July 2009

Newsletter of the County of Orange Radio Amateur Civil Emergency Service

Inside this issue:

The Next OCRACES Meeting is

July 6, 2009
1930 Hours
840 N. Eckhoff St., Suite 104, Orange

Featured Speaker: RACES Sgt. Jim Carter, WB6HAG, on Mesonet Weather Station

Orange County Sheriff's Department
Communications & Technology Division

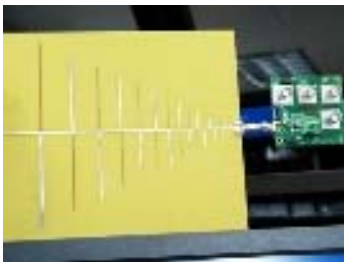
Captain's Corner

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

Can You 'Ear Me Now?

One of the greatest joys of being an amateur radio operator and RACES member is discovering new radio technology, whether by our own experiments or by studying research done by others. An excellent source of information on new radio-frequency (RF) technology is *RF Globalnet*. I encourage you to check their Web site on a regular basis at http://www.rfglobalnet.com or sign up for their free e-mail newsletter. I read a very exciting article (at least for us RF geeks) posted on their Web site on June 5th, entitled, "New Radio Chip Mimics Human Ear, Could Enable Universal Radio." The article describes a fast, ultra-broadband, low-power radio chip, modeled on the human inner ear, that could enable wireless devices capable of receiving cell-phone, Internet, radio, and television signals. The chip was designed by Rahul Sarpeshkar, MIT associate professor of electrical engineering and computer science, and his graduate student, Soumyajit Mandal, to mimic the inner ear (cochlea). The chip is faster than any human-designed RF spectrum analyzer and operates at much lower power.

Sarpeshkar says the ear is "like a super radio with 3,500 parallel channels." He and his students have dubbed their new chip the "RF cochlea." They have also filed for a patent to incorporate the RF cochlea in a universal or software radio architecture that is designed to efficiently process a broad spectrum of signals including cellular phone, wireless Internet, FM, and other signals.



The RF cochlea mimics the structure and function of the biological cochlea, which uses fluid mechanics, piezoelectrics, and neural signal processing to convert sound waves into electrical signals that are sent to the brain.

As sound waves enter the cochlea, they create mechanical waves in the cochlear membrane and the fluid of the inner ear, activating hair cells (which cause electrical signals to be sent to the brain). The cochlea can perceive a 100-fold range of frequencies from 100 Hz to 10 kHz. Sarpeshkar used the same design principals in the RF cochlea to create a device that can perceive signals at million-fold higher frequencies, which includes radio signals for most commercial wireless applications (and probably amateur radio equipment).

The RF cochlea, embedded on a 1.5-mm by 3-mm silicon chip, works as an analog spectrum analyzer, detecting the composition of any electromagnetic

Continued on page 2

Captain's Corner *Continued from page 1*

waves within its perception range. Electromagnetic waves travel through inductors and capacitors (analogous to the biological cochlea's fluid and membrane). Transistors play the role of the cochlea's hair cells.

The analog RF cochlea chip is faster than any other RF spectrum analyzer and consumes about 100 times less power than that would be required for direct digitization of the entire bandwidth. That makes it desirable as a component of a universal or "cognitive" radio, which could receive a broad range of frequencies and select which ones to attend to.

OCRACES Has Field Day at Craig Park

OCRACES members, applicants, and visitors gathered at Craig Regional Park on June 27-28, 2009, for Field Day. RACES Sgt. Chuck Dolan, KG6UJC, drove the OCRACES emergency communications response vehicle (ECRV) from Eckhoff to the park, and setup began by 0800 hours. By not much after 0900, we were set up and ready to operate. Operations actually began at 1100, and lasted until 1100 Sunday morning, at which time teardown began.

RACES Lt. Ralph Sbragia, W6CSP (left), and Applicant Alberto Valdes, KI6ZTO, launch antenna support rope into tree at Craig Park

Sheriff Sandra Hutchens (center) joins OCRACES and OCSD/Communications personnel at Craig Regional Park during Field Day

Thanks to RACES Lt. Ralph Sbragia, W6CSP, who was our Field Day chairman, for putting together an excellent event plan and coordinating our event in accordance with NIMS and SEMS procedures. Ralph brought his well-equipped communications trailer to the event, which provided one of our "2A" stations. Thanks also to the Park Rangers for their hospitality, especially Park Ranger II Chris Lorenzi and Park Attendant Angelica Moran.

