



Newsletter of the County of Orange Radio Amateur Civil Emergency Service

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Captain's Corner

by RACES Captain Ken Bourne, W6HK, Chief Radio Officer

Protecting Your HF Receiver

Some modern SDR HF and 6-meter transceivers such as the Icom IC-7610 and the Apache Labs ANAN-8000DLE have dual receivers. The Elecraft K3S has an optional second receiver, and the FlexRadio Systems Flex-6700 has up to eight built-in receivers. Having at least a dual-receiver capability provides diversity reception, enhanced contesting and DX chasing capabilities, and monitoring of other QSOs or an emergency frequency while operating on another frequency or band. Diversity reception on HF using, for example, a vertical antenna on one receiver and a horizontal antenna on the other receiver, both tuned to the same frequency, can increase reception reliability. Frequently, a skip signal will fade on one polarity while peaking on the other polarity, and later will reverse the effect.

Unfortunately, transmitting on one antenna while monitoring on a second receiver connected to another antenna can damage the second receiver if the two antennas are in close proximity, especially during diversity operation with both receivers on the same frequency. This is not a problem if the transceiver is designed to disable all receivers while transmitting.

Some transceivers do not have a second receiver but do have a separate receive antenna input, handy for low-noise loop or beverage antennas, for example. If you're using a separate receive antenna, the KD9SV Products Front End Saver eliminates the chance of accidentally destroying your radio's front end from a nearby strong



Ameritron Model TRP-150 receiver input protector.

RF source, such as a second transceiver on another antenna. This problem can occur at Field Day, for example, from another transceiver on the same band (probably on a different mode). It interrupts the receive antenna input on your radio when you key the T/R line. The Front End Saver essentially doubles as an amplifier keying interface to prevent transmitted RF energy from going directly back into your radio. A similar device is the Ameritron Model TRP-150. It protects the transceiver during receiving and automatically bypasses it during transmitting, providing that a cable is routed from the "offending" transceiver's T/R line.

Dedicated receive antennas can be safely connected to HF transceivers that do not have a separate receive antenna port by a device such as the DX Engineering RTR-1A Receive Antenna Interface. It also pro-

Continued on page 2

Next OCRACES Meeting:

**Monday,
April 2, 2018,
at 1930 Hours**

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

**Motorola APX 6000
Portable and APX 6500
Mobile Radios**



Captain's Corner *Continued from page 1*



DX Engineering Model RTR-1A receive antenna interface.

protects an unswitched receive antenna port on a transceiver. It features a limiter circuit that passes normal level signals without affecting receiver intermodulation distortion (IMD). It also acts as a T-R antenna switch for older systems using separate transmitters and receivers. It's also handy for interfacing antennas to phasing or noise-canceling systems. An added receive preamplifier may also be protected by the RTR-1A.

The RTR-1A is a receive-transmit relay unit that automatically or manually switches the RF output connect-or on an HF transceiver between a separate receiving antenna system and a standard transmitting antenna. It operates from a "transmit on ground" keying line and prevents the hot switching and timing errors that are common on other transmit/receive relays. It switches at about 4 ms, fast enough to allow for QSK CW operation.

If your transceiver's receiver is active while another nearby transmitter is on the air (such as at Field Day), or if the transceiver has a second receiver that remains active and your second receive antenna is near your transmitting antenna and subject to high levels of RF, you can protect the receiver's front end with an RF limiter such as the DX Engineering RG-5000 Receiver Guard. It also protects other transceivers in Field Day operations or at multiple-transmitter contest sites where many transmitters are in close range. The Receiver Guard's RF limiter covers 500 kHz to 150 MHz, with an insertion loss under 0.15 dB at 50 MHz and under 0.3 dB to 150 MHz. Its multi-stage design includes a gas-discharge tube (GDT) for maximum pulse energy protection. The RG-5000 is a passive electronic limiter, not a filter, so competitive contesting stations still use separate band filters. The RG-5000HD version's limiters can reject 10 watts of catastrophic receive antenna feedline RF while passing a signal of about 87 dB over S9, which is only 25 mW, well under the point of front-end damage.

