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Amateur Radio

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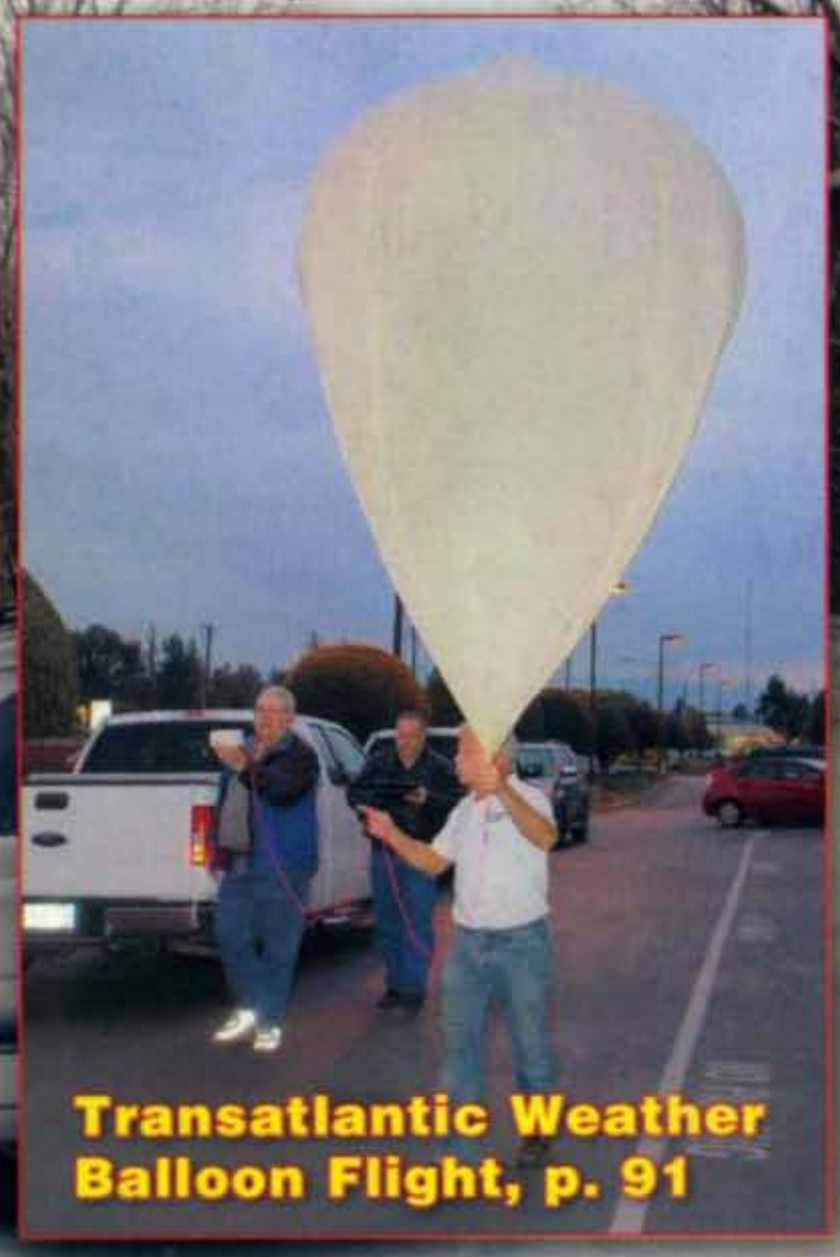
On the Cover: Tom Lutz, W0ZR, of Minnetonka, Minnesota. Details on page 62.



Transatlantic Weather Balloon Flight, p. 91

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The TH-D72A is perhaps the most technology advanced, feature rich portable offered to the Amateur market. Easy to use, yet affordable. You be the judge!

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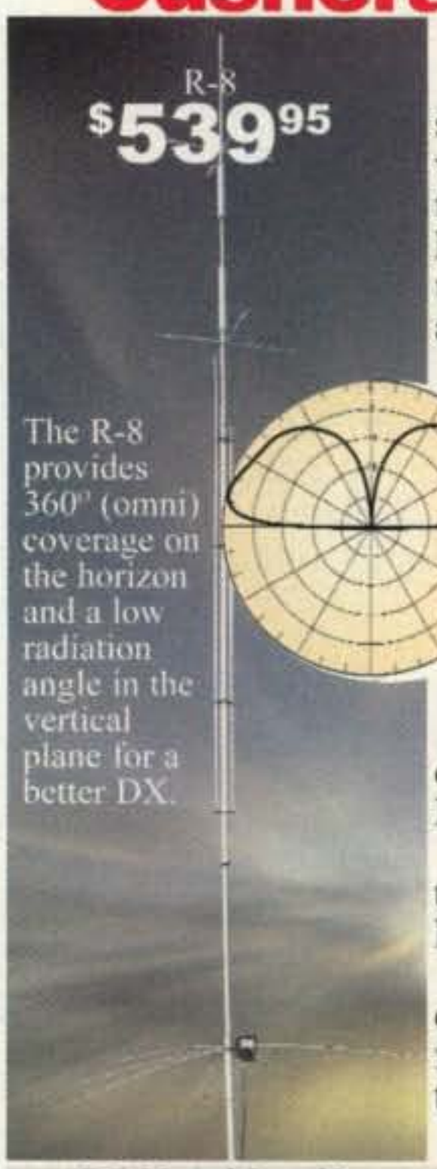
Cushcraft R8 *8-Band Vertical*



Covers 6, 10, 12, 15, 17, 20, 30, and 40 Meters!

The Cushcraft R8 is recognized as the industry gold standard for multi-band verticals, with thousands in use worldwide. Efficient, rugged, and built to withstand the test of time, the R8's unique ground-independent design has a well-earned reputation for delivering top DX results under tough conditions. Best of all, the R8 is easy to assemble, installs just about anywhere, and blends inconspicuously with urban and country settings alike.

Automatic Band Switching: The R8's famous "black box" matching network combines with traps and parallel resonators to cover 8 bands. You QSY instantly, without a tuner!

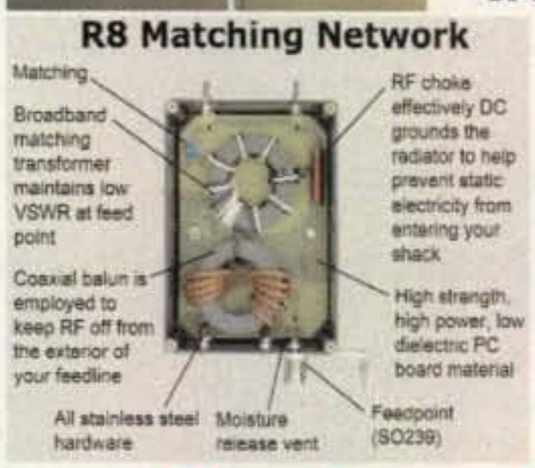
Rugged Construction: Thick fiberglass insulators, all-stainless hardware, and 6063 aircraft-aluminum tubing that is double or triple walled at key stress points handle anything Mother Nature can dish out.

Compact Footprint: Installs in an area about the size of a child's sandbox -- no ground radials to bury and all RF-energized surfaces safely out of reach.

Legal-Limit Power: Heavy-duty components are contest-proven to handle all the power your amplifier can legally deliver and radiating it as RF rather than heat.

The sunspot count is climbing and long-awaited band openings are finally becoming a reality. Now is the perfect time to discover why Cushcraft's R8 multi-band vertical is the premier choice of DX-wise hams everywhere!

R-8GK, $56.95. R-8 three-point guy kit for high winds.



MA-5B *5-Band* Beam

Small Footprint -- Big Signal

The MA-5B is one of Cushcraft's most popular HF antennas, delivering solid *signal-boosting directivity* in a bantam-weight package. Mounts on roof using standard TV hardware. Perfect for exploring exciting DX without the high cost and heavy lifting of installing a large tower and full-sized array. Its 7 foot 3-inch boom has less than 9 feet of turning radius. Contest tough -- handles 1500 Watts.

The unique MA-5B gives you 5-bands, automatic band switching and easy installation in a compact 26-pound package. On 10, 15 and 20 Meters the end elements become a two-element Yagi that delivers solid power-multiplying gain over a dipole on all three bands. On 12 and 17 Meters, the middle element is a highly efficient trap dipole. When working DX, what really matters are the interfering signals and noise you *don't hear*. That's where the MA-5B's impressive side rejection and front-to-back ratio really shines. *See* ***cushcraftamateur.com*** *for gain figures.*

Cushcraft 10, 15 & 20 Meter Tribander Beams

Only the best tri-band antennas become DX classics, which is why the Cushcraft World-Ranger A4S, A3S, and A3WS go to the head of the class. For more than 30 years, these pace-setting performers have taken on the world's most demanding operating conditions and proven themselves every time. The key to success comes from attention to basics. For example, element length and spacing has been carefully refined over time, and high-power traps are still hand-made and individually tuned using laboratory-grade instruments. All this attention to detail means low SWR, wide bandwidth, optimum directivity, and high efficiency -- important performance characteristics you rely on to maintain regular schedules, rack up impressive contest scores, and grow your collection of rare QSLs!

It goes without saying that the World-Ranger lineup is also famous for its rugged construction. In fact, the majority of these antennas sold years ago are still in service today! Conservative mechanical design, rugged over-sized components, stainless-steel hardware, and aircraft-grade 6063 make all the difference.

The 3-element A3S/A3WS and 4-element A4S are world-famous for powerhouse gain and super performance. **A-3WS, $499.95,** 12/17 M. **30/40 Meter** *add-on kits* available.

