

May 2023



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**Next  
OCRACES  
Meeting**

**Online on  
Zoom**

**Monday,  
May 1, 2023  
at 7:30 p.m.**

Orange County Sheriff's Department  
Emergency Management Division



Newsletter of the County of Orange Radio Amateur Civil Emergency Service

## CRO's Nest

*by Ken Bourne, W6HK, OCRACES Chief Radio Officer*

### Hydrogen Fuel Cells

When I first heard about hydrogen fuel cells, I thought, "Someday I might have a car that doesn't pollute the environment, uses cheap and abundant fuel, and produces water vapor as a byproduct. Plus, I will be able to power my ham radio equipment with a cheap source of energy." Unfortunately, it isn't that simple (or cheap)!

The only products of hydrogen fuel cells are electricity, water, and heat. They can provide power for multiple applications, including transportation, industrial/commercial/residential buildings, and long-term energy storage for the grid in reversible systems.

Many electric cars, such as the Tesla, and hybrid cars, such as the Toyota Prius, have gained popularity, in part because they reduce the amount of carbon emissions. Furthermore, hydrogen fuel-cell electric vehicles (FCEVs) provide another alternative to the combustion engine, and their only byproduct is water vapor. Hydrogen vehicles are electric cars that use fuel cells to power the motor, but they don't rely on a lithium-ion battery pack.

FCEVs have multiple fuel cells (called a hydrogen fuel cell stack) working at once to generate electricity (just like lithium-ion cells in an electric-vehicle battery).

Inside the fuel cell stack, hydrogen from the car's fuel tanks combines with oxygen to generate electricity. This process is called reverse hydrolysis. Like a lithium-ion battery, a hydrogen fuel cell has an an-

ode (negative electrode), a cathode (positive electrode), and a catalyst (electrolyte) that causes the separation of electrons and protons. Hydrogen gas is pumped into the anode and air (oxygen) is fed to the cathode. The catalyst at the anode separates hydrogen molecules into protons and electrons, which take different paths to the cathode. The electrons go through an external circuit, creating a flow of electricity. The protons migrate through the electrolyte to the cathode, where they unite with oxygen and the electrons to produce water and heat.

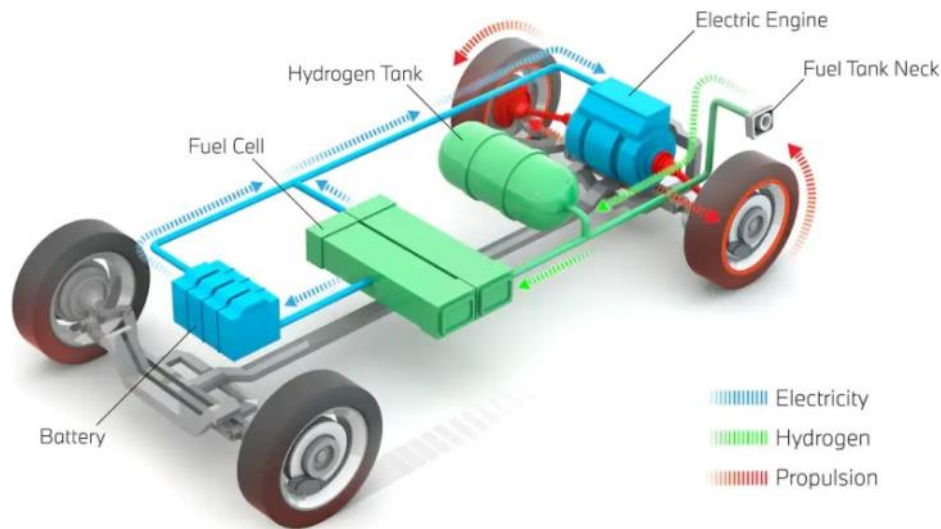
The electricity generated by the hydrogen fuel cells either powers the electric motor directly or charges a small lithium-ion battery that helps power the motor and stores the energy for later use. This battery also receives power from the vehicle's regenerative braking system for later use and stores excess power from the fuel cell stack during low-energy driving. If more demand is placed on the engine, the battery assists.

I hesitate buying an electric car, because of range limitations and because it takes so long to charge. However, refueling an FCEV's hydrogen tanks takes as little time as filling up a gasoline-power car.