The highlight of our Field Day operations was a visit by Sheriff Sandra Hutchens and her husband Larry. The Sheriff spent about an hour with us, learning about the purpose of Field Day and getting a tour of our ECRV. She became well-acquainted with the services provided by OCRACES, and our capabilities. We presented her with a Gordon West *Technician Class* book, which many of us signed on the inside rear cover, in hopes that she would eventually

Continued on page 3

OCRACES Field Day *Continued from page 2*

become an amateur radio operator. We deeply appreciate the interest that she showed in our operations.

Band conditions were very good on 40 and 20 meters during Field Day. We worked all over the country, as well as some DX. Antennas included a screwdriver vertical, a Super Antennas YP3 three-element yagi on 20 meters provided by RACES Lt. Scott Byington, KC6MMF, an extended double zepp built by RACES Capt. Ken Bourne, W6HK, and a half-wave 40-meter sloper built by OCRACES Applicant Don Cooke, AF6CV.

We had a good crowd at our pot-luck dinner at 1800 on Saturday. Our master hamburger chef was the son of Martin La Rocque, N6NTH.

In addition to the OCRACES members, officers, and applicant mentioned above, other participants included Randy Benicky, N6PRL, RACES Sgt. Ernest Fierheller, KG6LXT, OCSD/Communications Assistant Director Ray Grimes, N8RG, Walter Kroy, KC6HAM, OCSD/Communications Program Support Manager Denis Marin, K6OLU, RACES Lt. Harvey Packard, KM6BV, Joe Selikov, KB6EID, OCSD/Communications Director Robert Stoffel, KD6DAQ, Tom Tracey, KC6FIC, pending Applicant Brian Turner, KI6WZS, Applicant Alberto Valdes, KI6ZTO, and Applicant Don Zweifel, KI6KZB.

Sheriff Sandra Hutchens listens to explanation of OCRACES Field Day operations given by Radio Officers Scott Byington, KC6MMF, and Harvey Packard, KM6BV

OCRACES members and applicants and families began to gather at Craig Park at 1800 hours on Saturday for the Field Day pot-luck dinner

RACES Lt. Ralph Sbragia, W6CSP, operates Field Day from his mobile communications trailer

Joe Selikov, KB6EID, operates Field Day from the OCRACES emergency communications response vehicle

Martin La Rocque, N6NTH, operates the "Get on the Air" (GOTA) station at Craig Regional Park

City/County RACES & MOU Picnic Proposed

Considering the enjoyable time we had at the OCRACES Field Day, and the good reports we heard about City RACES Field Days, it has been proposed that we hold another park-type event for all City/County RACES units and MOU organizations, this time a picnic for members and families. We are looking for someone to coordinate this event, and to reserve a County or City park for a particular Saturday or Sunday. This would let us get together and discuss our projects (such as Winlink and training plans) and allow our families to socialize.

Next OCRACES Meeting: July 6th

The next OCRACES meeting is on Monday, July 6, 2009, at 7:30 PM, at OCSD/Communications, 840 N. Eckhoff Street, Suite 104, in Orange. Our featured speaker is RACES Sgt. Jim Carter, WB6HAG, who will give a presentation on "How to Become a Mesonet Weather Station for NWS San Diego." Jim will describe how his Davis weather station communicates information directly to the National Weather Service. All those who are interested in weather spotting or monitoring are invited to attend.

Irvine Emergency Preparedness Expo

OCRACES exhibited its emergency communications response vehicle (ECRV) at the Irvine Emergency Preparedness Expo on Saturday, June 6, 2009. Approximately 800 visitors attended the event, and many of them visited our exhibit. RACES Sgt. Chuck Dolan, KG6UJC, drove our van from Eckhoff to Irvine. Joining him at the exhibit were RACES Sgt. Jack Barth, AB6VC, RACES Capt. Ken Bourne, W6HK, and RACES Lt. Scott Byington, KC6MMF. We also had a good showing from OCRACES Applicants, including Don Cooke, AF6CV, Kenan Reilly, KR6J, Alberto Valdes, KI6ZTO, and Don Zweifel, KI6ZKB,

The event also included exhibits of OCSD's Search and Rescue Reserve Unit, Orange County Fire Authority, Irvine Police Department's MobileComm emergency communications vehicle, and Irvine Disaster Emergency Communications (IDEC, the city's RACES unit).

