

December 2004



Newsletter of the County of Orange Radio Amateur Civil Emergency Service



Captain's Corner

by Ray Grimes N8RG, Chief Radio Officer

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Thanks to all who worked the Orange County Election on November 2. This was definitely the best supported election event ever, thanks to OCRACES and city RACES members. The election process was fairly complex this time, with both electronic voting and paper ballots being used.



schedules, regular testing of vehicle and communications systems, identification of defective equipment and notification for repairs, and coordination of scheduled maintenance downtime and posted vehicle deployments. This is a very important responsibility that Tom has taken seriously and aggressively. Thanks Tom, we all appreciate the effort!

Don't forget the OCRACES Holiday Dinner at 1900 hours on Monday, December 13. You are also invited to the Orange County Sheriff's Communications Division holiday luncheon that will be at 1130 at the Eckhoff Street facility on Wednesday, December 15.

OCRACES also supported the Statewide EMS Exercise on November 18. Carol Matthews, KF6ERZ was assigned to the Health Care Agency office in Santa Ana, and Scott Byington, KC6MMF and Harvey Packard, KM6BV staffed the Loma Ridge RACES radio room.

OCRACES will be displaying our OCRACES emergency communications vehicle at HRO Anaheim on Saturday, December 4. If you would like to support this event, please contact Ken Bourne, W6HK.

I would like to recognize and thank Tom Tracey, KC6FIC as the new OCRACES Vehicle Manager. Tom has already jumped into this newly created volunteer position by creating tracking processes to manage the vehicle maintenance

I wish you the best Thanksgiving and look forward to seeing each of you in December at the OCRACES and OCSD/

The Next
OCRACES
Meeting is

January 3, 2005
1930 Hours

840 N. Eckhoff St.
Orange, CA



Orange County Sheriff's Department
Michael S. Carona, Sheriff-Coroner

OCRACES Holiday Dinner

Our annual OCRACES Holiday Dinner will be Monday, December 13, 2004. Family members are invited and encouraged to attend. Awards will be presented. Please join us at 7:00 p.m. for an evening of good food and an opportunity to say "thanks" for your past year of service to the County of Orange.

COUNTY & CITY RACES MEMBERS SUPPORT THE NOVEMBER 2ND ELECTION

At 7:00 p.m. on Tuesday, November 2nd 145 people formed as the Election ballot transportation team, under the direction of Marten Miller. Marten is the OCSD/Communications Division training officer by day ... and the Ballot Transportation Manager by night!

Forty-four vehicles driven by members of our team transported 2,624 boxes of ballots from 23 collection centers to the Vote Talley Center (VTC). Personnel from OCSD, RDMD, SSA, OCRACES, and various city RACES organizations composed the Ballot Transportation Team.



800 MHz radios were used to coordinate driver activity, and RACES provided an alternate communications link between the VTC and collection centers using Amateur Radio.



Net Control operators Harvey Packard (left) and Bryan Hovde communicated with County and City RACES volunteers from inside the Sheriff's "Samantha II" command post at the VTC.



A familiar face to RACES volunteers and Election personnel alike, Walter Wilson made a "special guest appearance" Election night. Walt, now living in Oregon, was both RACES program coordinator and Ballot Transportation Manager for many years before his retirement.

Marten Miller had the following words of thanks for all RACES participants ...

I just wanted to express my appreciation for your support election night. I know each one of you are aware of the many obstacles we faced at the collection centers. None of us were prepared for the confusion we encountered out there. Our job on election night is to transport the ballots to the VTC but you all know (or perhaps found Tuesday night) it is never that simple.



There was a lot of RACES radio traffic. You were instrumental in many cases in finding answers for the collection center personnel whose cell phones were not very useful. Thank you once again and I hope we can count on your support again in the future!



The boxes of electronic and paper ballots were transported from a Collection Center to the VTC and then unloaded for counting.