A similar device is the Array Solutions AS-RXFEP receiver front-end protector. It protects your preamp and transceiver from excessive RF and lightning. It limits input RF threshold from 1 to 150 MHz to less than 350 mVrms. The receiver still acts normally and measured

signal strength is not affected. The circuit uses a multiple-stage design of transformer saturation coupling and current limiters. It also incorporates a low-voltage GDT for lightning protection. The AS-RXFEP is for receiving only; you cannot transmit through it without damaging the unit. The AS-RXFEP consists of a high-voltage blocking capacitor input, two impedance-converting broadband transformers, and low-capacitance limiter diodes. The circuit transforms the 50 or 75 ohm input impedance in a broadband configuration where the diodes limit the applied signal to about 0.5 V. The signal is then transformed back to 50 ohms at the device's output.

The AS-RXFEP features "soft limiting," achieved by series resistance, which introduces very little insertion loss (about 0.5 dB at HF and 1 dB at VHF). The onset of limiting (-1.0 dBm) is approximately 4 dBm below the beginning of blocking for most modern transceivers. The maximum output (+10 dBm) is a few dBm below the damage threshold of common transceivers. The range from first limiting to maximum output is 11 dB, which is considered "soft limiting." The series resistance can be adjusted to change the soft limiting point.

When large signals are presented to the device, the input transformer saturates instantly, input VSWR increases, and the balance of input signal is reflected back toward the source. For this reason, power-handling capacity is mostly irrelevant. But even so, the components can handle approximately 10 watts ICAS (Intermittent Commercial and Amateur Service). Impedance of other signals at lower levels is undisturbed. Insertion loss from 1 to 75 MHz is typically 1 dB. Limiting begins and holds at approximately 0.7 Vrms, or approximately 10 dBm. A level of +5 dBm is 80 dB over S9 and is not often present in most single-operator stations. In a multi-operator station it is possible to see these levels on incoming receive antennas with no band-pass filters in line or where more than one station is active on a single band. Band-pass filters are recommended to limit the RF overload and to prevent RF from other bands getting in, and to further block possible harmonics reflected back to the antenna.



DX Engineering Model RG-5000 Receiver Guard.

Next OCRACES Meeting: April 2nd

The next OCRACES meeting will be on Monday, April 2, 2018, at 7:30 PM, at OCSO Communications & Technology Division, 840 N. Eckhoff Street, Suite 104, in Orange. Our featured speaker will be OCSO Senior Communications Technician Heidi Aguirre, K3TOG, who will give us training on the Department's new Motorola APX 6000 portable radio and the APX 6500 mobile radio. She may also discuss how these radios fit into the "rebanding" efforts now underway in the Division.

Also at this meeting we will continue our formation of teams for publicizing and recruiting, scheduling meeting programs and guest speakers, and enhancing our technical capabilities. We will also discuss our plans for ACS Radio Rodeo to be held on May 5th at the back parking lot at Eckhoff. We also need to discuss whether we will participate in Field Day this year, since we no longer have a van for our operations.

ARRL Requests Expanded HF Tech Privileges

As reported in the March 2018 issue of *NetControl*, ARRL has asked the FCC to expand HF privileges for the entry-level Technician license to include limited phone privileges on 75, 40, and 15 meters, plus RTTY and digital mode privileges on 80, 40, and 15 meters, where Technicians already have CW privileges. ARRL believes the additional digital privileges will attract younger people to amateur radio.

The proposed additional HF phone privileges are 3.900 to 4.000 MHz, 7.225 to 7.300 MHz, and 21.350 to 21.450 MHz. Technicians already have HF privileges on parts of 10 meters.