Cushcraft Dual Band Yagis

One Yagi for Dual-Band FM Radios

Dual-bander VHF rigs are the norm these days, so why not compliment your FM base station with a dual-band Yagi? Not only will you eliminate a costly feed line, you'll realize extra gain for digital modes like high-speed packet and D-Star! Cushcraft's A270-6S provides three elements per band and the A270-10S provides five for solid point-to-point performance. They're both pre-tuned and assembly is a snap using the fully illustrated manual.

Cushcraft Famous *Ringos* Compact FM Verticals

W1BX's famous *Ringo* antenna has been around for a long time and remains unbeaten for solid reliability. The Ringo is broad-banded, lighting protected, extremely rugged, economical, electrically bullet-proof, low-angle, and more -- but mainly, it just plain works! To discover why hams and commercial two-way installers around the world still love this antenna, order yours now!

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Five Years of Code-Free Licensing

This month marks the fifth anniversary of the end of Morse code testing for all levels of FCC amateur radio licenses. The final code tests were administered on February 22, 2007 after being a part of U.S. license exams since the inception of amateur radio licensing nearly a century ago. Over the decades, code test speeds rose and fell with changing times. Code testing for the entry-level Technician Class was eliminated in 1991. Since the end of code testing, the ranks of radio amateurs in the U.S. have increased by nearly 50,000 and many newer hams are learning CW even though it is no longer required. See this month's "Zero Bias" editorial for commentary on this issue.

APRS Weather Balloon Smashes Distance Record

An amateur radio weather balloon launched by a group of hams in California on December 11 flew across the United States and the Atlantic Ocean before landing in the Mediterranean Sea off the coast of Algeria three days later. The balloon was carrying a ham radio APRS (Automatic Packet Reporting System) transmitter and was tracked by amateurs in North America and Europe as it made its record-smashing 6,236-mile journey. The flight nearly doubled the previous distance record of 3,361 miles. For complete details on the flight and the story behind it, see this month's "VHF-Plus" column on p. 91.

"End of Mission" for AO-51

As the 50th anniversary of the December 12, 1961 launch of OSCAR-1 approached in late November, controllers of AMSAT-OSCAR 51 announced that amateur satellite's "end of mission." AMSAT-NA Vice President of Operations Drew Glasbrenner, KO4MA, said, "It is with a heavy heart I report that AO-51 has ceased transmissions and is not responding to commands." AO-51 provided low-earth orbit satellite contacts for seven years before its batteries finally failed. The AMSAT News Service reports that the AO-51 command team will regularly attempt to communicate with the satellite over the coming months and years, in hopes that at least one of its batteries will come back to life.

AMSAT Seeks NASA Funding for Fox-1

The amateur satellite planned to replace AO-51 is called Fox-1, and in mid-November, AMSAT submitted the project for consideration in NASA's CubeSat Launch initiative, part of the space agency's educational programs. Educational components of the Fox-1 mission include incorporation in the ARRL's Teacher Institute seminars, according to the AMSAT News Service. Projects selected for the program will have their integration and launch costs paid by NASA, significantly easing the financial needs of the satellite builders.

NASA Pioneer W3PRB Silent Key

CQ Amateur Radio Hall of Fame member John Townsend, W3PRB, became a Silent Key in November. Townsend was one of NASA's early administrators, responsible for the acquisition and construction of the Goddard Space Flight Center in Greenbelt, Maryland. He was also a key negotiator of the first US-Soviet space treaty. Townsend left NASA for several years to help establish the National Oceanographic and Atmospheric Administration (NOAA) and to work in private industry. After the explosion of the shuttle Challenger in 1986, he returned to NASA as Deputy Associate Administrator and led America's return to space. He also served as Goddard's Director from 1987 until his retirement in 1990. Townsend was profiled in an interview in the June, 2008, issue of *CQ*.

RAST HQ Station Destroyed by Flooding

Last fall's massive flooding in Thailand, the country's worst in 60 years, counted among its victims HS0AC, the headquarters station of the Radio Amateur Society of Thailand (RAST). Well-known Thai contester Champ Muangamphun, E21EIC/KY1A, noted that photos of the devastation have been posted on the web at <http://www.qsl.net/rast>. Champ notes that anyone wishing to help with donations for rebuilding HS0AC may contact RAST International Liaison Officer Tony Waltham, HS0ZDX. Tony's e-mail address is <dx@thai.com>.

RSGB Reorganizes to Try to Save Itself

Beset by a scandal in which its former general manager allegedly stole thousands of pounds from the organization, the Radio Society of Great Britain (RSGB) has undertaken a major reorganization to try to stay afloat. At an "Extraordinary General Meeting" of the society on November 19, RSGB members voted overwhelmingly to adopt a reform committee proposal to temporarily replace the elected board of directors with an "interim board" made up of eight amateurs with significant business and financial expertise. According to the RSGB website, these directors will serve for 15 months, will take necessary actions to put the society back on a sound financial footing and make recommendations to the membership for future governance.

AMSAT-DL Receives Signals from Mars Satellite

Amateurs at the AMSAT-DL facility in Bochum, Germany, received telemetry signals from the NASA Mars Science Laboratory (MSL) satellite about seven hours after ist recent launch. According to the AMSAT News Service, the satellite was more than 67,000 miles from Earth at the time of reception. This is believed to be the first reception of MSL signals outside of NASA's Deep Space Network. AMSAT-DL's Bochum facility is part of its work on the planned P5A amateur satellite to Mars mission.

Congress Considers Easing ITAR Restrictions

International cooperation on amateur satellite missions has become nearly impossible since the U.S. government's enactment of its International Traffic in Arms Regulations, or ITAR. The rules limit exchanges of technology between countries—even friendly countries—if that technology could possibly have military applications. Violators face stiff fines and possible jail terms. According to the AMSAT News Service, this rule has technically made AMSAT-NA a "munitions supplier," even though its satellite technology has always been strictly for civilian use.

Now, ANS reports that Congress is considering a bill —H.R. 3288—which is aimed at easing ITAR restrictions on commercial satellite development and which, if passed, may once again permit amateur satellite groups around the world to collaborate on multinational ham radio satellite projects. More information, including bill tracking, is available at <http://www.govtrack.us/congress/bill.xpdbill=h112-3288>.

Additional and updated news is available on the Ham Radio News page of the CQ website at <http://www.cq-amateur-radio.com>. For breaking news stories, plus info on additional items of interest, sign up for CQ's free online newsletter service. Just click on "CQ Newsletter" on the home page of our website.

Leveraging SDR for Better Digital Mode Communications

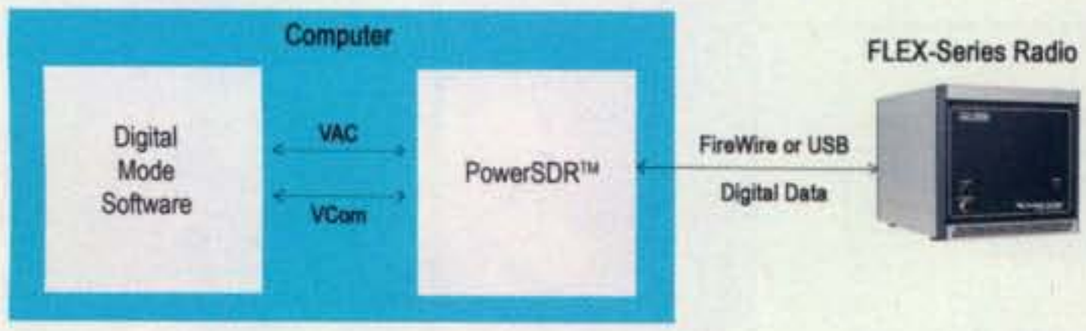
FlexRadio Systems PowerSDR™ Advantage

History and the Problem

As computers and software grow more advanced, more and more digital modes have been added to the amateur's repertoire. Some of these modes include Olivia, RTTY, Clover, PACTOR, AMTOR, PSK31, MT63 and numerous modes supported by WSJT. Many of these modes are able to be modulated and demodulated in a computer and, as such, do not require and external modem device. For the modes supported in a computer, numerous software packages have sprung up that do everything from basic mod/demod all the way to complex contest support operations, logging and integrated spotting. While the software packages and the radio are both very functional as individual components, interfacing these two system components requires electronics, effort and quite often, an interactive try-this-try-that approach to remove interference and signal issues between the two components.

The PowerSDR Advantage

So how does an SDR help out with all of these problems? To understand this, we need to review the architecture of an SDR system. In the figure below, the digital data line represents the digital spectrum data and the radio control signals that are passed between the radio and PowerSDR™.



PowerSDR™ Digital Mode Connections

This data path is digital rather than traditional analog signals. A single cable between the radio carries the PTT signal for transmitting, as well as, both receive and transmit audio data. Since the data is digital, it doesn't suffer the same degradation that an analog signal travelling down an analog cable is likely to experience. This means your audio is ultra clean and cannot be degraded once it leaves the radio.

Once the data is delivered to the computer, PowerSDR demodulates the signal then passes it via a Virtual Audio Cable (VAC) to the users' digital mode software inside the computer. VAC was designed to be a "pass-through" that connects two digital sound programs as if each is seeing a sound card rather than another piece of software. A virtual interface also eliminates the need for additional cables, interface boxes and all the headaches related to interfacing in a high RF environment.

If the digital mode audio can be virtual, why not the control signals too? Using virtual COM port software, the user's digital mode software can be easily interfaced to PowerSDR for controlling frequencies and PTT signals. All with no more wires!

Further, once connected, this virtual digital mode interface requires no work on the operator's part -- he does not have to constantly adjust levels or protect the system from radio frequency interference. It just works.