IN BUILDING COVERAGE 101 by Ray Grimes, N8RG

Every one of us has at some time operated a hand-held radio transceiver from within a building. Few of us though, have ever really considered why it works, or doesn't work from that location. The design of in-building radio coverage first considers the type of structure which may be one of several possible categories such as a one-story wood frame, a concrete one story concrete and steel tilt-up, or multi-story and high-rise types. The building materials of the structure, the materials or objects within the structure (furniture, office equipment, machinery, and even the number of people), and openings such as windows and doors, all affect in-building radio coverage in some way. In order to talk via radio to someone outside of a building from within, there must be adequate outdoors signal in the vicinity of that building that can somehow enter the building, though attenuated by the building itself. In order to talk between building floors using hand-held transceivers, there must also be adequate signal, allowing for the effects of building materials attenuation. Building telephone and electrical wiring may help to passively propagate radio signals between floors or into parking garages. Even something as simple as turning the handheld portables sideways so that the antennas of the two communicating transceivers are both parallel can make an amazing difference with in-building communications (handheld portable transceiver antennas radiate around the antenna rod and not off the top or bottom).

An interesting university study performed several years ago found a strong correlation between RF attenuation in structures and large cities with earthquake histories. Upon thinking about it, that's not too amazing, as seismic construction codes demand strong concrete and steel construction, and we all know that these materials pretty much stop radio waves.

The materials used in buildings are not constants when it comes to RF attenuation. Wood, concrete, and stucco can absorb great amounts of moisture which can change RF attenuation by several deci-

bels. Window glass is not a pure insulator, as all glass contains metallic impurities. Window glass that is treated with tinted sun shade material is in fact a pretty good RF attenuator. It has been observed on several occasions that buildings which used to enjoy useable in-building coverage greatly lost the ability to use a two-way radio after building window tinting was applied. The amount of RF attenuation (or useable radio coverage) in a structure is dependent on the operating frequency. Low Band is terrible for use in-building, while VHF is fair, and 800 MHz and 900 MHz work quite well. This is largely due to relatively small wavelength UHF radio signals being able to enter through windows and doors with minimal attenuation, being propagated within the building thanks to exterior and interior reflections off of walls and other objects.

A very interesting situation occurred during the 2002 Salt Lake Olympics where in-building 800 MHz indoors stadium coverage was engineered and successfully tested prior to the opening ceremony. During the games, radio users soon reported that the radio dispatchers within this facility would experience fading communications. We were able to demonstrate that this condition occurred when this indoors stadium was filled with people, and the coverage slowly improved after the event when most everyone left. That was a very graphic illustration of the importance in considering all variables when designing in-building coverage. This problem was resolved by relocation of several base radio antennas in order to increase in-building signals enough to provide a fade margin. Thanks to some changes in building codes for major populated areas, in-building coverage for first responders needn't be so hit and miss. BDA's (bi-directional amplifiers) or 'signal boosters' have been in use for several years as an effective in-building coverage solution. A properly engineered in-building 'signal booster' system is primarily designed to provide high reliability in-building portable transceiver coverage, with little or no outdoors coverage.

[Continued on Page 4](#)

IN BUILDING COVERAGE **continued from Page 3**

This system requires a backup power system to assure that it will be operable during a commercial power outage. The 'signal booster' consists of a pair of back-to-back RF amplifiers with bandpass filters, connected to what is known as a 'leaky cable' transmission line system, or a network of in-building antennas coupled to the 'signal booster' through semi-rigid transmission line. Their installation and funding was previously voluntary by the building owner, or may have been purchased by a local government to provide vital police and fire coverage. Things have changed, where in-building public safety communications systems are now mandatory for large buildings. These laws can be traced to as early as 1991 for the City of Burbank. The Uniform Fire Code (UFC) and National Fire Protection Association (NFPA, which is also the primary author of the National Electrical Code, NEC), is the thrust of current legislation requiring installation of in-building public safety communications enhancement systems.

A nice side-benefit of a well-designed in-building RF communications 'signal booster' system is that it benefits all users that operate in that band, with some 'signal boosters' designed to operate in more than one band (the New York Holland Tunnel, for example). Police and fire radios, cellular telephones, and conventional two-way radios can all operate simultaneously using the same 'signal booster' system. There was early criticism that the in-building 'signal booster' system in the New York World Trade Center failed during the 9-11 attack, and that it left first responders without vital communications. The truth of that matter is that the signal booster amplifiers were located on the upper floors and the signals were distributed throughout the building using 'leaky cable'. The last thing anyone envisioned was a high-rise building being totally destroyed. One lacking element that following the initial attack was the immediate availability of alternative communications systems. I would like to thank the following who provided information for this article: APCO International Public Safety Communications Magazine, October, 2004, "Ordinances and In-Building RF Coverage, P. 18, Hagstrom, Jennifer, APCO Contributing Editor, and Jack Daniel, Owner of The Jack Daniel Company, and APCO Life Member.