Some in the amateur radio community have questioned the need for expanded Technician privileges or to express other perspectives. ARRL has responded to point out some of the key advantages of its petition, which recognizes the tremendous technological advances and changes in amateur radio. Some key points:

- A thorough review of operating privileges available to the entry-level license has not taken place since the late 1970s, when the Novice-class license—the entry-level license at that time, and no longer issued—was modified to allow Novices access to a limited portion of 10 meters. This included the first HF phone privileges for Novices.
- The 2-year process that led to the development of ARRL's petition includes significant input from the amateur radio community. The two surveys that the ARRL board's Entry-Level License (ELL) Committee conducted on this issue drew more than 8,000 responses from ARRL members.
- The 378,000 Technician licensees comprise more than half of the US Amateur Radio population, yet the Technician-class license no longer serves its original purpose from 18 years ago. Many Technicians do not participate actively, pursue on-air and public service opportunities, renew their licenses, or upgrade. An uncomfortably large attrition rate exists among Technician licensees. Technician licensees are not upgrading, because they don't find their operating privileges interesting enough to keep them in the hobby.
- The proposed addition of 275 kilohertz of HF phone privileges, spread across 80, 40, and 15 meters, would allow Technicians the opportunity to develop and expand their understanding of HF propagation. In addition, this proposed change would allow Technician licensees to participate in public-service-oriented, emergency, and Section traffic nets on 75 meters, from 3900 to 4000 kHz, where primary state/Section-wide public-service activities often take place.
- Additional operating privileges for Technicians will not limit their incentive to upgrade. ARRL points out that Technicians now have access to 850 kilohertz of spectrum in four HF bands. ARRL proposes an additional 275 kilohertz on three of those bands, so the total under this proposal is 1,125 kilohertz on four bands—80, 40, 15, and 10 meters.

Compare that to current General Class HF privileges: 3150 kilohertz across nine HF bands—160, 80, 40, 30, 20, 17, 15, 12, and 10 meters. In addition, Generals have access to the five 60-meter channels and to the two newest bands, 2200 and 630 meters. The incentive to upgrade from Technician to General is a tripling of the available HF spectrum; upgrading to General allows access to eight additional bands, including the prime daytime bands of 20 and 17 meters. Also, Technicians upgrading to General or higher are permitted the maximum amateur power level of 1500 W PEP.

ACS Radio Rodeo: May 5, 2018

Taking the place of the usual City/County RACES & MOU ACS Exercise on the first Saturday in May will be ACS Radio Rodeo, covering all operational areas (counties) in the Southern Region (Mutual Aid Regions I and VI) of Cal OES. Mutual Aid Region I counties include Los Angeles, Orange, San Luis Obispo, Santa Barbara, and Ventura. Mutual Aid Region VI counties include Imperial, Inyo, Mono, Riverside, San Bernardino, and San Diego.

The exercise objective will be to establish contact between all counties on HF (40 meters) as well as on 2-meter, 1¼-meter, and 70-centimeter high-altitude repeaters and linked systems (such as Cactus). In Orange County, we will test local communications on our repeaters on those bands, plus simplex on 2 meters and 70 centimeters, plus our 6-meter repeater. Each county will establish a location for gathering RACES and other amateur radio EmComm vehicles. The first hour (0900-1000) of the exercise will be spent communicating between the local vehicles and perhaps with EOCs throughout the county. The next hour (1000-1100) will be devoted to intercounty communications. Net control for intercounty communications will be assigned prior to the exercise.

Formal message traffic is not planned for this exercise. At the conclusion of the exercise, participants will have an opportunity to inspect the communications vehicles and portable stations.

Plans have been drafted, and include an ICS 205 Incident Radio Communications Plan and an Incident Action Plan (IAP), in accordance with FEMA National Incident Management System (NIMS) and Incident Command System (ICS) procedures.

The Orange County portion of this event will be held in the back parking lot of the OCSD Communications & Technology Division building, 840 N. Eckhoff Street, in Orange.