Applicant Kenan Reilly, KR6J, Sgt. Jack Barth, AB6VC, Sgt. Chuck Dolan, KG6UJC, Applicant Don Cooke, AF6CV, and Lt. Scott Byington, KC6MMF (left to right) at Irvine Expo

OCRACES at OC Fair: August 7th

OCRACES is sharing the ham radio booth at the Orange County Fair on the evening of Friday, August 7, 2009, with the new Santa Ana Response Team (SART) ACS unit. Booth duty is from 5:00 PM to 11:00 PM. This is an excellent opportunity to recruit ham visitors into RACES, to explain the role of amateur radio emergency communications to other visitors, and to introduce the excitement of amateur radio to the many kids who visit the ham radio booth, which will be in a new area of the Fair this year. OCRACES members are urged to sign up for booth duty at this enjoyable event.

HB RACES to Meet at OC EOC August 10th

OCRACES members are asked to assist in hosting a Huntington Beach RACES meeting at the Orange County EOC (Loma Ridge) on Monday, August 10, 2009, at 7:00 PM. We will give a presentation on OCRACES, and OCSD Emergency Communications Manager Marten Miller, KF6ZLQ, will talk about the OCSD 800-MHz communications system. We will also provide a tour of the EOC and especially the RACES Room. Huntington Beach RACES is an active and highly capable RACES unit, and we are proud to have its members visit our EOC.

Watching The Web

Web Sites of Interest to RACES Personnel
by RACES Capt. Ken Bourne, W6HK, Chief Radio Officer

AIM 4170C Antenna / Lab RF Analyzer
http://www.arraysolutions.com/Products/AIM4170B.htm

This page on the Array Solutions Web site describes the AIM 4170C antenna/lab RF analyzer, which measures the complex impedance (magnitude and phase) at each frequency of interest in the range of 0.1 to 170 MHz. A personal computer is used to calculate all RF parameters, including R ± X, magnitude and phase, SWR, return loss, TL loss, and more, and plot the results in a graph and interactive Smith chart.

The test frequency is generated digitally and bandpass filters are used to reject stray signals (such as broadcast stations) that are more than a few kilohertz from the operating frequency. A 12-bit analog-to-digital converter digitizes the raw data. This avoids nonlinearities associated with diode detectors, and results in very good dynamic range and linearity for accurate magnitude and phase measurements.

Impedance measurements can range up to 10 k ohms. The true phase angle is measured, so inductive or capacitive reactance can be determined without ambiguity.

The RF generator can also be used as a signal source for testing receivers. The frequency is very stable and it can be calibrated to WWV.

The digitized data is sent to the PC via the RS232 port. Power for the analyzer can be obtained from a small DC power supply or a battery. With a laptop computer, the unit is quite portable and it can even be mounted up on a tower at the antenna feed point if desired, with power being supplied through the RS232 cable.

The impedance at the antenna itself can be read with the AIM 4170C located in the shack at the receiving/transmitting end of the coax. The cable can be any length. The cable's impedance and loss characteristics are determined by a simple calibration and the antenna's impedance is plotted directly during the scan.

Some of the RF parameters that are calculated include the following:

- SWR referenced to any impedance
- Resistance and reactance at the cable input
- Resistance and reactance at the antenna terminals
- Resistance and reactance of discrete components
- Return loss
- Reflection coefficient
- Cable length
- Cable impedance
- Cable loss
- Distance to fault (open or short)
- Smith chart display
- Quartz crystal parameters

The scan data can be saved to disk or printed to compare before-and-after results.

The program has been tested with Windows 95, 98, 2000, and XP. It does not require an installation procedure. It will run directly from a CD or floppy disk.

The Web page includes links to a PowerPoint slide show of the AIM and PowerAim (broadcast-station version), an article comparing the AIM 4170 with an HP8753B vector network analyzer, ARRL lab tests of antenna analyzers compared to the AIM 4170, a comparison of several network analyzers (including the AIM 4170), an application note showing how the AIM 4170/B can be used to measure the Q of coils and tuned circuits and to evaluate transformers, a wireless remote application note for using the AIM from a wireless laptop, and the W5BIG.com Web site for detailed information by the instrument's designer.

