

May 2012



Newsletter of the County of Orange Radio Amateur Civil Emergency Service

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Captain's Corner

by RACES Capt. Ken Bourne, W6HK, Chief Radio Officer

Twisting Radio Waves

Twisting radio waves into spirals could ease frequency congestion, according to a group of Italian and Swedish researchers. They say the technique could allow a potentially infinite number of channels to be transmitted and received.

They propose manipulating radio waves by orbital angular momentum (OAM) so that they can hold more than one channel of information. A wave can twist about its axis a certain number of times in either a clockwise or counterclockwise direction, giving it several possible configurations.

Bo Thide of the Swedish Institute of Space Physics in Uppsala and Fabrizio Tamburini of the University of Padua led a team that found a way to transmit radio waves in a helical, twisted pattern. The results appear in *The New Journal of Physics*.

The team has shown experimentally, in a real-world setting, that it is possible to use two beams of incoherent radio waves, transmitted on the same frequency but encoded in two different OAM states, to simultaneously transmit two independent radio channels. This radio technique allows the implementation of, in principle, an infinite number of channels in a given, fixed bandwidth, even without using polarization, multipoint, or dense coding techniques.

The team's paper explains that OAM is a fundamental physical quantity that spans an infinite state space. It offers, in addition to the conventional translational linear momentum and polarization (spin angular mo-

mentum, or SAM) rotational degrees of freedom, which spans only a two-dimensional state space, additional rotational degrees of freedom that are distinctly different from SAM. Without increasing the frequency bandwidth, the OAM states can be used as a new, very large set of communication channels that are mutually orthogonal to each other in the OAM state space.

Unlike already existing radio communication protocols that use the spatial phase distribution generated by a set of antennas to artificially increase the transmission bandwidth, the immediate advantage provided by a protocol based on the physical OAM states as independent communication channels is that of using the peculiar spatial phase distribution of each of these states as a reference pattern to generate, modulate, and detect them in a better way.

To date, according to the team's paper, there has been no report on the transmission of twisted radio beams in a real-world environment. The results of their outdoor radio vorticity experiments demonstrate that, when using a given radio frequency bandwidth around a fixed carrier frequency, the inherent orthogonality of the denumerably infinite OAM state space can ideally provide, without increasing the frequency bandwidth, an arbitrarily large set of independent OAM transmission channels, each characterized only by its peculiar topological property. This new technique can be described as *topological diversity*.

"In a three-dimensional perspective, this phase twist looks like a fusilli-pasta-

Continued on page 2

**The Next
OCRACES
Meeting is**

**May 7, 2012
1930 Hours**

**840 N. Eckhoff Street,
Suite 104, Orange**

**City/County RACES &
MOU Drill Plans
and Antenna Projects**



Orange County Sheriff's Department
Communications & Technology Division

Captain's Corner *Continued from page 1*

shaped beam," says Dr. Tamburini, the lead author. "Each of these twisted beams can be independently generated, propagated, and detected even in the very same frequency band, behaving as independent communication channels."

The teams demonstrated this, by beaming their pasta-shaped waves across the waters of Venice, Italy. They transmitted two twisted radio waves, in the 2.4-GHz band, over a distance of 442 meters (about 1,450 feet) from a lighthouse on San Giorgio Maggiore Island to a satellite dish on a balcony at the Palazzo Ducale in Piazza San Marco on the mainland of Venice, where it was able to pick up the two separate channels.

Tamburini says that by using multiplexing, it should be possible to give 55 channels on the same frequency.

Part of the apparatus in the demonstration was an ordinary satellite dish antenna. "We bought it on eBay," Tamburini said. A cut was made in one side to get it into a helical shape. To detect the altered shape of the radio signal, though, requires an additional antenna.

Twisting the radio waves in this way offers one more dimension in which to divide a signal. A radio signal can be split up so that many users can transmit on the same frequency. Besides twisting the signal, it can be divided into time slots (time division multiple access, or TDMA) or frequency slots (frequency division multiple access, or FDMA), or each piece of information can be tagged so

that the receiver only strings together a certain signal with all the others coming in as noise. This is code division multiple access, or CDMA, which employs spread-spectrum technology (since the modulated coded signal has a much higher data bandwidth than the data being communicated) and a special coding scheme (where each transmitter is assigned a code) to allow multiple users to be multiplexed over the same physical channel.

