was no appreciable communications quality difference between using the ARC J-Pole Kits and a Mag Mount Antenna.
- Regnart Canyon was previously reported to have "dead" spots. This situation was reconfirmed given the CARES' current communications coverage.

Recommendation
Replace ARC Antenna Kits with Mag Mounts
There apparently was no appreciable difference between the signal quality of communications using the ARC J-Pole and a ARC-mounted Mag Mount Antenna. The Mag Mounts are operationally easier to deploy when compared to the setup required by the ARC J-Pole Kits. To this end, the following recommendation is made:

1. At all ARCS other than Monta Vista, replace the ARC J-Pole antenna kit with one Mag Mount Antenna.
2. At the Monta Vista ARC, continue to use the J-Pole Antenna Kit.
3. Publish minimum power levels needed by field responders when deployed to the ARC sites.

Regnart Canyon Coverage

While it is unclear what a CARES response to this area would involve, radio coverage would be required just the same. To address this, the following recommendation is made:

4. Investigate the feasibility of a high-ground mobile cross-band repeat station.
5. Include a repeat coverage test of this area.
6. If this is successful, make a recommendation for deployment.

However, if we are deployed to this region, the following locations are recommended sites with good visibility into Regnart Canyon and excellent visibility into the rest of Cupertino:

7. The top of Regnart Road (vicinity of 22399 Regnart Road) or along that crest
8. The top of Rainbow Drive (vicinity of 21798 Rainbow Drive)

Access to these sites may be impassible in the event of severe seismic activity.

Logs, attachments:

As applicable, include a description of actions taken, assignments, associated costs or budget, timetable for completion or correction, and follow-up responsibility.

End of Report.