Fire safety is a factor when choosing which kind of car to purchase. During an accident, a ruptured gasoline tank is certainly a hazard. Large lithium-ion batteries in electric or hybrid vehicles can catch on fire. Hydrogen is highly flammable. An FCEV can have several hydrogen tanks, but they are thick-walled, pressurized, and

*Continued on page 2*

## CRO's Nest *Continued from page 1*



**The hydrogen tank, battery, and electric motor all work together to power the fuel-cell electric vehicle (FCEV).** (Courtesy BMW)

tested to ensure crash safety. Built-in fail-safes disperse and release the hydrogen if the fuel cell is removed or overheats.

FCEV range is, on the average, at least 100 miles beyond that of an electric car., and refueling time is considerably shorter, about the same as a gasoline-powered car.

Unfortunately, FCEVs are much more expensive to refuel, partly because pure hydrogen is very expensive to produce. That may seem strange, since hydrogen is the most abundant element on earth but refining or separating it so it can power a vehicle is a complex and expensive procedure.

It's possible, but somewhat expensive, to set up a home recharging system for an electric vehicle. But home refueling is not an option for a gasoline vehicle or an FCEV. Only a few hundred FCEV fueling stations exist nationwide (with 1000 predicted by 2030), versus almost 200,000 electric-car charging ports in the U.S.

If your purpose for acquiring an FCEV is to help save the environment by running a car with only water vapor as an emission, think again. Many facilities that produce hydrogen fuel do so by burning fossil fuels in a pro-

cess called *steam reforming*. Alternative processes are being explored, such as water electrolysis, which uses a renewable energy source such as solar to generate electricity that can be used to separate hydrogen from water.

The challenge is to produce enough hydrogen to meet demand, without messing with the environment. Part of the solution might be *hubs*, which are regional networks of hydrogen producers. Most states have joined at least one proposed hub. Last year, a bipartisan infrastructure law was signed, which included \$8 billion for funding six to 10 regional hydrogen hubs around the U.S.

The U.S. Department of Energy is working closely with its national laboratories, universities, major fossil fuel companies, and renewable-energy developers to address technical barriers to developing hydrogen fuel cells. Cost, performance, and durability are key challenges. DOE provided the following information.

Research, development, and demonstration (RD&D) focuses on the development of low-cost fuel cell stack and balance of plant (BOP) components and advanced high-volume manufacturing approaches to

reduce overall system cost. The catalyst, based on platinum, is a major cost factor. The electrolyte is a platinum membrane, and approaches are being studied to increase activity and utilization while reducing the content of current platinum group metal (PGM) and PGM-alloy catalyst, as well as PGM-free catalyst approaches in the long term.

To improve hydrogen fuel cell efficiency and performance, RD&D focuses on innovative materials and integration strategies. Efforts include developing ion-exchange membrane electrolytes with enhanced efficiency and durability at reduced cost; improving membrane electrode assemblies (MEAs) with high power density through integration of state-of-the-art MEA components; modeling to understand system design and operating conditions; and developing stacks with high efficiency at rated power and high-performing BOP components, such as air management components with low parasitic losses.

Fuel cell applications generally require adequate performance to be maintained over long periods of time. DOE has set ultimate targets for fuel cell system lifetime under realistic operating conditions at 8,000 hours for light-duty vehicles, 30,000 hours for heavy-duty trucks, and 80,000 hours for distributed power systems. In the most demanding applications, system reliability and robustness is required under dynamic and harsh operating conditions. Realistic operating conditions include starting and stopping, freezing and thawing, impurities in the fuel and air, and humidity and dynamic load cycles that result in stresses on the chemical and mechanical stability of the fuel cell system materials and components. RD&D focuses on identifying and understanding fuel cell degradation mechanisms and developing materials and strategies to mitigate their effects. ★

## Next OCRACES Meeting: May 1st on Zoom

The next OCRACES meeting will be on Monday, May 1, 2023, at 7:30 p.m. This meeting will be back online, on Zoom. The meeting ID and passcode will be emailed to the ocsd-races.groups.io list.

During this meeting we will discuss our preparations for

the May 6th City/County RACES & EmComm ACS Drill and proposed June 24-25 Field Day activities.

All county and city RACES and EmComm members may attend this meeting. PSRs must register on the Reserve Tracker Calendar. ★

## City/County RACES & EmComm Drill: May 6

The next City/County RACES & EmComm ACS Drill will be on Saturday, May 6, 2023, from 0900 to 1200 hours for the simplex portion. Winlink messages will be accepted over a 24-hour period, from 1500 hours on Friday, May 5th, to 1500 hours on Saturday, May 6th.