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:

w6hk@ ocraces.org

Laguna Beach

Our apologies to Marc Morin, KI6APG, who was not mentioned in the June 2009 *NetControl* coverage of the Statewide Special Election. Laguna Beach Chief Radio Officer John Kountz, KE6GFF, reports that, without Marc's key operation from the Laguna Collection Center, there would have been no support for Laguna Beach

Huntington Beach

Huntington Beach RACES will hold its August 10th meeting at 7:00 PM at the Orange County EOC (Loma Ridge). OCRACES members will provide a tour of the EOC, and OCSD Emergency Communications Manager Marten Miller, KF6ZLQ, will give a presentation on the OCSD 800-MHz communications system.

Seal Beach/Los Alamitos

Seal Beach/Los Alamitos RACES participated in Field Day again this year from the EOC at the Seal Beach Police Department. They operated from the start of the event at 1100 on Saturday until almost the close at 1045 on Sunday (but not continuously). Since 20 meters was almost wide open, members used that band almost exclusively. Most of the contacts were on voice. There were 10 digital contacts on 20 meters. Contacts included Hawaii, several in the western region up to Canada, several in the east to Maryland, and into the Caribbean on the south. The team logged a total of 10 digital and 131 phone QSOs, totaling 151 QSO-score points.

The RACES unit also copied the Field Day message, had visitors, ran the emergency generator, and had an interview with the media. The 14 participants included Assistant Radio Officer Tom Rothwell, K6ZT, Seal Beach Radio Officer Alan Ginsburg, WA6TOI, Los Alamitos Radio Officer John Unrath, K6JHU, KJ Smith, KF6QPW, Seal Beach PD Emergency Services Coordinator Todd De Voe, KI6RBW, Sandy Sandusky, KI6UMD, Vonnie Schulten, KI6UME, Jim Cazares, W6JFF, Dick Crowe, KG6XJ, Jerry Grandt, KD6JPD, Rick Shab, KB6VCM, Carlos Adams, KE6QEU, Joe Constantino, W6AAC, and Ole Thompson, W6SAV.

Hospital Disaster Support Communications System (HDSCS)

HDSCS made a rapid and comprehensive response following the Richter 4.7 earthquake that shook Southern California on Sunday evening, May 17, 2009. Members were checking in on their primary repeater before the chandeliers stopped swinging. Assistant Coordinator Tom Gaccione, WB2LRH, established a net and assigned members to check on the status of supported hospitals. Highest priority was given to trauma centers, large multi-building facilities, and those closest to the epicenter in the Lennox area. (The two closest Orange County hospitals were 18 miles away.) Within 20 minutes, all of these facilities were determined to be functional with no communications problems. Net members then went on to check status of the remainder of the supported hospitals. It was less than 55 minutes after the earthquake when the functional status of every facility had been determined. HDSCS then provided a report of its findings to the Medical Disaster Management Coordinator of Orange County's Emergency Medical Services Agency.

Orange County

Congratulations to OCRACES Member Tom Tracey, KC6FIC, who passed his General Class amateur radio examination on June 7, 2009.

July 2009

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4
5	6 OCRACES Meeting & Weekly ACS Net	7	8	9	10	11 RACES Breakfast
12	13 Weekly ACS Net	14	15	16	17	18 SWACS Meeting
19	20 Weekly ACS Net	21	22	23	24	25
26	27 Weekly ACS Net & SWACS Freq Test	28	29	30	31	

Upcoming Events:

- Jul 6: OCRACES Meeting, 1930, 840 N. Eckhoff St., Suite 104, Orange
- Jul 11: RACES/MOU Breakfast, Katella Grill, Orange, 0800
- Jul 18: Southwest ACS Meeting, Cal EMA REOC, Los Alamitos
- Jul 27: Southwest ACS Radio/ Frequency Test, 2015, OC EOC
- Aug 7: Orange County Fair, OCRACES & SART at Ham Radio Booth, 1700-2300
- Aug 10: HB RACES Meeting, OC EOC, 1900
- Aug 19: SONGS Dress Rehearsal Plume Exercise
- Sep 23: SONGS FEMA Graded Exercise

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
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: 1282.025 MHz output, 1270.025 MHz input, 88.5 Hz PL

*Primary Net—Mondays, 1900 hours

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Questions or Comments?
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"W6ACS ... Serving Orange County"

Meet your County of Orange RACES Members!


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