Here is the planned event timeline:

- 0800-0830: Participant check-in and setup
- 0830: Mandatory participant briefing
- 0900-1000: Roll call and testing between local RACES/ACS/EmComm units
- 1000-1100: Roll call and testing between Operational Areas
- 1100-1115: Mandatory participant debriefing
- 1115-1200: Vehicle and equipment exhibition and inspection
- 1200: Demobilization

Antenna for 40-meter Portable Stations

As ACS Radio Rodeo approaches, participants are considering what type of antenna to use for the 40-meter net. If trees or poles are available, spaced around 70 feet apart, a half-wave dipole (about 66 feet long), an off-center-fed dipole, a G5RV, or an end-fed long wire could be used. If just one pole or tree is available, a sloper could be effective. However, it appears that the Orange County location for the event will be in the back parking lot west of the OCSD Communications & Technology Division building at 840 N. Eckhoff Street in Orange, near the Santa Ana River. For OA-to-OA communications,

the Yaesu FT-857D transceiver aboard the Division's Control Seven Tahoe may be used, feeding the vehicle's ATAS-120A mobile antenna. As an alternative, we could set up something like a shortened dipole antenna, using two MFJ-1640T HamTenna whips coupled together on an MFJ-347 "HF Stick" mini-dipole mount. The MFJ-347 mounts on a mast up to 1¼ inches OD. One possibility is the MFJ-1918EX portable tripod, which includes a 9.5-foot telescopic fiberglass mast, which collapses to 3.8 feet. Another antenna choice is a Buddipole portable dipole antenna system.



MFJ-347 mini-dipole mount combines two HamTennas, which have 3/8 x 24 threads, into a dipole.

MFJ-1918EX portable tripod with 9.5-foot telescopic mast.



MFJ-1640T HamTenna.

KC6MMF Hides in Orange

Scott Byington, KC6MMF, was the fox on the monthly cooperative T-hunt on Monday, April 19, 2108. He hid in Hart Park in Orange, under the Glassell Street bridge, just north of the 22 Freeway. Hiding with Scott was his wife Pat, KC6ZHR. Scott turned on the fox box immediately following the 2-meter OCRACES ACS net.

Seven hunting teams participated in the hunt. The first to find the fox was Dennis Brunning, KC6NVX. Next was Ron Allerdice, WA6CYY. Coming in third was Joe Moell, KØOV. Following Joe was Peter Gonzalez, KC6TWS. Fifth place was taken by Roger Kepner, W6SQQ, and his wife Carole, K6PUP. Coming in sixth were Ken Bourne, W6HK, and his son Bob, K6RBI. Also hunting was Jack Barth, AB6VC, who came close just before the fox box was turned off.

The next hunt will be on Monday, April 16, 2018, immediately following the OCRACES 2-meter net (approximately 7:20 PM). The fox will hide on paved, publicly accessible property in a city or sector of Orange County to be announced a few days before the hunt. No fees will be required to drive directly to the fox. He will transmit on the input (146.295 MHz) of the 146.895 MHz repeater. Hunters will compare bearings via the 448.320 MHz repeater and are encouraged to beacon their positions via APRS throughout the hunt. We are looking for a volunteer to be the fox.

The cooperative T-hunts are usually held on the third Monday of each month. The hunts provide excellent practice in working together to find sources of interference quickly. The hunts are not official RACES events, so DSW (Disaster Service Worker) coverage does not apply. Please drive carefully!