The scenario for this combined drill is a strong earthquake off the Orange County coast, generating a tsunami and significant damage, including a countywide power outage. We chose a tsunami as our drill scenario based on what could happen in Orange County, considering what has happened in other coastal areas around the world. For example, a massive earthquake and resulting tsunami in 2004 off the coast of Indonesia left at least 230,000 people dead. While we don't expect that level of catastrophe to hit our coastal cities, they are increasing their preparedness, nevertheless. Most Southern California coastal cities have siren systems that would alert residents to seek higher ground during a tsunami, as well as street signs and maps on their websites, detailing evacuation routes from tsunami inundation areas. In the deep ocean, tsunamis are barely noticeable, but they can move over 500 mph. As they enter shallow water near land, they slow but then can grow in height, and can exceed 100 feet. Large tsunamis can flood low-lying coastal areas more than a mile inland. If an earthquake hits within 150 miles off the coast, there may be only 15 to 20 minutes warning before a tsunami hits.

Repeaters will "fail" as a result of the assumed earthquake.

- All participants must be at field locations with portable or mobile radio equipment.
- No home-station operations, except for Winlink.
- County and city net controls may be at EOCs that have backup power capabilities.
- Participants in coastal cities within 3 miles of the coast must be at a safe location, high enough to avoid a 100-foot-high tsunami and to report incoming waves and resulting flooding.
- Participants beyond 3 miles from the coast in coastal cities and in inland cities will report earthquake damage, request emergency resources, and report open routes and facilities to handle evacuees from coastal areas.

- Transmitted simplex voice reports will be immediate without filling out ICS-213 forms.
- Net control will fill out an ICS-213 form only if time permits. Otherwise, noted information will be quickly delivered to the EOC's Command Center.

On 2 meters simplex and on 60 meters, all participants must be at field locations with portable or mobile radio equipment. County and city net controls may be at EOCs with backup power, but no operations will be from home stations. Communications will consist of simplex communications on 2 meters FM and HF NVIS (Near Vertical Incidence Skywave) on 60 meters. OCRACES net control will operate from the Orange County EOC. City and County RACES and EmComm members will operate portable stations, preferably at locations that need to be tested for local and countywide simplex radio coverage. Those in coastal cities will operate at locations that are high enough to avoid tsunami danger. The simplex drill will run from 0900 to 1200 hours. On 2 meters, the first hour will be devoted to communicating with each RACES unit's own members. The remaining two hours will be for communications between OCRACES on 146.595 MHz simplex and city net controls, while city RACES and EmComm members may continue to call their net controls for urgent resources. On 60 meters (5371.5 kHz upper sideband, dial frequency), the drill will probably conclude before 1130 hours. Specific details on the time schedule and message details are in the drill plan.

The Winlink portion of the drill is detailed in the drill plan. Winlink messages will be accepted for the 24-hour period up to 1500 hours on Saturday, May 6th (i.e., 1500 hours Friday, May 5th through 1500 hours Saturday, May 6th). Using the Winlink Express software application, participants will prepare a message with an attached Field Situation Report form (Listed in Template Manager, Standard Templates, under GENERAL forms, as Field Situation Report.txt) and will send it to OCRACES tactical and backup member addresses (details in the drill plan). Fields to be completed in the Field Situation Report Form are detailed in the drill plan. The message can be sent using any of the available communications modes (i.e., telnet or using radio through an RMS gateway), though it is highly recommended to use radio. ★

# Icom Releases Specs on VHF/UHF/SHF IC-905

Icom has released features and specifications on their IC-905 all-mode VHF/UHF/SHF transceiver. Output power is 10 watts on 144/430/1200 MHz and 2 watts on 2400/5600 MHz. With the optional CX-10G transverter, the IC-905 produces 0.5 watt on 10 GHz. GPS is built-in (antenna supplied).

Modes include SSB, CW, FM, AM, RTTY, and D-STAR DV on 144/430 MHz, plus DD and FM ATV (with included AV

input/output ports) on 1.2/2.4/5.6, and 10 GHz.

The transceiver features a separate controller and RF module, allowing for the installation of the weatherproof RF module near the antennas. The controller connects to the RF module via a LAN cable, eliminating the need for long runs of expensive microwave cable. PoE (Power over Ethernet) technology provides flexibility and simplifies the installation of the RF power module.