Summary

Amateurs have come to recognize that SDR systems provide superior audio and filtering capabilities, but few are aware of the key advantages that an SDR brings to digital modulation schemes. These include:

- No additional wiring between the computer and the radio.
- No 3rd party interfaces to connect the computer and radio.
- No additional sound cards are required.
- Because all data is already digital when it leaves the radio, all signals are protected from degradation and interference typically encountered with traditional analog audio interfaces.

For more information or to download the full white paper on Digital Mode Communications, visit www.flexradio.com.

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- Frequency range from 5 kHz to 1 GHz.
- Data plots include SWR, RL, R + X, series and parallel, magnitude, phase, and more.
- Dual Smith charts with rotation and 20 markers.
- Plots and calibration files can be saved and used anytime in CVS and dynamic formats.
- AIM 4170C is still in production covering 5kHz to 180 MHz.
- New TDR functionality

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The information shown is preliminary and may be subject to change without notice or obligation.

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Measures impedance magnitude, phase and transmission parameters for antennas, filters, and discrete components - using one or two ports.

- Frequency range is 5KHz to 180MHz.
- Data plots include: impedance, SWR, return loss, S11 and S21.
- Plots can be saved for before and after comparisons.
- New TDR functionality

AIM 4170C Antenna Lab RF Analyzer

The AIM 4170C antenna analyzer measures the complex impedance (magnitude and phase) at each frequency of interest in the range of 5KHz to 180 MHz. A PC is used to calculate all RF parameters, including R +/-X, Magnitude and Phase, SWR, Return Loss, line loss, and more and plot the results in an easy to read graph and interactive Smith Chart.

- New TDR functionality

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FT DX 9000 Contest

The FT DX 9000 gives you the opportunity to build up your radio to match your operating style and competitive requirements. World-class ergonomics combine with leading-edge performance to put more QSOs in your log faster. This is what Amateur Radio is about: building the best, so you can be your best! Two Pairs of Meters, plus LCD Window, VRF Input Preselector Filter, Three Key Jacks, and Dual Headphone Jacks, 50 V/12 A Internal Switching Regulator Power Supply.

FT-2000, FT-2000D, FT-950 and the FT-450D

FT-2000 and FT-2000D

This rugged DX hunter has power and performance to spare. The FT-2000 provides a full 100 Watts RF output on 160 through 6 meters with an internal power supply, but the FT-2000D version doubles down with 200 Watts and an external supply. The impressive feature list for both versions includes dual receive capability for effortless split frequency operation; a receiver front-end VRF (Variable RF Tuning) preselector; 1st IF roofing filters (3/6/15 kHz) for superb dynamic range; variable IF bandwith and IF Shift; receiver DSP with Auto-Notch, Manual Notch, Digital Noise Reduction; and a continuously-variable passband contour control.

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Three electro-luminescent sub-displays indicate sub frequency, graphical wave and menu functions. Additional features: Parametric Microphone Equalizer; Dual Receive In Band Function Contest-ready Antenna Selection; Manual and Automatic Digital Notch; High Speed Automatic Antenna Tuner; DSP Noise Reduction.

FT DX 5000MP
Station Monitor SM-5000 included; 0.05 ppm
OCXO included; 300 Hz
Roofing Filter included

FT DX 5000D
Station Monitor SM-5000 included; 0.5 ppm
TCXO included; 300 Hz
Roofing Filter optional

FT DX 5000
Station Monitor SM-5000 optional; 0.5 ppm
TCXO included; 300 Hz
Roofing Filter optional

FT-950

Whether you're a serious or casual DXer, the Yaesu FT-950 should be at the top of your list. The FT-950 packs a 100 watt punch on 160 through 6 meters and includes a built-in antenna tuner; triple-conversion superheterodyne receiver; three factory-installed 1st IF roofing filters; variable IF bandwidth and IF shift, manual IF notch filter, an Automatic Digital Notch Filter (DNF) and many other expanded features available with optional DMU-2000 Data Management Unit.

FT-450D

This easy-to-pack radio is a DXpeditioner's dream come true – a lightweight, high performance transceiver spanning 160 through 6 meters with 100 Watts RF output. When it's time to wade into the pileups, you'll appreciate the FT-450D's 10 kHz bandwidth roofing filter in the 68 MHz first IF, right after the first mixer. This filter provides outstanding selectivity when the going gets rough – a feature rarely found in rigs in this price range!

CQ editorial

zero bias – a column by CQ's editorial staff

No-Code Plus Five Years: An Assessment

BY RICH MOSESON,* W2VU

Five years ago this month, the FCC eliminated Morse code testing from all levels of amateur radio license exams. So, on this anniversary, let's take a moment to assess the impact of that decision on ham radio in general and on the use of CW on the air. To start with, the world is still here. Ham radio is still here. CW is still here. Despite the fears of many CW aficionados, the universe did not implode on February 23, 2007.

Back in 2006 when the FCC was still trying to make up its mind, *CQ*'s position was that a 5 word-per-minute CW exam for Extra Class ought to be retained. But we also believed that CW had enough appeal, and offered enough benefits, to stand on its own as an operating mode, regardless of whether a ham had to demonstrate proficiency in order to achieve a certain license class. We still believe that, and we believe history has shown us to be correct. We constantly hear stories of increased activity on the HF CW bands, especially among slower-speed stations trying to build up their skills. On the other hand, Tom Lutz, WØZR, who's on our cover this month and calls CW "a long-time passion," feels code is "becoming a lost art."

Feelings, beliefs and anecdotes aren't hard facts, though, so we tried to get some of those to accompany our feelings and beliefs. We checked in with a manufacturer of keys and paddles, with the head of an international CW promotion group, with *WorldRadio Online*'s Morse code columnist, and with the stats on our own contests as well as FCC licensing statistics. Overall, they paint a very positive picture, plus or minus a few hiccups along the way.

The manufacturer, whom we won't identify in print, said sales of its main line of paddles fell sharply in the two years after the CW test requirement was dropped, but then began a slow recovery that has continued over the past three years. Sales are not yet back to where they once were, but are heading in the right direction. It should also be noted that additional competition entered that segment of the marketplace in around the same timeframe, so dropping the code requirement may not have been the only factor involved. The very fact that the field is growing rather than contracting is another positive sign.

Another factor to consider is that a beginning CW operator is not likely to invest (yet) in paddles for an electronic keyer, so the sales figures shared with us perhaps paint a more accurate picture of those hams whose CW proficiency has increased to the point where a $100+ investment for sending code becomes worthwhile. This interesting divide between beginners/learners and committed CW operators also showed up in an assessment by Nancy Kott, WZ8C, President of the FISTS CW Club (which, by the way, is celebrating its 25th anniversary this month—congrats to FISTS from all of us at CQ).

Nancy says she was worried that CW would disappear from the airwaves as a result of the FCC's dropping the code test requirement. "Five years later," she says, "I am glad to see I was wrong. The use of Morse code is alive and well." However, she adds that "I've given out literally thousands of free FISTS code course CDs and many of our members are having well-populated code classes, but CW activity (on the air) from the newly-licensed hams who join FISTS is oddly sparse. I don't know if it's cold feet or sunspots or whatever. We keep hearing the same old-timers over and over."

Nancy speculates that "although people have the desire to learn code, they often do not have the incentive to learn it well enough to be comfortable on the radio." On the other hand, Nancy paints a very positive picture, looking toward the future. She notes that "(h)ams with technical curiosity, which led them to discover amateur radio, are finding uses for the code that involve new technologies. For example, they are incorporating it into videos and creating applications for smartphones, as well as having fun with it on the air."

There are no negatives in the statistics we've gathered, from total licensing numbers to participation in contests. At the end of November, according to the <www.ah0a.org> website, the total U.S. ham population stood at an all-time record high of 701,844, up some 46,000 over the past four years. The previous peak of 685,000 was reached in 2002, in the months after the 9/11 attacks, then slowly declined until 2007, when it bottomed out at just under 655,000. It has been climbing steadily ever since. The only significant event in 2007 that might have a widespread impact on people's decisions to become hams was the dropping of the code requirement. (It didn't really matter that there had been no code test for the entry-level Technician Class since 1991; it was a psychological barrier that was removed.)

One way to quantify CW activity at a given point in time is to look at contest logs and compare activity "then" with similar activity "now." Back in 2006, there were just over 4500 logs submitted for that year's CW weekend of the CQ World-Wide DX Contest. As of mid-December of 2011 (with a couple of weeks still to go before the deadline), 6500 CW logs had already been received for last September's competition. This is a continuation of a steady climb in the past several years, with each year setting a new record, even as we've gone through the depths of an extended solar minimum. Yes, there are operating aids for contesters, such as the CW Skimmer. But the Skimmer alone can't account for two-thousand additional CW logs over the past five years. What can? Only one thing: increased interest and activity; it's highly unlikely that someone who doesn't operate CW 51 weekends out of the year will dive into the CQWW CW! Bottom line: CW is hardly a dying art.

The same trend is seen in Field Day logs. In his Morse Code column this month in *WorldRadio Online* <www.worldradiomagazine.com>, Randall Noon, KCØCCR, analyzes CW activity in ARRL Field Day between 2005 and 2011. His reasoning is that "people who participate in Field Day are at least minimally active hams," and that "hams will likely use the same modes on Field Day as they do when operating at other times of the year." Randy found that both participation in Field Day and the number of CW contacts reported have increased significantly in the past six years, and to a greater extent than can be explained only by the overall rise in licensing numbers. In fact, Randy says, "(t)here were a record number of Field Day 2011 entries, a record number of participants … and the highest number of CW QSOs in 17 years."

The only real "hiccup" we see is in the conversion of CW learners to comfortable CW operators (who might then be in the market for keyer paddles). The best approach there, as with most other aspects of our hobby, is to team up with a more experienced ham who can provide mentoring, practice and encouragement. Ham radio is not and should not be a solitary activity. If you're trying to learn and practice CW but don't have a partner to work with, contact FISTS at <www.fists.org>. The group's members are dedicated to helping new CW ops and will slow down as much as you need in order to make your QSO a success.