A spiral-shaped radio wave offers yet another way to divide the signal. Using two or more antennas, you could look at where along the spiral your message is, just as in code-divided signals a cell phone builds your voice from the pieces tagged with the right bits. Given the congestion in the limited radio spectrum, it's a technology that could save cell-phone carriers a lot of money. We don't experience that kind of congestion on the ham bands, but it's an interesting technology to consider, nevertheless.

There are other applications to the research. Black holes, for example, are constantly rotating, dragging space-time with them, and their mass is so great they bend it. As radio waves (which usually move in straight lines) pass them, they are forced to twist in line with the black hole. According to Tamburini, analyzing the incoming waves from the supermassive black hole at the center of the Milky Way, Sagittarius A, could help astronomers obtain crucial information about its rotation.

Golden Guardian: May 15th

The Golden Guardian exercise at the Orange County EOC will be held on Tuesday, May 15, 2012, from 8:00 AM to 4:00 PM. The exercise scenario is a major earthquake. One OCRACES member is needed to participate in the exercise. All participants in the exercise are asked to take the Golden Guardian Overview course. The course was offered on April 19, 2012, and will be repeated on Thursday, May 10, 2012, from 10:00 AM to 12:00 PM. This course is designed for personnel who will play a role in the OA's exercise. The course will provide an overview of the exercise, the exercise scenario, as well as protocols and processes within the EOC. OCRACES members may take the Overview class and participate in the exercise even if they have not yet taken the SEMS/NIMS & EOC Orientation Class, the EOC Responder Section Training, and other EOC classes. Contact Melissa Chorn at MChorn@ocsd.org to register for the Overview class. Marty Oh, KJ6RWE, took the course on April 19th, and is planning to be the OCRACES representative on May 15th at the exercise.

Next OCRACES Meeting: May 7th

The next County of Orange RACES meeting will be on Monday, May 7, 2012, at 7:30 PM, at 840 N. Eckhoff Street, Suite 104, in Orange. At this meeting we will discuss our preparations for the May 19th City/County RACES & MOU drill. We will also hear reports of Baker to Vegas activities, and will discuss antenna preparations for Field Day. The OCRACES Digital Team will report on progress with the Winlink system, as well as plans for D-STAR, APRS, packet with Outpost, and other digital modes. Remaining work to be done on the RACES antennas at the EOC will also be discussed.

OCRACES Provides Baker to Vegas Support

OCRACES members spent a weekend out in the hot desert for the April 21-22, 2012, Baker to Las Vegas Challenge Cup Relay. Members provided a communications network along the 138 miles of highway and 120 miles of race course between Baker, Shoshone, Pahrump, and Las Vegas. The OCRACES command post (CP) was in Pahrump. Technical support was in Baker on Saturday and equipment recovery was in Las Vegas on Sunday. All communications sites, follow vehicles, and shuttle vehicles monitored the backbone repeater frequency for emergency or priority traffic.

The project leader was RACES Lt. Ralph Sbragia, W6CSP, who was at the Baker starting point for APRS and voice equipment installations. Also at Baker was retired OCSO Emergency Communications Coordinator Walt Wilson, K7WWW, down from Oregon for installations. The Pahrump CP used APRS to monitor teams from the Orange County Sheriff's Department, California Department of Insurance Fraud Squad, and Arizona Attorney General. Randy and Lee Anne Benicky, N6PRL and KI6VUH, deployed to Las Vegas, with Randy riding in an OCSO follow vehicle.

RACES Sgt. Chuck Dolan, KG6UJC, RACES Sgt. Jack Barth, AB6VC, Martin La Rocque, N6NTH, and Brian Lettieri, KI6VPP, arrived at the Best Western in Pahrump on Friday evening, April 20th, to staff the CP. Chuck was the team captain. They spent the evening setting up their work station and attempting to bring their computers on line, using the motel's WiFi. All computers except Ralph's (loaded with APRSIS32) were able to connect. Consequently, they used UI-View through the repeaters and Depiction (with OpenAPRS) on the Internet with Jack's computer and APRSIS32 on the Internet with Brian's computer for tracking. They were able to track all equipped teams from the Baker starting point to the Las Vegas finish line.