- Other features include:
- 4.3-inch touch-screen color LCD display
  - Real-time, high-speed spectrum scope and waterfall display
  - Easy digital-mode settings
  - Full D-STAR functions (DV/DD mode)
  - SD card slot

Ports are provided to connect external accessories such as a microphone, external speaker/speaker microphone, headphones, AV input/outputs, CW key, USB-C, and two LAN ports—one for the RF module and one for wired Ethernet and a DC power connector.

The IC-905 has not yet been released by Icom for sale in the United States. It



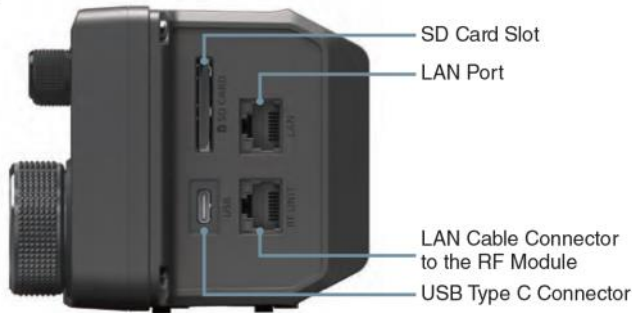
IC-905 RF module.

is awaiting Type Certification by the FCC. Meanwhile, HRO has tentatively announced the discount prices of \$3,499.95, plus \$999.95 for the CX-10G transverter. Antennas with mounts and cable assemblies will be available. ★

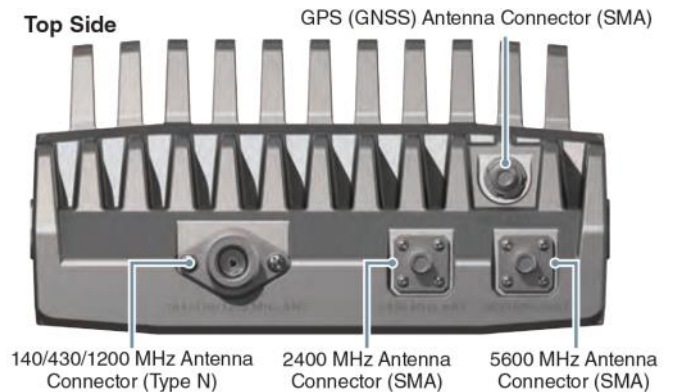


Icom IC-905 transceiver controller.

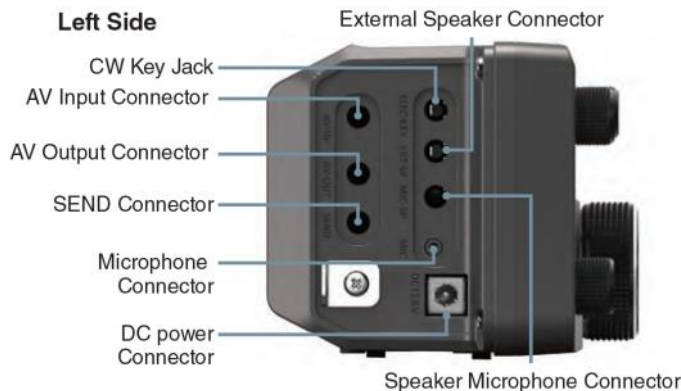
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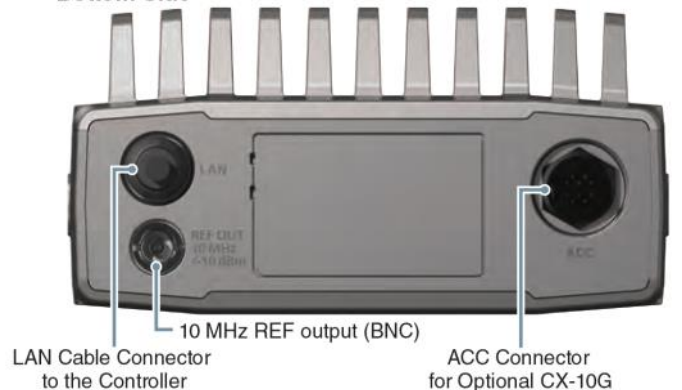
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### Left Side



### Bottom Side



# Orange County Sheriff's Department **CAREER FAIR & OPEN HOUSE**

For professional and sworn positions




**Saturday  
July 15, 2023  
9 am - 1 pm**

**15991 Armstrong Ave., Tustin, CA 92782**

**See Helicopters, SWAT, Bomb Squad, Horses and K-9s. Explore opportunities in Forensic Science, Technology, Finance and more!**



Meet the men and women who serve the Orange County, CA community. Learn about careers and current openings for both sworn and professional staff positions while getting a look inside the various teams, equipment and vehicles of the Sheriff's Department.