Fox-hunt loops and beams are available from Arrow Antenna and HRO, including the Arrow Model FHL-VHF fox-hunt loop (covers 1 MHz to 600 MHz) and the Arrow Model 146-3 three-element portable hand-held yagi. The Arrow OFHA 4-MHz offset attenuator can be useful when close to the fox, to prevent receiver overload. For on-foot hunting, the BC-146.565 three-element, hand-held, foldup, yagi antenna is available from Bob Miller Enterprises (<http://www.rdfantennas.com>), along with the VK3YNG MK4 sniffer. An all-mode transceiver is quite useful, allowing hunters to switch to the SSB or CW mode for detecting extremely weak signals, or to switch in a built-in attenuator, reduce RF gain, or tune slightly off frequency when dealing with extremely strong signals. Some hunters use the DF2020T radio direction finder kit, which is a Doppler system available from Global TSCM Group, Inc. (<http://www.kn2c.us>). A very similar system is the MFJ-5005 Doppler direction finder. Useful apps are available for iPhones and Android phones. For some excellent information on T-hunting, see <http://www.homingin.com>.



At the fox's den are (left to right) Ken Bourne, W6HK, Scott Byington, KC6MMF (the fox), Peter Gonzalez, KC6TWS, Dennis Brunning, KC6NVX, and Ron Allerdice, WA6CYY. Other hunters not pictured included Joe Moell, KØOV, Roger and Carol Kepner, W6SQQ and K6PUP, Bob Bourne, K6RBI, and Jack Barth, AB6VC.

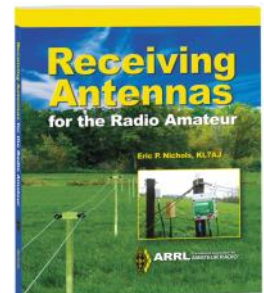
Receiving Antennas for the Radio Amateur

Increase your station's receive performance with a new book, *Receiving Antennas for the Radio Amateur*, by ARRL author Eric P. Nichols, KL7AJ.

Although the fundamental characteristics of antennas apply to both transmission and reception, the requirements and priorities of receiving antennas can be vastly different from those of transmitting antennas. *Receiving Antennas for the Radio Amateur* focuses entirely on active and passive receiving antennas and their associated circuits. There are relatively few cases where a radio amateur cannot benefit from a separate, well-designed receiving antenna or antenna system. On the low bands, including our new allocations at 630 and 2,200 meters, heavy emphasis on the receiving end of these radio paths is essential for success.

The active antenna holds a prominent position in this book, as it offers good receiving performance while taking up minimal space. Recent developments in radio frequency (RF) semiconductors, especially low-noise RF operational amplifiers, have made a number of previously difficult-to-implement active antenna designs a very simple task.

Receiving Antennas for the Radio Amateur is available from the ARRL Store or your ARRL Dealer. (ARRL Item no. 0789), ISBN: 978-1-62595-078-9, \$27.95 retail, special ARRL Member Price \$24.95).



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 and supportive amateur radio clubs in Orange County.

Please send your news to NetControl Editor Ken Bourne, W6HK, at: w6hk@ocraces.org

Laguna Beach Emergency Communications Team (LBECT/RACES)

The Laguna Beach 52nd Annual Patriot Day Parade, "Waves of Freedom," on March 3, 2018, was supported by LBECT's team members at the Parade's High School starting point and the Library and City Hall



LBECT Members Arlene Schwartz, KE6GFI, Barbara Bowler, W7IGB, and Elaine Merz, WA2NQB (left to right), at "Waves of Freedom" in Laguna Beach.

announcers. The LBECT team consisted of Elaine Merz, WA2NQB, Barbara Bowler, W7IGB, and Arlene Schwartz, KE6GFI, net control. Also, LBECT's Chief Radio Officer John Kountz, WO1S, served as the parade announcer at City Hall.