At approximately 0715 on Saturday, the CP team started erecting antennas and made their radios operational. At 0730 they ran a radio check with Race Command in Las Vegas, alternate CP in Shoshone, and Ralph in Baker. All were loud and clear. APRS tracking worked perfectly. However, the CP received no calls for status checks.

By 0500 on Sunday, all runners had passed through Pahrump, all position reporting had stopped, and there was virtually no radio traffic. The CP team stopped operations when the follow vehicles reached Stage 17 and could no longer be tracked with UI-View (which had the most accurate Stage locations). Tear-down was completed at 0530 and the CP team departed Pahrump at approximately 0600 on Sunday.

At 0500 Sunday, Ralph prepared for follow-van recovery at the Circus Circus RV Park. He assisted in follow-van cleanup and APRS and voice equipment removal until about 0900.

FCC Seeks EmComm Comments

In response to the Congressional directive to prepare a study to assess Amateur Radio's role in emergency and disaster communications and the impact of private land use regulations on the amateur community's ability to provide such communications, the FCC issued DA 12-523 soliciting comments from the public. The period for public comment runs until May 17, 2012.

The FCC Public Notice focuses on two specific areas for comments. The first is the role that Amateur Radio has played and continues to play to support emergency and disaster relief organizations, such as FEMA and local/state emergency management agencies. The second is to determine impediments to enhanced Amateur Radio communications. This would include the impact that private land-use regulations—such as deed restrictions and homeowner association covenants—have on the ability of licensed amateurs to fully participate in providing support communications to the served agencies.

“This study is not about zoning ordinances or regulations adopted by the local or state governments,” explained ARRL Regulatory Information Manager Dan Henderson, N1ND. “Amateurs already have the limited protection of PRB-1 to assist them with those situations. The areas of concern here are the limitations that are placed on a property when it is purchased, either as part of the deed of sale or by restrictions imposed by the neighborhood/homeowner's association. Those restrictions—sometimes referred to as CC&Rs—are not currently covered by the FCC's PRB-1 decision from 1985.”

Henderson said, “Whether your support communications are with ARES®, RACES, SKYWARN, CERT, or other emergency and disaster groups, your voice should be heard. If you cannot operate effectively from home during an emergency because CC&Rs prohibit adequate antennas on your property, that is important to document and quantify. This issue affects all of Amateur Radio, not just ARRL members.”

City/County RACES & MOU Drill: May 19th

The next City/County RACES & MOU drill is scheduled for Saturday, May 19, 2012, from 0900-1100 hours. OCSD Emergency Communications Manager Marten Miller, KF6ZLQ, e-mailed some information about this drill to the City RACES units and to the MOUs, and asked them to notify him if they are participating. Included in that information was the basic exercise plan, including the ATV/SSTV drill component. A simplex relay exercise will again occur in addition to the normal drill activities. The information is included below. Participants are asked to advise Marten if the plan needs further explanation. Marten also needs to know which organizations plan to participate, and the modes they will utilize. Please provide that information, plus any questions or suggestions, to him as soon as possible—no later than May 7th. Marten will then send a final plan to all organizations.

County of Orange RACES, City RACES units, and MOU organizations such as the Hospital Disaster Support Communications System (HDSCS), Red Cross Communications, and SKYWARN traditionally participate by using radio equipment from their Emergency Operations Centers (EOCs). By conducting this drill as an ACS exercise, all designated participants will be able to communicate directly with each other regardless of whether or not an MOU exists. Orange County RACES will be the coordinating agency for this ACS exercise.