The entire community is invited to our Career Fair & Open House. If you or someone you know is interested in career opportunities with the Sheriff's Department, please come out and join us. We are looking to fill a wide range of positions with qualified candidates.

This is a family friendly event with face painting and a prize drawing. Snacks and beverages will also be available for purchase.

**For more information, visit [OCSheriff.gov/join](http://OCSheriff.gov/join) or call (877) SHERIFF.**



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# Countywide RACES/EmComm News

**“RACES/EmComm News” provides an opportunity to share information from all City & County RACES/ACS units and EmComm organizations and supportive amateur radio clubs in and near Orange County, as well as from Cal OES and federal agencies.**

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

**[kbourne.ocsd@earthlink.net](mailto:kbourne.ocsd@earthlink.net)**

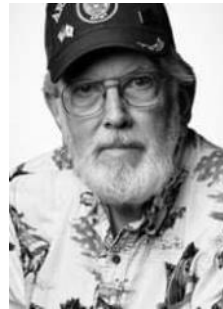


## Anaheim RACES

Mark Warrick, KM6ZPO, will check in for Anaheim RACES during the weekly OCRACES Monday nets at 1900 hours, stepping in for Richard Lewis, AF6TM, who passed away on April 11, 2023 (see below).

### Richard Lewis, AF6TM, Silent Key

We are very sad to report that Anaheim RACES Member Richard Lewis, AF6TM, passed away on Tuesday, April 11, 2023. Richard became a part of the Anaheim CERT/RACES family in 2009. He regularly participated in Fire Watch and community events.



Richard Lewis, AF6TM.

A graveside service for Richard was held on Monday, April 24, 2023, at Rose Hills Memorial Park in Whittier.

## OCRACES Field Day

It's been a few years since OCRACES had a Field Day operation. That activity was discontinued after the OCRACES van was decommissioned and COVID reared its ugly head. OCRACES has been discussing whether to set up for Field Day again, using member-provided tents and canopies.

Field Day is a nationwide ARRL event. Participants set up temporary stations in public places to demonstrate ham radio's science, skill, and service. It combines public service, emergency preparedness, community outreach, and technical skills all in a single event. Field Day is a contest or competition between organizations and individuals, but OCRACES has mostly treated it as a field drill for setting up temporary stations to provide auxiliary communications to the Orange County Sheriff's Department during an emergency. In the past, some members have also enjoyed the contest aspect of Field Day. The ARRL objective is to contact as many stations as possible on the 160-, 80-,

40-, 20-, 15-, and 10-meter HF bands, as well as all bands 50 MHz and above, and to learn to operate in abnormal situations in less than optimal conditions.

The last OCRACES Field Day was at Craig Regional Park in Fullerton. At about 300 feet above sea level, VHF/UHF coverage was not fantastic. This year, OCRACES will be able to use Irvine Regional Park, which is east of Orange and where some spots are over 600 feet ASL. Another alternative is to accept an invitation to operate with a city RACES unit, if enough OCRACES members do not sign up to host Field Day at Irvine Park this year. This will be discussed during the May 1st OCRACES meeting on Zoom.

## Orange County Amateur Radio Club

The next meeting of the Orange County Amateur Radio Club is Friday, May 19, 2023, at 7:00 p.m. Dennis Kidder, W6DQ, will give a talk on software available for amateur radio. This will be a hybrid meeting on Zoom and at the American Red Cross (George M. Chitty Building), 600 Park-center Drive, in Santa Ana.

## Westminster RACES

Westminster RACES Chief Radio Officer Adam Valek, N6HVC, reports that they are seeking ham radio operators to assist with the 2023 annual Blessed Sacrament Church School Festival at 14072 Olive St. in Westminster. The dates and times for their involvement with the festival are Friday, May 19, 2023, from 1700 to 2300 hours; Saturday, May 20, from 1400 to 1830 hours and 1800 to 2300 hours; and Sunday, May 21, from 1400 to 1830 hours and 1800 to 2230 hours.

The ham radio operators will be acting as extra eyes and ears to keep not only the coordinators of this festival but also the local on-property police and security personnel apprised of any incidents that require immediate attention. The goal is to have two operators together during the hours of darkness, if possible. To participate, contact Adam at [N6HVC@gmail.com](mailto:N6HVC@gmail.com) or (714) 305-9026.