Fountain Valley RACES

PIO Garry Jones, N6NQN, reports that Fountain Valley RACES supported the annual Easter Egg Hunt at Fountain Valley Recreation Park at Ellis and Brookhurst on March 31, 2018. The festivities for all ages of children started at 8:00 AM and carried on until 11:00 AM. The new go-box radios

worked well and were remotely powered by a small U-1 battery for the 3+ hours of the event with hardly any battery drain. The remote station was positioned in the middle of the soccer fields and supported the Recreation Department event, scouting for lost parents and maintaining vigilance for any injuries. Fountain Valley RACES feels it is imperative to maintain a visual presence with the City of Fountain Valley by supporting these types of events. Last month they supported the 5K Fun Run at the park with their system and discovered several areas of the park that had communications difficulties on simplex 440. That problem is being addressed with a study of the terrain on the park's blind spots and a possible work around using their new Kenwood TM-V71A's dual-band capabilities to cross band and be a remote repeater system for coverage of the northeast end of the county side of the park. Plans are to survey the entire city for dark areas and map the communications possibilities. Future plans may be to move their 440-MHz repeater from the Fountain Valley Police department to the Fountain Valley Hospital towers, putting it on par with their 2-meter antenna height and improve the 440-MHz performance and coverage.

Fullerton RACES

Fullerton RACES Radio Officer Gene Thorpe, KB6CMO, announced that the City of Fullerton welcomes Fullerton/Brea Fire Department Division Chief of Administration/Fire Marshal Kathy Schafer as the Fullerton City RACES Coordinator.

Mission Viejo RACES

Mission Viejo RACES-ARES provided Communications Support for the 1st Annual OSO FIT – Community Health Fair and 5K Fun Run on March 3, 2018, in Mission Viejo. The heavy rain the night before and forecast of rain on the event day caused many route changes for the 5K run, but everything went well, with a strong attendance. The event organizers said having the RACES-ARES people was a Huge Help and made their first annual event look much better.

April 2018

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2 Weekly 2 m ACS Net & OCRACES Meeting	3	4	5	6	7 Weekly 40 m ACS Net
8	9 Weekly 2 m ACS Net	10	11	12	13	14 Cal OES Southern Region ACS Meeting
15	16 Weekly 2 m ACS Net & Cooperative T-Hunt	17	18	19	20 Orange County Amateur Radio Club Meeting	21 Weekly 40 m ACS Net
22	23 ACS Nets on Five Bands & Cal OES Nets	24	25	26	27	28 Weekly 40 m ACS Net
29	30 Weekly 2 m ACS Net					

Upcoming Events:

- **April 2:** OCRACES Meeting, 840 N. Eckhoff Street, Suite 104, Orange, 1930-2130 hours
- **April 14:** Cal OES Southern Region ACS Leadership Meeting, San Bernardino County Fire Department, Office of Emergency Services, 1743 Miro Way, Rialto, 1000 hours
- **April 16:** Cooperative T-Hunt on input of 2-meter repeater, 1920 hours
- **April 20:** Orange County Amateur Radio Club Meeting, American Red Cross (George M Chitty Building), 600 Parkcenter Drive, Santa Ana, 1900 hours
- **May 5:** ACS Radio Rodeo, 0800-1200 hours



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

40 m: 7250 kHz SSB (City/County/MOU Net—Saturdays, 1000 hours)
 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: 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)
 23 cm: 1287.650 MHz, 1287.675 MHz, 1287.700 MHz, 1287.725 MHz, 1287.750 MHz, and 1287.775 MHz outputs, -12 MHz inputs, 88.5 Hz PL
 *Primary Net—Mondays, 1900 hours

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 714-997-0073

Radio Officer (Lieutenant)
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Assistant Radio Officers (Sergeants)
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**“W6ACS ...
Serving
Orange County”**

Meet Your County of Orange RACES Members!



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W6HK



Scott Byington
KC6MMF



Jack Barth
AB6VC



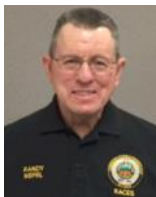
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David Corsiglia
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N8RG



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KC6HAM



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N6NTH



Matt Luczko
KM6CAO



Fran Needham
KJ6UJS



Harvey Packard
KM6BV



Tom Riley
K6TPR



Brad Russo
KB6GPM



Tony Scalpi
N2VAJ



Joe Selikov
KB6EID



Robert Stoffel
KD6DAQ



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