As you know, any official messages we send during an EOC activation would be generated and approved by designated Emergency Management personnel in the EOC. In light of this, we are requesting the Emergency Manager or designee from each participating city/agency to prepare and/or approve several messages for their RACES/ACS personnel to send during the exercise. Considering the scenario for this exercise, please prepare messages that reflect the possible needs public safety might have such as structure protection, firefighting, traffic gridlock, road closures, evacuations, rescue operations, shelter needs, potable water procurement, hospital damage, etc. Also include any resources your city can offer such as care and shelter facilities or police/fire/public works personnel and equipment. Having these messages already prepared will help expedite the flow of radio traffic during the two-hour exercise. The FEMA ICS 213 General Message Form should be utilized by all participants in this drill, and will help to ensure common radio traffic passing techniques. The form can be downloaded from the County of Orange RACES Web page at <http://www.ocraces.org/ics213.pdf>. This form is also available on the Operational Area's WebEOC.

Here is the exercise scenario: *"This is a drill. Eighteen hours ago, a magnitude 7.8 earthquake struck along the San Andreas Fault. The earthquake began in the area northeast of the Salton Sea, and created a rupture that moved northwest. The earthquake rendered many phone systems unusable, due to the large call volume. Immediately after the shaking stopped, existing emergency response measures were implemented. Due to the ground motion and resulting liquefaction, there is widespread damage to buildings and infrastructure. It is estimated that 40,000 persons are displaced due to ground motion and fires. There are reports of hundreds of fires actively burning in several Operational Area jurisdictions, including two conflagrations in La Palma and Huntington Beach. There are numerous hazardous material issues. Gas pipelines have been ruptured throughout the area and services are suspended. Seventy-five to eighty percent of streets and highways are passable. There are no major road closures reported at this time, although the Operational Area is still receiving status updates from affected areas. There are more than 6.4 million tons of debris throughout the county, impacting roads and highways. Downed traffic signals have caused gridlocked streets throughout the region. As a result, there are more than 200,000 stranded commuters and visitors. The entire county initially lost power, which has been restored; however, rolling brownouts are occurring. There are serious impacts to the water system and most residents are without water. Updates from jurisdictions vary from reports of low pressure to do-not-use orders. The Orange County Emergency Operations Center has been activated to a level three and all critical positions are operational. This is a drill."*

Three exercises will occur simultaneously during the two-hour exercise period. Exercise A is a general message blitz. Exercise B is simplex relay. Exercise C is ATV/SSTV. Exercises A and B will be required of all participants. Organizations that wish to test ATV/SSTV may do so by participating in Exercise C.

The primary focus of Exercise A is to communicate by voice between a city's EOC and surrounding city EOCs, as well as with MOU agencies and the County EOC. In addition to sending outgoing message traffic, each agency must have someone monitoring their primary channel for incoming message traffic.

Exercise B, which is concurrent with Exercise A, is a simplex voice relay in which a general message will be sent out from OCRACES to selected City RACES EOCs. Each of those Cities will then resend the message to a pre-designated neighboring city or MOU agency. This process will continue until the last Cities receive the message and resend it back to OCRACES. The message that OCRACES receives from the final four Cities should be an exact replica of the message that OCRACES originated. This portion of the exercise will only utilize simplex channels, and each City/MOU agency will forward the message to the next City/MOU agency via the receiving agency's simplex frequency and in accordance with the exercise plan. All participating agencies will be divided between three "nets." The first agency in each net will receive the original message from OCRACES and pass it along. (See the communications plan and message relay net assignments in Marten Miller's April 20th e-mail.) If you are not able to make contact with the next agency in your net, skip that agency and make contact with the next listed agency, then inform OCRACES regarding the agency you were not able to contact. If you are not able to contact anyone via simplex, notify OCRACES on the 146.895 MHz repeater. Each agency must have someone monitoring their primary simplex channel for incoming message traffic.

Request June 5th Primary Election Support

by OCSD Emergency Communications Manager Marten Miller, KF6ZLQ

It is election time once again in Orange County. OCSD/Communications will coordinate ballot transportation for the Primary Election scheduled for June 5, 2012, and RACES support has been requested. Our goal is to have a communicator at each of the 23 Collection Centers in Orange County for 100% coverage as we have been able to do for the past few elections.