# May 2023

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1 Weekly 2 m ACS Net & OCRACES Meeting	2	3	4	5	6 City/County RACES ACS Drill
7	8 Weekly 2 m ACS Net	9 WebEOC Training	10	11	12	13 Weekly 60 m ACS Net
14	15 Weekly 2 m ACS Net	16	17	18	19 Orange County Amateur Radio Club Meeting	20 Weekly 60 m ACS Net
21	22 ACS Nets on 4 Bands	23	24	25	26	27 Weekly 60 m ACS Net
28	29 Weekly 2 m ACS Net	30	31			

### Upcoming Events:

- **May 1, 1930 hours:** OCRACES monthly meeting, on Zoom
- **May 6, 0900-1200 hours:** City/County RACES & EmComm ACS Drill
- **May 6: 0900 hours:** Prescreen for PSR Applicants, Sheriff's Regional Training Academy, Tustin
- **May 9, 1330-1530 hours:** WebEOC Training (PSRs only), OC EOC, Loma Ridge
- **May 19, 1900 hours:** Orange County Amateur Radio Club meeting, on Zoom and at the American Red Cross in Santa Ana
- **June 5, 1930 hours:** OCRACES monthly meeting on Zoom
- **June 21, 1830 hours:** Orientation for PSR Applicants, Sheriff's Regional Training Academy, Tustin
- **June 24-25:** Field Day
- **July 8, 0900 hours:** Prescreen for PSR Applicants, Sheriff's Regional Training Academy, Tustin
- **July 15, 0900-1300 hours:** OCSD Career Fair & Open House, Sheriff's Regional Training Academy, Tustin



### County of Orange RACES Frequencies

- 60 m: 5371.5 kHz USB (dial) (Channel 4) (OC ACS Net—Saturdays, 1000 hours)
- 40 m: 7250 kHz LSB
- 10 m: 29.640 MHz output, 29.540 MHz input, 107.2 Hz PL (down for repair)
- 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: 146.595 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: 448.320 MHz output, 443.320 MHz input, 141.3 Hz PL (private)
- 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)
- 70 cm: 449.680 MHz output, 444.680 MHz input, 131.8 Hz PL (private)
- \*Primary Net—Mondays, 1900 hours



<https://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.

#### OCSD RACES Coordinator

Lee Kaser, KK6VIV, (714) 628-7081

#### Chief Radio Officer

Ken Bourne, W6HK, (714) 997-0073

#### Radio Officer

Scott Byington, KC6MMF

#### Assistant Radio Officers

Jack Barth, AB6VC  
Ernest Fierheller, KG6LXT

### County of Orange RACES

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# County of Orange RACES

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

Questions or Comments?  
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[kbourne.ocsd@earthlink.net](mailto:kbourne.ocsd@earthlink.net)



**“W6ACS ...  
 Serving  
 Orange County”**

## Meet Your County of Orange RACES Members!

**Officers** →



**Ken Bourne** W6HK    **Scott Byington** KC6MMF    **Jack Barth** AB6VC    **Ernest Fierheller** KG6LXT

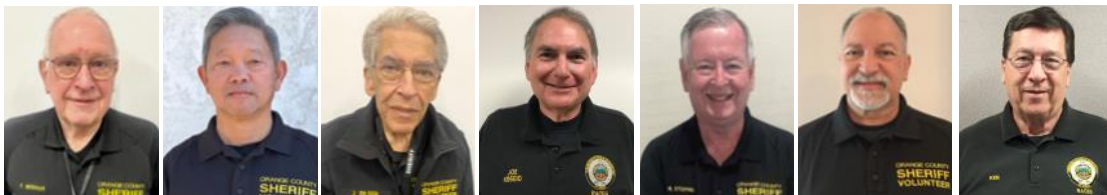
**OCSD  
 RACES  
 Coordinator** →



**Lee Kaser** KK6VIV



**Heide Aguire** K3TOG    **Randy Benicky** N6PRL    **Eric Bowen** W6RTR    **Ray Grimes** N8RG    **Steve Livingston** NJ6R    **Scott MacGillivray** KM6RTE    **Ron Mosher** K0PGE



**Fran Needham** KJ6UJS    **Chi Nguyen** KE6MVS    **John Pilger** K6PIO    **Joe Selikov** KB6EID    **Robert Stoffel** KD6DAQ    **Chuck Streitz** KK6HFS    **Ken Tucker** WF6F