In closing, it is clear that the future of CW is bright. Like ham radio itself, CW is alive and well, despite—or perhaps because of—the elimination of the code test requirement. As KCØCCR points out in his column, "(r)adio amateurs have not used CW because there was a test. CW has been used because it has been, and continues to be, a very useful mode of wireless communication." And, as WZ8C concludes, "Morse code's timeless simplicity … assures its place in ham radio, requirement or not."

73, W2VU

*e-mail: <w2vu@cq-amateur-radio.com>

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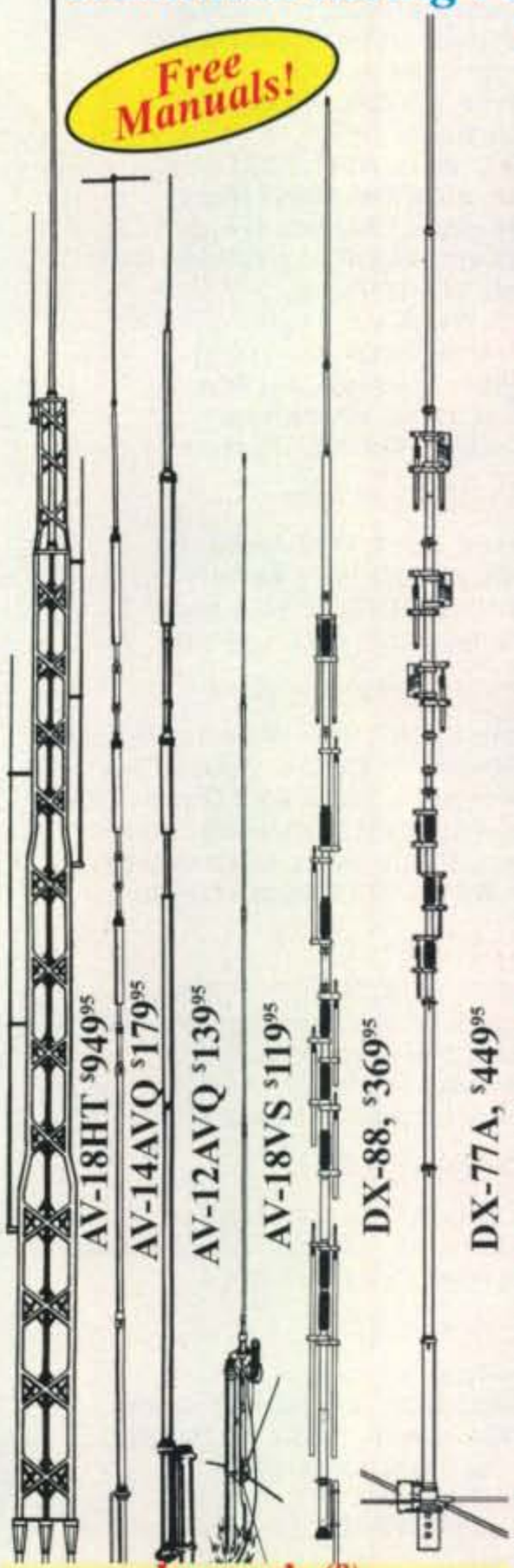

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AV-18VS	**$119.95**	**10 - 80 M**	**1500 W PEP**	**18 feet**	**4 pounds**	**80 MPH**	**1.5-1.625"**
DX-88	$369.95	10 - 40 M	1500 W PEP	25 feet	18 pounds	75 mph no guy	1.5-1.625"
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announcements

• **The following Special Event stations are scheduled for February:**

WASHINGTON, PENNSYLVANIA — The Washington Amateur Communications Inc. will air special event station **W3C** from the Washington County Sportsmen Show from February 2–5, 1500–2200 UTC daily. Frequencies: 7.210, 14.260, 18.130, and 21.250 MHz. QSL to Ed Oelschlager, N3ZNI, 60 Carl Avenue, B2, Eighty Four, PA 15330. Contact: Elmer Plants, N3TIR; e-mail: <bud@n3tir.com>.

LUBBOCK, TEXAS — Special event station **W5B** will be on February 3–5, 1500–0400 UTC to commemorate the 53rd anniversary of Buddy Holly's death. Frequencies: 18.150, 14.260, 7.260, and 3.860 MHz. For a QSL card or certificate send request to: W5B, 109 N. Pontiac Avenue, Lubbock, Texas 79416. Website: <http://www.amcrc.com/w5b>.

PHOENIX, TUCSON, PRESCOTT, ARIZONA — The Central Arizona DX Association will air a special event station, **K7UGA**, to salute the 100th anniversary of Arizona's statehood, February 13–19, 1500–2359 UTC . Operations will be on all amateur bands (160 to 2 meters) as well as CW, SSB, RTTY, PSK31, and satellite. QSL with a SASE to Bob Davies, K7BHM, 1623 N. Los Altos Ct., Chandler, AZ 85224. Website: <http://www.cadxa.org>.

• **The following hamfests, etc. are slated for February:**

NEGAUNEE, MICHIGAN — The Hiawatha Amateur Radio Association will hold its annual **Swap and Shop** on February 4 at the Negaunee Township Hall,. Contact: John, N8RSE, 906-228-9417; e-mail: <carczar52@gmail.com>. For tables, Bob, N8PKN, 906-225-6773; e-mail: <x51bob@aol.com>. (Talk-in 147.27 [100 Hz])

RICHMOND, VIRGINIA — The Richmond Amateur Telecommunications Society will hold **Frostfest 2012** on, February 4 at the Richmond Raceway Complex,. DXCC card checking, forums and meetings, and the ARRL Virginia State Convention. Contact: Rob Marshall, KI4MCW, 804-657-7038; e-mail: <info@frostfest.com>; website: <http://www.frostfest.com>. (Exams 10 AM to 1 PM)

CHARLESTON, SOUTH CAROLINA — The 39th Annual Charleston Hamfest and Computer Show will be held February 4 at the Exchange Park Fairgrounds,. Forums plus VE testing beginning at 1 PM on a walk-in basis. Contact Jenny Meyers, WA4NGV, 2630 Dellwood Avenue, N. Charleston, SC 29405-6814; phone 843-747-2324; e-mail: <brycemyers@aol.com>. (Talk-in 146.790)

ORLANDO, FLORIDA — The Orlando Amateur Radio Club will hold the **66th annual Orlando HamCation® Amateur Radio and Computer Show** from February 10–12 at the Central Florida Fairgrounds. Commercial vendor booths, over 400 swap vendors, and large tailgating area. In addition, there will be forums, hourly raffles, testing sessions, RV camping, a "Special Event" guest amateur station, and more. This year will host the ARRL's Northern Florida Section Convention. Contact: Orlando Hamcation, P.O. Box 547811, Orlando, FL 32485-7811; website: <http://www.hamcation.com>; e-mail: <info@hamcation.com>. ***(See us at the CQ Booth)***

SALEM, OREGON — The Salem Repeater Association will hold the **32nd Annual Salem Hamfair** on February 18 at the Polk County Fairgrounds. Activities include a swap meet, commercial dealers, ARES/RACES, a country store, and raffle at 2:30 PM. Contact: Don Brusch, K7UN, 503-931-8751; e-mail: <hamfair@w7sra.org>. (Talk-in 145.33 [PL 186.2 Hz])

YUMA, ARIZONA — The 2012 ARRL Southwestern Division Convention and 8th Annual Yuma Hamfest & Emergency Preparedness Show will be held February 17–18 at the Yuma County Fairgrounds. Activities include vendors and exhibitors, consignment sales, license testing, antenna clinic, tailgating, seminars, DXCC card checking, and more. Contact: <info@yumahamfest.org>. (Talk-in 146.840- [PL 88.5 Hz])

LOCUST FORK, ALABAMA — The Blount County Amateur Radio Club will hold its **Amateur Radio Swapmeet and Fellowship** on February 18 at the Locust Fork High School,. Contact: Bill Pond, AE4IE, 205-647-5705. (Talk-in 146.700 [PL 91.5 Hz])

NEW PROVIDENCE, NEW JERSEY — The New Providence Amateur Radio Club (NPARC) will be holding its annual **Auction** on February 24 at the New Providence Municipal Center. Contact: Dr. Barry Cohen, K2JV; e-mail:<bgcohenusa@verizon.net>; website: <http://www.nparc.org/auction.htm>. (Talk in 147.255 [141.3 Hz]).