As many of you know, we added a new component to our plan for the last few elections, and the plan has worked nearly perfectly. This new component is to record the precinct numbers of the boxes being loaded into the vans, and transmit those precinct numbers to Net Control when the van departs from the Collection Center enroute to the Vote Tally Center (VTC) in Santa Ana. This allowed the Registrar of Voters (ROV) staff to update their Web site with this information in real time. The ROV has been very pleased with the way this has worked and the information we are able to provide them, and has requested the same service for the June 5, 2012, Primary Election. The precinct-number data that RACES personnel provide to Net Control will be entered directly into the ROV Web site by CP staff for public interest. The ROV has placed a lot of trust in our services and we look forward to exceeding their expectations once again.

This election will be conducted using electronic ballots with the addition of paper verification, so we will have multiple boxes to transport from each precinct. OCSD/Communications will be managing the transportation of the ballots, supplies, and paper verification equipment to the VTC. RACES communicators provide a communications link between Collection Centers and the VTC. We will use three repeaters for this election, with the Collection Centers divided between the three repeaters. A Net Control operator will be assigned to each repeater channel.

In the June 5, 2012, Primary Election, around 1110 polling places and 23 Collection Centers will be utilized. The Collection Centers are in the following locations: Anaheim (PD parking lot); Canyon Hills; Buena Park; Costa Mesa; Santa Ana; Fountain Valley; Fullerton; Garden Grove; Huntington Beach; Irvine; Laguna Beach; Laguna Woods; La Habra; Los Alamitos; Orange; Rancho Santa Margarita; Placentia; San Clemente; Saddleback; Tustin; Westminster; Laguna Niguel; and Aliso Viejo.

We will also need OCRACES communicators to work at the VTC: 4 Traffic Control Operators; 3 Net Control Operators; and 1 Relief Operator.

Collection Center activity for each election begins at 8:00 PM, and most are closed around 11:00 PM. VTC activity begins at 7:30 PM with setup, and ends around midnight. Communicators should arrive at the Collection Center location no later than 8:00 PM on election night. They should be in some form of uniform or jacket that identifies with RACES or your organization. This will assist the Collection Center personnel and van drivers in identifying you.

The responsibilities of the communicator will be to transmit information to Net Control regarding the activities at the Collection Center, including the movement of the vans and the precinct numbers loaded into the vans. A Ballot Transportation Manual with all the necessary information will be available to you prior to Election Day.

In years past, some cities have taken the opportunity to use this event as a training exercise. We welcome this, but the training exercise must not interfere with any of the Collection Center activities, including the delivery, logging, and transporting of ballot boxes.

A briefing will be provided at the June 4, 2012, OCRACES Meeting at 7:30 PM, at 840 N. Eckhoff Street, Suite 104, in Orange.

Please respond via e-mail to Marten.Miller@comm.ocgov.com and let me know if you or others in your group are available to support this event. If you can advise the name and e-mail address of those that will work the event, it would be appreciated. This will allow direct communication with the latest information.

As always, your support is greatly appreciated.

Fred Maia, W5YI, Silent Key

The holder of one of the best-known US Amateur Radio call signs, Frederick (Fred) Maia, W5YI, died of cancer Wednesday, March 28, 2012. He was 76 and was a resident of Arlington, Texas. Fred was a leading Amateur Radio journalist for nearly 35 years and a pioneer of the volunteer examining program adopted by the FCC in 1984.

Maia published *The W5YI Report* from 1978 to 2003, and has been a *CQ* contributing editor since 1985. His regulatory affairs column, first titled "Ticket Talk," then "Washington Readout," offered news and perspective on FCC Regulations and ITU (International Telecommunications Union) actions, and helped untold numbers of hams wend their way through often-confusing mazes of the volunteer examining and vanity call sign systems. His final column will appear in the May 2012 issue of *CQ*.

After the FCC adopted volunteer examining for all levels of Amateur Radio licensing in 1984, Fred became the first Volunteer Examiner Coordinator (VEC) appointed by the FCC. Fred subsequently founded The W5YI Group in 1986 to develop, publish, and sell amateur and commercial radio license study materials.