RACES VEHICLE DISPLAY

On October 7th the OCRACES Communications Vehicle was a part of an emergency services vehicle display in Anaheim. The display was in conjunction with a medical conference at the Anaheim Convention Center, and our presence was requested by the Health Care Agency. Participating were Jack Barth, Scott Byington, Harvey Packard, John Roberts and Steve Sobodos.



“WATCHING THE WEB”

Web Sites of Interest to RACES Personnel

By Ken Bourne, W6HK
Radio Officer, County of Orange RACES

If you are thinking of building a portable station for emergency communications, take a look at “The Box” put together by Steve Merrill, KB1DIG, described and pictured on his Web page at <http://home.comcast.net/~buck0/combox.htm>.

His “Box” (shown to the right) is a strong, hinged, plastic, file-folder container into which he installed a 2-meter/440-MHz dual-band transceiver, a cross-needle VSWR meter, a 12-volt battery system monitor, an 8-ohm powered speaker, an LCD clock, a cigarette-lighter socket, and other components. Several suggestions for



improving or modifying “The Box” have been added to the Web page, including ideas for battery boxes, antennas, muffin fan, fuse block and Anderson Powerpoles. At the bottom of his page are



www.ocraces.org



Mission Statement

County of Orange RACES has made a commitment to provide all Public Safety departments in Orange County with the most efficient response possible to supplement emergency/disaster and routine Public Safety communications events and activities. We will provide the highest level of service using Amateur and Public Safety radio resources coupled with technology, teamwork, safety and excellence. We will do so in an efficient, professional and courteous manner, accepting accountability for all actions. We dedicate ourselves to working in partnership with the Public Safety community to professionally excel in the ability to provide emergency communications resources and services.

County of Orange RACES Frequencies:

- 6m: 52.62 MHz output, 52.12 MHz input, 103.5 PL
- 2m: 146.895 MHz output, 146.295 MHz input, 136.5 PL *
- 23cm: 1282.025 MHz output, 1270.025 MHz input, 88.5 PL
- 1.25m: 223.76 MHz output, 222.16 MHz input, 110.9 PL
- 70 cm: 449.180 MHz output, 444.180 MHz input, 107.2 PL

* Primary Net - Mondays, 1900 Hours

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RACES News from Around the County

News, Information, Special Events ...

CITY/COUNTY RACES – The first City/County RACES meeting of 2005 will be held Monday, January 31, 2005 at 1900 hours at our usual meeting location, 840 N. Eckhoff Street in Orange. Mark your calendar now!

COSTA MESA RACES – Costa Mesa RACES (MESAC) participated in the SONGS reception and decontamination exercise held November 17, 2004. The new reception and decontamination site is at the Orange County Fairgrounds, and MESAC will be the RACES first call when activation of this site is necessary. Participating were Mike Oviatt KE6IWM, Lynn Bosen KF6WES, Brad Russo KB6GPM, Gordon West WB6NOA and Robert Watts KG6UMZ.

CITY/COUNTY RACES – The November 2, 2004 General Election had more RACES involvement in this election than in any previous election with 35+ RACES volunteers covering 22 collection centers and the VTC. Only the San Clemente collection center was without a RACES communicator. These RACES volunteers came from OCRACES and the following city RACES organizations: Anaheim, Brea, Buena Park, Costa Mesa, Fountain Valley, Fullerton, Huntington Beach, Irvine, Laguna Beach, Laguna Niguel, Los Alamitos, Orange, Placentia and Westminster. “RACES did a superb job of

providing additional information and reporting problems to the VTC command post, and their efforts contributed to resolving several confusing issues,” said Marten Miller, the Election Ballot Transportation Manager. For more election coverage see the related article on page 2 of this newsletter.

(Election Photos in this newsletter by Jack Barth & Steve Sobodos)

Election Night ... By The Numbers!

2025: The first box arrives at a collection center (Garden Grove).

2125: The first van arrives at the VTC (Orange 15A).

2216: The first Collection Center is finished for the evening (Laguna Woods).