SOUTH BURLINGTON, VERMONT — The Radio Amateurs of Northern Vermont willsponsor **HAM-COM** on February 25 at the Holiday Inn Convention Center, Exit 14 on Interstate 89. Activities include a flea market, dealers, forums, demonstrations and VE Exams. Contact: Mitch Stern, W1SJ, at 802-879-6589; e-mail: <w1sj@arrl.net>; website: <http://www.ranv.org>. (Talk-in 145.15; bulletins on 146.67)

*Please submit hamfest and special event announcements **at least three months in advance** by e-mail to <hamfest@cq-amateur-radio.com> or <specialevent@cq-amateur-radio.com>, or by postal mail to: CQ Magazine, Attn: Hamfests (or Special Events), 25 Newbridge Rd., Hicksville, NY 11801.*

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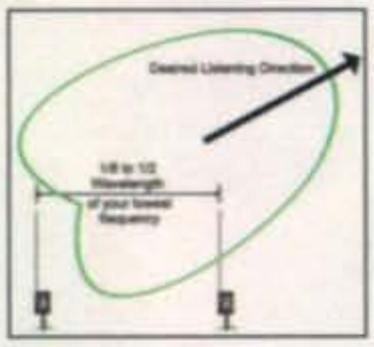

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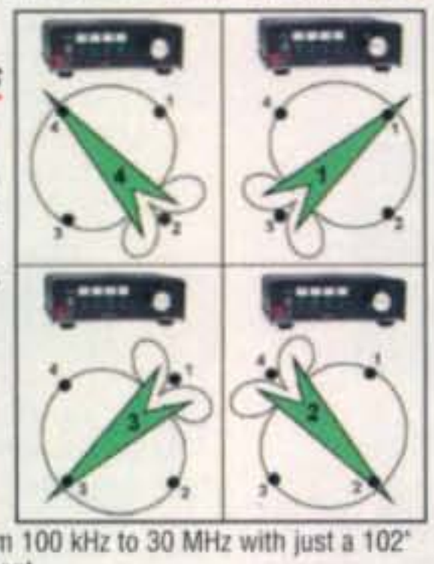

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VHF/UHF Handhelds

BY GORDON WEST,* WB6NOA

Anyone in the market for a new handheld has plenty to choose from, including some with built-in GPS, APRS and digital D-Star capabilities. (Photos by the author or courtesy respective manufacturers)

This should be a great year for the portable VHF/UHF market. Prices remain steady with Kenwood, Yaesu, ICOM, and Alinco—the big HT four. Chinese single-band and dual-band handhelds may appeal to the most frugal of HT buyers, coming in as low as $69 for a two-band HT and $49 for a single-bander.

If your current HT runs on older nickel-cadmium (Ni-Cd) batteries, finding replacement Ni-Cds is getting tough. Sure, you can upgrade to Nickel Metal Hydrides (NiMH), but this pack may not be compatible with your old Ni-Cd charging system. Many of the new HTs that we will review in this article now incorporate lithium ion (Li-ion) sealed packs, along with the rapid charger cup, so this new gear may play for twice as long as your current trusty HT on Ni-Cds.

Our ham radio ranks have grown to over 700,000, with a spike of new hams coming on board from Community Emergency Response Team (CERT) programs. Plenty of CERT members studied and passed the ham tests as part of their continuing CERT upgrade education. Lots of these volunteer emergency responders are fascinated and enthusiastic about their new ham radio privileges, but have limited funds for this new hobby. CERT operators can get on the air for under $100!

We will divide our HT market survey into the following categories: single-band HTs; two-band and dual-band HTs (there *is* a difference!); and tri-band, quad-band, and handheld D-STAR transceivers. Working alphabetically through each group, we will cover them *all*!

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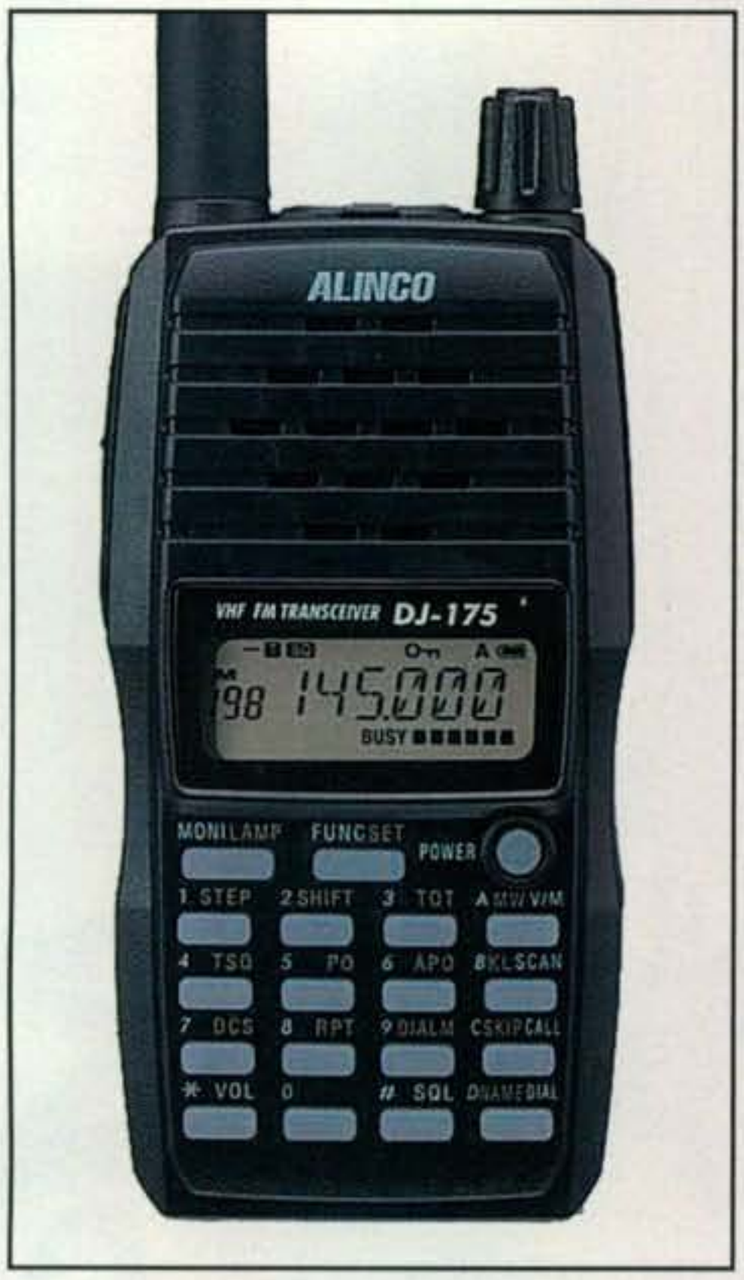
TIP: If you are a member of Coast Guard Auxiliary, MARS (Military Auxiliary Radio System), or Civil Air Patrol, work with your local radio dealer to determine which handheld may do out-of-ham-band double duty *legally*. Regular ham radio handhelds may no longer be used on federal government frequencies, because of tighter specifications and ±2.5 kHz bandwidth limitations. Check with your military communications officer to see which handhelds can be used for both ham and federal auxiliary operation.

Single-Band HTs

ALINCO. This well-known company offers the DJ-V17 for 2 meters, the V27 for the 222-MHz band, and the V47 for the 70 cm (440-MHz) band, all with interchangeable accessories. Each of these "V"-series single-banders is rated submersible for 30 minutes under 3 feet of ocean or river water, perfect for mountain or ocean search-and-rescue teams! The Alinco "V" series comes with a "starter" NiMH battery pack, upgradeable to higher battery capacity and high-tech chemistry when purchased through a dealer or online.

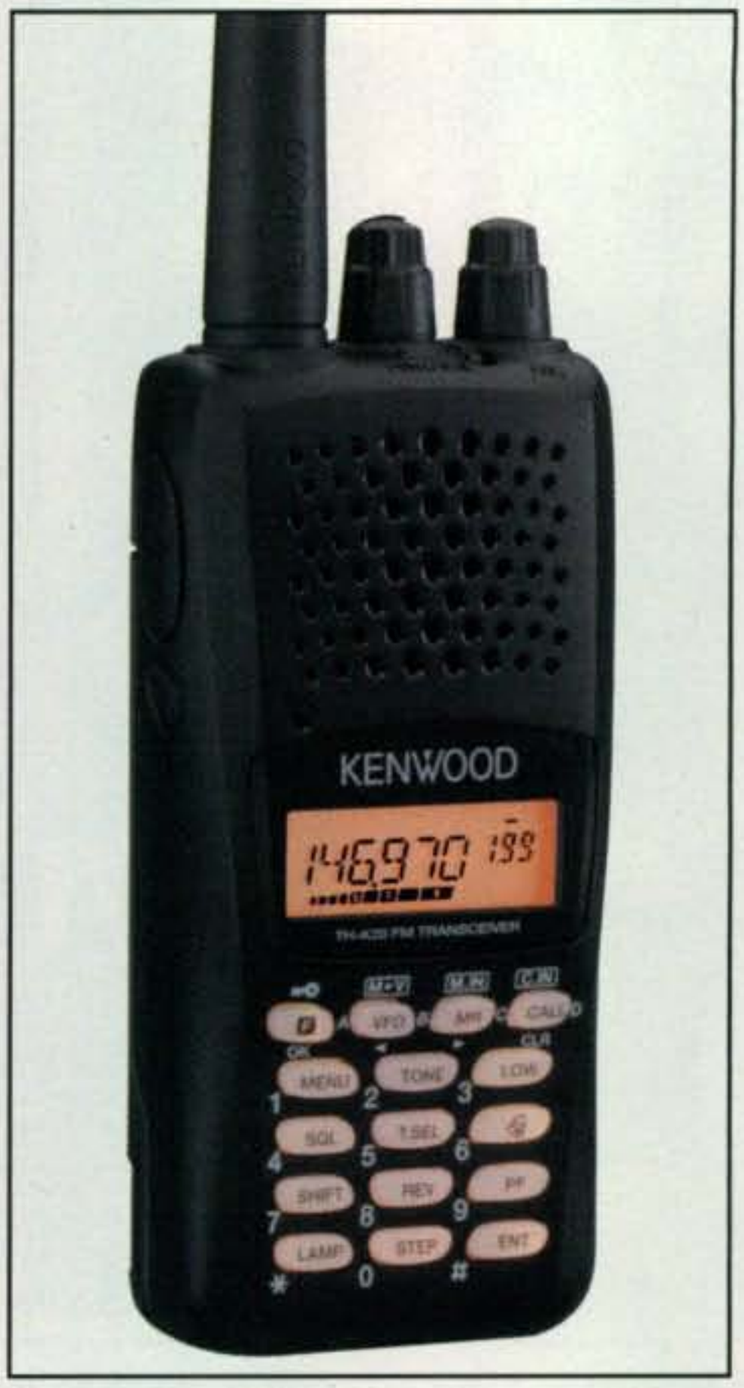
TIP: *Submersible* means a handheld can survive an accidental dunking under 3 feet of water for up to 30 minutes. For ocean and river volunteer rescue responders, submersible is a rating that could save your life. With any dunked submersible, immediately remove the battery pack and dry it, dry out the battery contacts and the battery holder inside the radio's back cover. Even though the internal electronics may be bone dry, you still need to maintain a clean and dry battery compartment after a swim.