RACES/MOU News from Around the County

"RACES/MOU News" provides an opportunity to share information from all City & County RACES/ACS units and MOU organizations in Orange County.

**Please send your news to
NetControl Editor
Ken Bourne,
W6HK, at:

w6hk@
ocraces.org**

Tri-Cities RACES

San Juan Capistrano RACES Radio Officer Joe Lopez, W6BGR, expressed his appreciation for the use of the OCRACES 2-meter repeater for the Warriors Society Bike Race on April 17, 2012. He said it was very useful to the team of operators who participated. The area of coverage for the 146.895-MHz machine was the Main Divide from the area known as "Beck's Place" near Skyline Drive and north on Main Divide to Maple Springs. Joe said they had coverage like never before because of the use of the machine for the early morning duration of the event (4:30 AM to 12:00 PM). Joe said, "The race was a great success this year, and although we had a few crashes, nobody was seriously injured. The four radio checkpoints using your system handled three minor situations of crash victims and accounting for riders who had turned back and quit the race before arriving at the first-aid station. The rest of the event was covered by a SOARA system that took the medical ham teams and radio checkpoints up and over Santiago Peak and down the Holy Jim trail. The racers covered 57 miles and gained 12,000 feet of elevation during the average six and a half hour ride."

Amateur radio operators have assisted with this event for the past 12 years and "have developed a very efficient methodology to maintain a safe and fun experience for all the operators, volunteers, and participants," said Joe.

Executive race director Chris Vargas, KF6TKE, and Communications Director Joe Lopez, W6BGR, each year put together a team of between 10 and 15 amateurs who give up most of a Saturday to help with this event.

This year's team included Chris Vargas, KF6TKE (Event Director), Carrie Harden, KF6FBS (EMT), Jeff Parrish, KJ6AJE, Jason Masterman, W6NRD, Heiko Peschel, AD6OI, Mike Morgan, KE6IBH, Patti Gentile, KI6WJX, Mike Syverson, KG6UMP, Robert Thompson, KE6RKG, Tom Hobbs, AF6SH (EMT), Chip Leopard, KJ6VCT,

Dale Cummings, KCØAQV, Preston Drake, KJ6OOF, Jess Vargas, KF6TKD, Ken Rands, K6KCR, Lubos Dardovic, KJ6EDD, Donna Ducharm, KI6IYZ (CERT trained light medical), and Joe Lopez, W6BGR (Finish Line Net Control).

American Red Cross Serving Orange, Riverside & San Bernardino Counties

Tom Woodard, KI6GOA, American Red Cross Regional Logistics Manager, Emergency Services Department, is promoting their Save-a-Life Saturday (formerly known as Super CPR Saturday) on May 12, 2012, at Angel Stadium Exhibition Center, 2000 Gene Autry Way, in Anaheim. Participants will learn hands-only CPR, care for choking victims, simple first aid, and how to stay safe during emergencies. English sessions are at 8, 9, 10, and 11 AM. Register online at <http://www.oc-redcross.org>. Admission is \$5 pre-registration and \$10 at the door.

Hospital Disaster Support Communications System (HDSCS)

HDSCS members Jim McLaughlin, AB6UF, and Dave West, KI6EPI, were on hand on Thursday, March 15, 2012, as College Hospital in Costa Mesa installed a new standby power generation system. Using their own radio gear and the hospital's outside VHF/UHF antenna, they were in contact with base stations operated by April and Joe Moell, WA6OPS and KØOV, ready in case the phone system failed and messages had to be relayed into and out of the hospital.

County of Orange RACES

Because of the interference potential to the new FAA/military/DHS aircraft/weather radar in San Pedro, all OCRACES 1200 MHz (23 cm) repeaters will be off the air until the radios are programmed to new coordinated frequencies and the duplexer cavities are retuned.