0100: The last van arrives at the VTC (Garden Grove 8B).

0115: All ballot transportation and precinct verification completed.

“RACES News” provides an opportunity to share information from all City & County RACES organizations in Orange County. Please send your news to: OCRACES@ocgov.com

December 2004

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4 OCRACES Vehicle Dis- play at HRO
5	6 <i>Weekly Net</i>	7	8	9	10	11
12	13 <i>Holiday Dinner</i>	14	15 OCSD/ Communica- tions Lunch	16	17	18
19	20 <i>Weekly Net</i>	21	22	23	24	25
26	27 <i>Weekly Net</i>	28	29	30	31	

UPCOMING EVENTS:

- **December 4:** OCRACES Vehicle Display at HRO Anaheim
- **December 6:** We will not have a regular meeting in December.
- **December 13:** OCRACES Holiday Dinner, RACES members and their family welcome! 1900 hours
- **December 15:** OCSD/ Communications holiday lunch – OCRACES members welcome!
- **January 3:** OCRACES monthly meeting, 840 N. Eckhoff Street in Orange. 1930 hours.

VISUAL COMMUNICATIONS 2004 by Jim Carter WB6HAG

The year 2004 was a very exciting one for the Visual Communications Committee. Its accomplishment's in technology and community recognition is nothing but amazing. A new Omni antenna was added to the ATV farm located on Loma Ridge. This antenna allows the RACES ATV operator to select between a beam or omni for the best ATV field picture. This has now improved operability for receiving City RACES video. The OCRACES van was dedicated March 1, 2004, and contains state of the art ATV and SSTV receiving equipment that is used



for field events. The van was equipped with 3 four-inch LCD monitors for selecting the best video to send to a 19 inch LCD monitor that can be mounted to the side of the van. The received video can also be distributed to other agencies via a four-port video amplified distribution box that can also provide audio. This design concept has proven very valuable at drills and exhibits. The ATV

Committee demonstrated what its capabilities are during the Orange Shield exercise. Both ATV and SSTV ground and aerial pictures were sent to OCSD Samantha 1 and 2, and the OCFA Communications trailer during this major event. This exercise truly tested our capabilities and pleased OCSD staff. Next year, new technology changes will face the committee as we look to adding new video feeds to the van and Loma Ridge. Over the years, we have successfully tested 900 MHz, 1.8 GHz and 2.4 GHz frequencies for ATV operations. Since the van construction is completed, we hope we can now use this technology. This would allow field operators to carry lighter ATV equipment as opposed to heavy backpacks containing large capacity storage batteries and video amplifiers. We should all be proud what we have accomplish this past year. Thank you for your assistance in making it a successful year. I look forward to working with you again during 2005. I want to wish you and your family a Happy Holiday and the best for 2005.



County of Orange RACES

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It's Where It's @!

Questions or Comments?
Contact the Net Control Editor
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County of Orange RACES History

The *Radio Amateur Civil Emergency Service (RACES)* was created in the early 1950's by the Federal government. On December 1, 1953, by resolution of the Orange County Board of Supervisors, the Orange County Communicators Club was authorized to become part of the *Orange County Civil Defense*. For the next 30 years, the *RACES* organization in Orange County was a group of Amateur Radio communicators that supported not only Orange County but also cities in the County during a time of emergency. In the mid-1980's, the cities in Orange County realized the benefits of Amateur Radio and began to form their own *RACES* organizations. Today, County of Orange *RACES* is recognized as one of the leading *RACES* organizations in the state. Our *RACES* program is administered by *OCSD/Communications* under the leadership of Emer-

gency Communications Coordinator Robert Stoffel, *KD6DAG*, and Chief Radio Officer Ray Grimes, *N8RG*. Our volunteers provide disaster, emergency and special event communications support to *Orange County Public Safety* agencies, and meet monthly for training and special activities. *RACES* supports the County by using various modes of Amateur Radio communications including voice, Morse Code, amateur satellite, amateur television, slow-scan television and various digital modes. County of Orange *RACES* has a dedicated radio room at the Operational Area Emergency Operations Center (EOC) and an emergency response communications vehicle that provides both Amateur Radio and Public Safety communications support at any emergency, disaster or special event location.



"W6KRW ...
Serving
Orange County"



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