The Alinco DJ-175 is a 2-meter, 200-channel, full-size transceiver seen selling for *under* $90! It has plen-



Alinco's DJ-175 is one of the company's four single-band handhelds, and it's selling for under $90.

The ICOM IC-V82 continues to be a very popular 2-meter-only handheld with its 7-watt high-power output.



Kenwood's newest single-band handheld is the TH-K20A, featuring 5.5 watts and high sound pressure for clear audio.

ty of battery pack options, and can wire clone and computer-program just like the "V" series.

ICOM. ICOM America has two single-band 2-meter HTs, the mil-spec IC V-80 and the IC-V82. The V-82 puts out a whopping 7 watts of power, has 200 memory channels, and a land-mobile radio style keypad with recessed buttons. Sorry, there is no aircraft monitoring, but the ICOM V-82 *can* take a D-STAR digital board for the exciting D-STAR connection.

The single-band 2-meter band ICOM IC V-80 puts out 5 1/2 watts on high power, has 207 alphanumeric memory channels, and can be purchased as the V-80 SPORT, which runs on AA alkaline batteries. For emergency volunteers, the AA battery pack makes great sense: There is no self-discharge such as you might find with a rechargeable pack. Also, at a disaster scene nearly everyone has (or should have!) an extra supply of AA alkaline cells.

TIP: *Alkaline Battery Holder.* This is a must for emergency communication responders. You may be extended for several days in your role as an emergency communicator. The area where you are assigned may not have battery charging AC or DC. Most everyone has spare AA alkaline cells, so a battery holder is an essential accessory to order.

New from ICOM is the ICOM ID-31, a 70-cm single-bander specifically designed for compact HT 440-MHz D-STAR digital voice technology. It also has a built-in GPS receiver. It is submersible. *Best of all*, the new ID-31 self-locates via GPS and then self-loads D-STAR repeaters in the local area.

"We are using the repeater lists from <www.dstarinfo.com> and <www.dstarusers.org> repeater directory for the memory channels. Local D-STAR repeaters will come up pre-programmed from the factory," explains Ray Novak, N9JA, of ICOM.

The ID-31 also does conventional FM, and you can manually load up FM repeaters as well. However, on the D-STAR side of this new single-band UHF HT, all D-STAR UHF repeaters pop in as the internal GPS determines the transceiver's position. It also comes with an SD memory card for storing settings and audio recordings.

More on D-STAR opportunities later!

KENWOOD. Phil Parton, N4DRO, of Kenwood, has news of a new product from his company, the TH-K20A, a 5.5-watt VHF portable. The "K20" ships with a Li-ion battery pack and a drop-in rapid charger. Its features include 200 alpha memories, adjustable mic sensitivity, cross-tone, built-in VOX, weather alert, and backlit LCD and keypad. It is also capable of narrow-band operation.

The Yaesu FT-250R(pictured), as well as its sibling, the FT-270R, has been upgraded with 200 memory channels and nickel metal hydride batteries.

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SINGLE BAND

Mfr	Alinco	Alinco	Alinco	Alinco	ICOM	ICOM	ICOM	Kenwood	Yaesu	Yaesu	Yaesu
Model	**DJ-V17T**	**DJ-V27T**	**DJ-V47T**	**DJ-175**	**ID-31**	**IC-V82**	**V-80**	**TH-K20A**	**FT-250R**	**FT-270R**	**FT-277R**
Bands	2 m	222 MHz	70 cm	2 m	70 cm	2 m	2 m	2 m	2m	2 m	70 cm
RX	130–174	216—250	410–470	136–174	420–470	138–174	136–174	136–174	136–174	136–174	420–470
Air	No	No	No	No	No	No	No	No	No	No	No
Memories	200	200	200	200	SD card	200	207	200	209	201	201
Alpha	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dual RX	No	No	No	No	No	No	No	No	No	No	No
Auto Repeater	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Illum. Keypad	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Clone	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Digital	—	—	—	—	D-STAR	D-S Opt	—	—	—	—	—
Ant. Connector	SMA	SMA	SMA	SMA	SMA	BNC	BNC	SMA	SMA	SMA	SMA
12 VDC	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes
DCS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Power Out	5 W	5 W	4.5 W	5 W	5 W	7 W	5.5W	5.5W	5 W	5 W	5 W
Audio	0.5 W	0.5 W	0.5 W	0.5 W	0.7 W	0.5 W	0.75 W	0.80 W	0.5 W	0.5 W	0.5 W
Battery Type	NiMH	NiMH	NiMH	NiMH	Li-Ion	Varies	Varies	Li-Ion	NiMH	NiMH	NiMH
Cost	$135	$159	$149	$99	$TBA	$149	$145	$150	$120	$130	$150
Weight	9.9 oz	9.9 oz	9.9 oz	8.7 oz	9.0 oz	14 oz	4.9 oz	12 oz	12 oz	14 oz	14 oz
H2O	Sub	Sub	Sub	Wea	Sub	Wea	Wea	Wea	Wea	Wea	Sub

Note: In the H_2O specifications, Sub = Submersible and Wea = Weatherproof.
Price listings are based on advertised prices as of press time and are subject to change. Please check with your dealer for updated pricing information.

"Another feature is high sound pressure—not quite the same as volume—delivering audio output clarity that is unmistakable. Just listen once to hear the difference the Kenwood audio makes," adds Parton.

TIP: *Turn off BS (Battery Saver)!* If you are planning on doing fast exchanges of radio traffic, battery saver turned ON may cause important syllables at the beginning of a message to be missed.

YAESU. Yaesu upgrades a pair of 2-meter HTs with the FT-250 and FT-270, each with 200 channels of memory, 5 watts of power out, and shipped with rechargeable NiMH batteries. The Yaesu FT-277R is the company's 70-cm model, upgraded with 5 watts of power output and 200 channels. Yaesu provides commercial-grade submersible construction for the FT-270R, and the compact -250R with top-mounted LCD is rated as waterproof.

TIP: *Antenna info*—The SMA connector is becoming more popular than the BNC connector. If you're going to hook up your handheld to an external antenna, be sure to order the spaghetti-thin adapter cable. This takes the pressure off the SMA or BNC antenna connector. Also, remember that most of the new Chinese radios take a *reverse* SMA.

CHINESE SINGLE-BANDERS. Single-band transceivers are popping up by the container load. Brands offered for sale by dealers in the U.S. include: Wouxun, TYT, Baofeng, Puxing, Yshon, Linton, Baojie, FDC, NKT, and Nanfone.

Each Chinese brand handheld will also carry a specific model number, and if it just has a V or a U in the model number, it is *only* a 2-meter *or* 70-cm transceiver. If you see a "VU" in the model number, it is a two-band transceiver with active audio on one band at a time.

At last year's Consumer Electronics Show (CES), we saw a lot of Chinese two-way radios ready for import. It was only a matter of time before the single-band and two-band HTs would arrive, sporting FCC Part 90 certification.

Part 90 radios—certified for public safety and commercial land-mobile use—are not permitted to have a keypad that end users could use to change frequencies. They also must land narrow-banded and must have no capabilities for internet software to expand the frequencies. The FCC is carefully monitoring this incoming equipment.

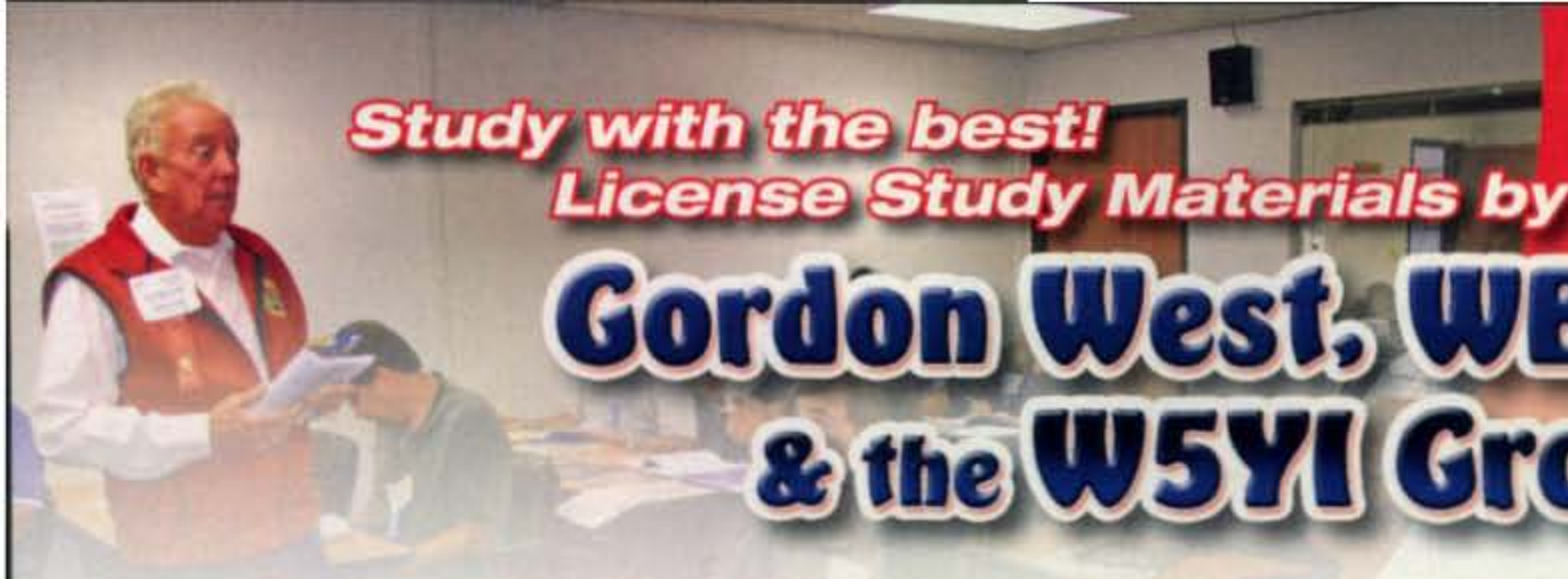
TIP: *FCC Certification*—FCC certification is not required for amateur gear operating under Part 97 of the FCC rules. However, most manufacturers design VHF/UHF gear for both the amateur and land-mobile markets, with only small differences among models. A rig with Part 90 certification provides a higher level of assurance that the amateur version also meets FCC technical standards.