May 2012

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5 <i>Digital Team Meeting</i>
6	7 <i>OCRACES Meeting & Weekly ACS Net</i>	8	9	10 <i>Golden Guardian Overview Course</i>	11 <i>OCARC Meeting</i>	12
13	14 <i>Weekly ACS Net</i>	15 <i>Golden Guardian Exercise</i>	16	17	18	19 <i>City/County RACES & MOU Drill</i>
20	21 <i>Weekly ACS Net</i>	22	23	24	25	26
27	28 <i>Weekly ACS Net</i>	29	30	31		

Upcoming Events:

- **May 5:** OCRACES Digital Team Meeting, 0900, OC EOC
- **May 7:** OCRACES Meeting, 1930 hours, 840 N. Eckhoff Street, Suite 104, Orange
- **May 10:** Golden Guardian Overview Course, 1000-1200, OC EOC
- **May 11:** Orange County Amateur Radio Club Meeting, 1900, Red Cross, Santa Ana
- **May 15:** Golden Guardian Exercise, 0800-1600 hours, OC EOC
- **May 19:** City/County RACES & MOU Exercise, 0900-1100 hours
- **Jun 5:** Primary Election
- **Jun 9:** Southwest ACS Meeting, 0900, Los Angeles County EOC
- **Jun 14:** EOC Responder Section Training, 1000-1200, OC EOC
- **Jun 23-24:** Field Day
- **Jun 25:** City/County RACES Meeting, 1900 hours, 840 N. Eckhoff Street, Suite 104, Orange



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

- 10 m: 29.640 MHz output, 29.540 MHz input, 107.2 Hz PL (off the air)
 - 6 m: 52.620 MHz output, 52.120 MHz input, 103.5 Hz PL
 - 2 m: 146.895 MHz output, 146.295 MHz input, 136.5 Hz PL*
 - 2 m: 147.480 MHz simplex
 - 1.25 m: 223.760 MHz output, 222.160 MHz input, 110.9 Hz PL
 - 70 cm: 446.000 MHz simplex
 - 70 cm: 449.100 MHz output, 444.100 MHz input, 110.9 Hz PL (private)
 - 70 cm: 449.180 MHz output, 444.180 MHz input, 107.2 Hz PL (private)
 - 23 cm: Off the air until reprogrammed to new coordinated frequencies
- *Primary Net—Mondays, 1900 hours

Program Coordinator
Marten Miller, KF6ZLQ
(714) 704-7917

Chief Radio Officer (Captain)
Ken Bourne, W6HK
(714) 997-0073

Radio Officers (Lieutenants)
Scott Byington, KC6MMF
Harvey Packard, KM6BV
Ralph Sbragia, W6CSP

Assistant Radio Officers (Sergeants)
Jack Barth, AB6VC
Chuck Dolan, KG6UJC
Jim Carter, WB6HAG
Ernest Fierheller, KG6LXT

County of Orange RACES

OCSD/Communications & Technology
840 N. Eckhoff St., Suite 104, Orange, CA 92868-1021
Telephone: (714) 704-7917 • Fax: (714) 704-7902
E-mail: ocraces@comm.ocgov.com

County of Orange RACES

OCSD/Communications & Technology
840 N. Eckhoff St., Suite 104,
Orange, CA 92868-1021

Telephone – (714) 704-7917
Fax – (714) 704-7902
E-mail – ocraces@comm.ocgov.com

Visit Our Web Site
<http://www.ocraces.org>
It's Where It's @!

Questions or Comments?
Contact *NetControl* Editor Ken Bourne, W6HK
w6hk@ocraces.org



**“W6ACS ...
Serving
Orange County”**

Meet your County of Orange RACES Members!



Ken Bourne W6HK Scott Byington KC6MMF Harvey Packard KM6BV Ralph Sbragia W6CSP Marten Miller KF6ZLQ Robert Stoffel KD6DAQ



Jack Barth AB6VC Jim Carter WB6HAG Chuck Dolan KG6UJC Ernest Fierheller KG6LXT John Bedford KF6PRN Randy Benicky N6PRL



Bill Borg KG6PEX Jim Dorris KC6RFC Nancee Graff N6ZRB Ray Grimes N8RG Walter Kroy KC6HAM Martin La Rocque N6NTH



Brian Lettieri KI6VPF Marty Oh KJ6RWE Kenan Reilly KR6J John Roberts W6JOR Joe Selikov KB6EID Tom Tracey KC6FIC Brian Turner KI6WZS