Some incoming Chinese gear is specifically peaked for ham radio VHF and UHF bands, and frequencies outside of the ham bands are computer-transmit locked out. On the other hand, some equipment comes in wide open for transmit and receive nearly anywhere, and hopefully the USA importers will fine-tune the gear so the 2-meter band harmonics are well within the FCC rules. At the same time, we have seen several importers as well as dealers not only insist on clean operation on 2 meters and 440, but also load popular repeater channels and their associated CTCSS tones for specific regions of the country.

Local dealers selling a $50 Chinese single-bander might charge an additional $25 to get this equipment pre-loaded with open ham repeater channels, simplex, and weather station receive.

TIP: The knowledgeable ham operator working with new *CERT* communications volunteers could order inexpensive handhelds for the group, computer-program a master unit to clone for ham-licensed CERT members, and set it to the memory mode for a couple of simplex channels and a few repeater channels. This gets the new operators on the air for weekly nets and training exercises using their new ham radio systems. Some of these CERT volunteers may really turn on to ham radio and grow into satellite, APRS, and digital modes found in step-up gear. These inexpensive units, under $100, get them on the air as new hams.

Some Chinese HTs are shipped with 1500-mAh lithium ion battery packs and rapid chargers, 4 watts of clean (and sometimes not so clean) power out, narrow-band capability by rolling off the lows on transmit, very loud staccato speaker output, bright LED band indicators on two-band gear, and



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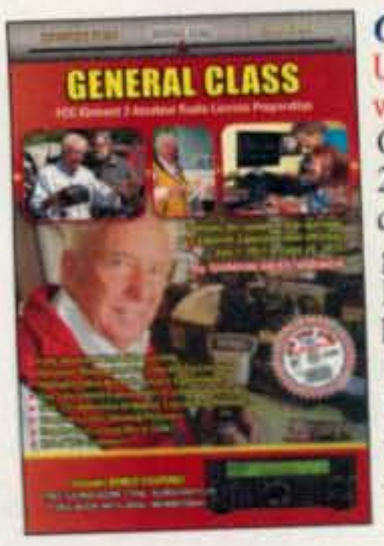

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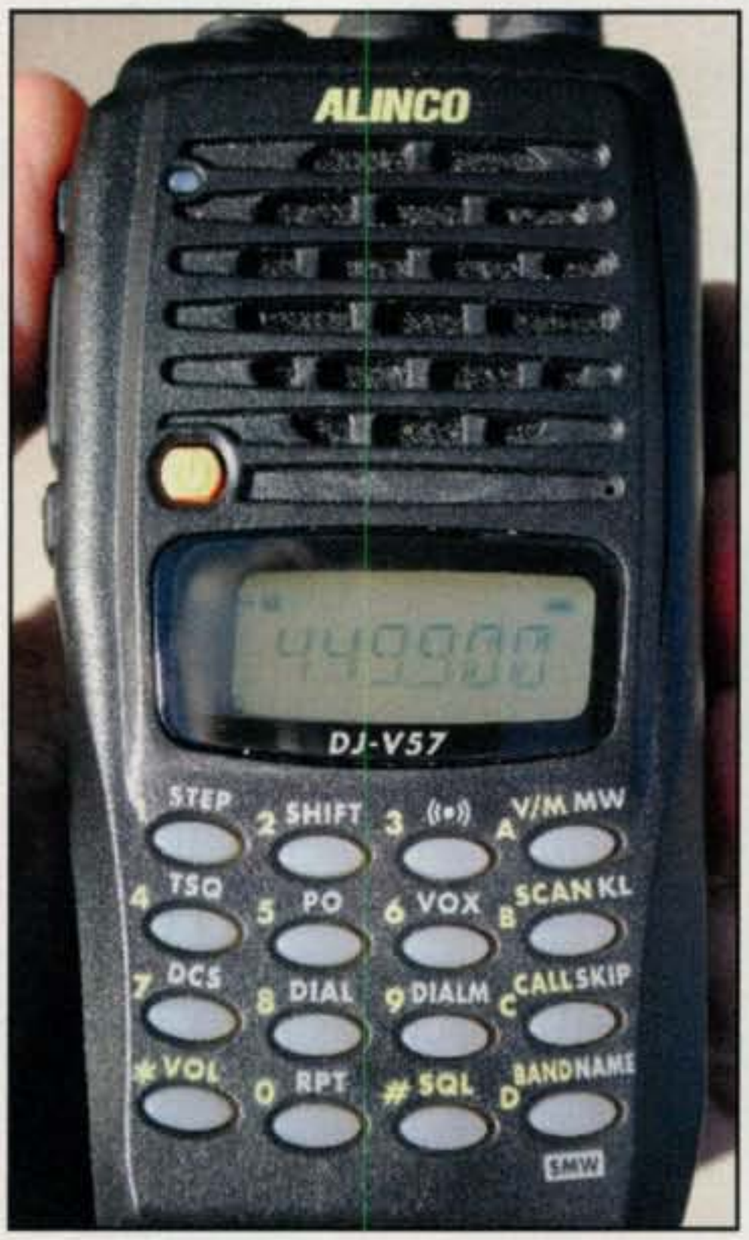
CO

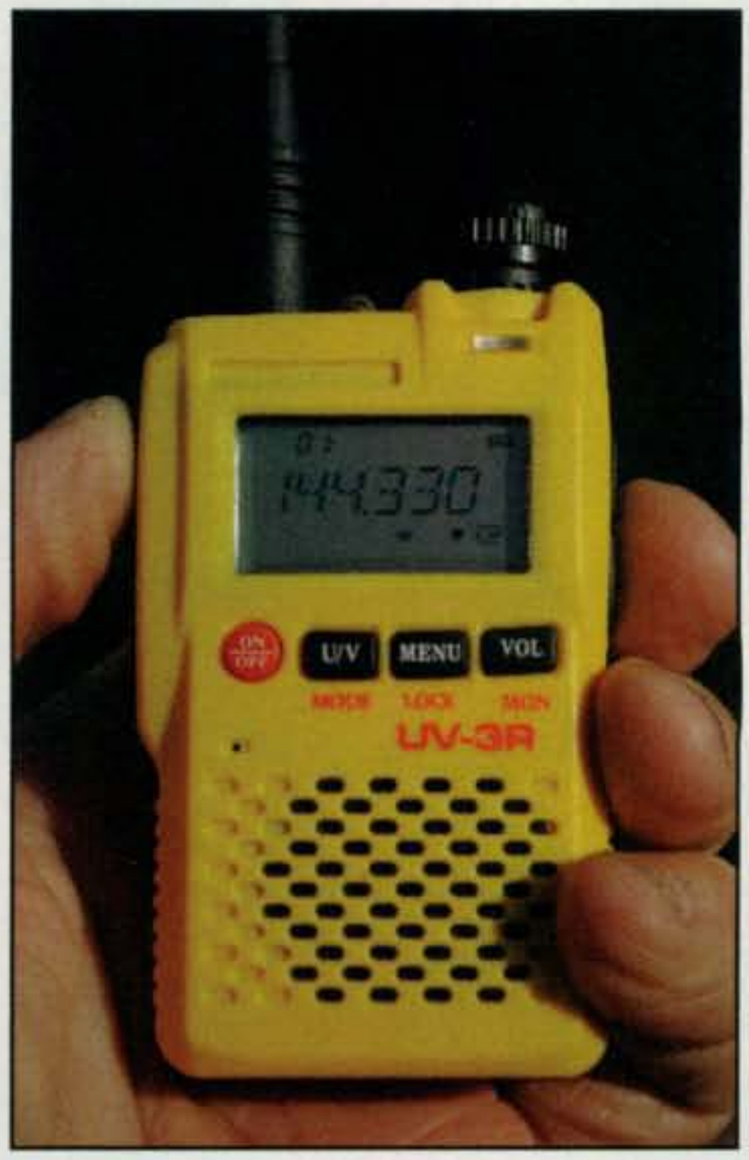
maybe even an LED flashlight as part of the package.

Everybody is getting in on this low-cost, low-profit, low-maintenance action. Once ham marketplace distribution settles in, and those selling the gear take steps to lock out speech inversion scramblers and out-of-band transmit, as well as spot checks for second harmonics on the 2-meter band and perhaps pre-loading local repeater frequencies, hams on a budget may find this new Chinese equipment only slightly less expensive than gear already here from Kenwood, Yaesu, ICOM, and Alinco.

Need repair on one of these low-cost handhelds? The seller may simply swap it (assuming you've bought it from a known, reputable dealer). Is it too time-consuming to program by hand? Yes, indeed, so best get the software, or work with a local who can clone some local channels. If you're looking for a single-band or two-band HT, you can program in the field. This may become paramount in your buying decision when selecting Made in Japan or Made in China.



New from Alinco is the two-band DJ-V57T, putting out 5 watts on both 2 meters and 70 centimeters.



The Baofeng UV-3R is one of many Chinese newcomers to the U.S. ham market. This rig covers 2 meters and 70 centimeters and sells for less than $100.

Two Bands and Dual Bands

Two meters and 70 centimeters are the two most popular ham bands in the world. The 2-meter band is a great place for the new operator to get started, and become familiar with his/her local club's repeater. The 440-MHz band (70 cm) is the most popular spot for EchoLink and IRLP repeaters. These repeaters may link into the internet, and a short "hello" with your callsign on the WIN System (www.winsystem.org) may tie you in simultaneously to 30 or 40 repeaters throughout the country and a few others around the world! The WIN system welcomes newcomers to try out IRLP. If you get hooked, and become a WIN regular, we hope you will contribute to the WIN System regular-user membership.

TIP: A handheld rated as *dual band* in this HT survey incorporates two running receivers with two or more display readouts. This allows for crossband full-duplex when working satellites, or cross-banding with an associated mobile unit. The true dualband HT may also include simultaneous monitoring of two separate channels within the same band (V/V, U/U).

A *two-band* HT can only receive one active band at a time. This is a great way to go if you're working a public-service event and don't need to worry about which band just asked for you by callsign! Scanning two separate bands squelched is two-band operation, *not* dual band.

Alphabetically, here is the latest from the manufacturers:

ALINCO continues to maintain stock of the credit-card-size, half-watt handheld, the DJ-C17. It even includes the FM music band, and ships with a 3.7-volt lithium ion battery. With 200 memory channels, this 4-ouncer is shirt-pocket ready!

The Alinco DJ-V57T is new to the company's two-band product line and boasts a large, 40-mm internal speaker for crisp, clean, and loud audio. It has 5 watts of power output, with 200 alphanumeric memory channels. Like many of the Alinco "V" series models, the new DJ-V57T two-bander is submersible for 30 minutes and offers separate encode and decode "split" for special repeater tone requirements. It also features an internal VOX (voice-operated switching), which works well with the accessory headset. It is priced about the same as the Alinco single-banders, so I bet this will be a hot seller for under $140.

Alinco continues to announce its plans for the DJ-G29T two-band transceiver with unique frequencies of 222 and 900 MHz. While there are several 222-MHz FM handhelds from other manufacturers, this may become a "cult" item for its added 902–928 MHz FM operation. It is sized much like Alinco's current G7 tribander, and Alinco tells me it has 5 watts output on 222 MHz and 2.5 watts on 902 MHz. It will ship with a lithium-ion battery and 100 channels of memory for your favorite repeaters.

TIP: Much-taller, flexible *accessory antennas* may help boost range and reduce repeater drop-outs. These flexible whips have a little rubber stopper at the tip end of the whip for eye protection. *Never, ever* use one of these thin whips without the eye protecting rubber tip in place!

BAOFENG. This company has the UV3R Mark II to offer, two bands plus the FM music band, 100 channels of memory, and shipped with a 1500-mAh lithium-ion battery with amazing prices seen from $60 to $75! It provides 2 watts power output and is small. Best get it computer-loaded with your local repeater channels and buy it from a source where you can be assured of spectral and harmonic rules compliance.

ICOM. The ICOM America T-70A is a two-band transceiver with 300+ memories that may also take alphanumerics. The audio out of this compact transceiver is over 700 mW, thanks to a bridge-tied load amplifier to greatly boost HT audio intelligibility when worn on your belt. (This unique amplifier circuit is found in several ICOM HTs.)

It ships with a nickel-metal-hydride battery and can take an optional lithium-ion battery as well as run on an optional AA alkaline battery case for emergency responders. This radio also contains its own built in VOX function to be used with a headset.

TIP: *Handheld headsets* are great for the EOC room and evacuation shelter. You will never miss a call and you can speak quietly into the boom mic. Only *you* hear the incoming audio. However, most of the microphone elements on the inexpensive headsets are overly sensitive, and most are *non*-noise canceling when you are working in a noisy environment. Also, some handheld transceivers now have built in VOX, and the supersensitive headset may lock up on transmit in a crowd and you won't even know it. Do not use an overly sensitive mic headset in a crowd without first checking audio transmit clarity with net control.

The IC-80AD is both a digital D-STAR-ready transceiver and a conventional FM handheld. It is also a scanner and shortwave receiver! 1052 memory channels will recall any great frequencies you may hear from the bottom of the AM broadcast band all the way through 999 MHz (cellular blocked). The shortwave is AM-only but sensitive enough to pick up time signals and some double-sideband commercial shortwave broadcasts. The optional GPS receive/speaker microphone simply plugs in, and the 80AD will point toward the direction of a received D-STAR station. It has plenty of accessories and is sized small enough that in the conventional FM mode you're not packing extra weight, even though digital D-STAR capabilities are built-in!

The IC-92AD is the big brother, offering full-duplex dual-band capabilities for working the FM satellites. This unit can also simultaneously receive two frequencies within the same band. Add the optional GPS microphone, and you'll never lose track of other D-STAR systems in your area. You can take it swimming, too; it's submersible! The -92 is ICOM's most elaborate true dual-band transceiver with full built in D-STAR functions.

KENWOOD. The Kenwood TH-D72A, with its built in GPS receiver, is instantly on the air with the Automatic Packet

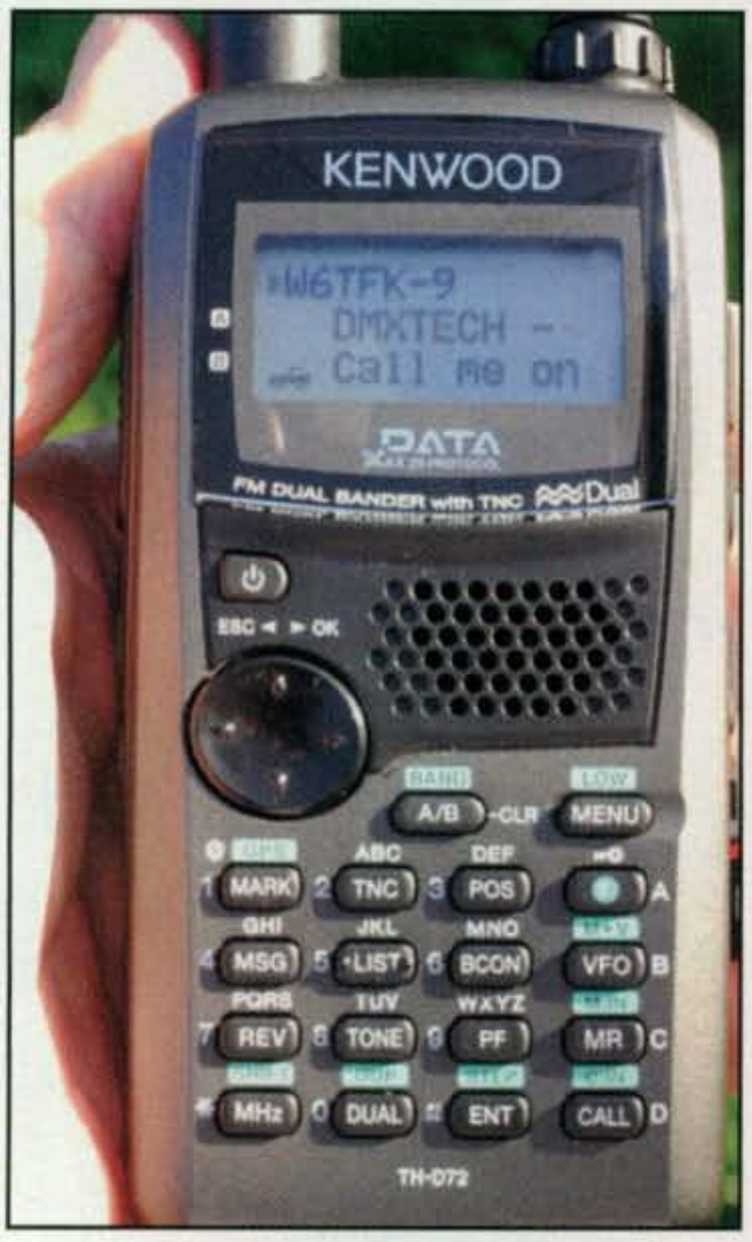
The IC-92AD is ICOM's top-of-the-line dual-band HT, with full-duplex capability for operating FM satellites, and D-STAR capability built in. You can also get an optional GPS microphone.

TWO BAND

Mfr	Alinco	Alinco	Alinco	Baofeng	ICOM	ICOM	ICOM	Kenwood	TYT	Wouxun	Yaesu	Yaesu	Yaesu
Model	**DJ-C7T**	**DJ-V57**	**DJ-G29**	**UV3R II**	**IC-T70A**	**IC-80AD**	**IC-92AD**	**TH-D72**	**UVF1A**	**UV-3D**	**FT-60R**	**VX-3R**	**VX-8GR**
Bands	2m/70cm	2m/70cm	222/902	2m/70cm	2m/70cm	2m/70cm	2m /70cm	2m /70cm	2m/70cm	2 m/70cm	2m/70cm	2m/70cm	2m/70cm
RX	78 -174	136-174	216-249	87-108	136-174	0.5-999	0.9-999	118-174	70-108	76-108	108-512	0.5-999	108-199
	380-511	400-511	902-928	136-174	400-479	—	—	320-524	136-174	136-174	700-999	—	420-470
				400-470	420-470	420-470	—	—	—				
Air	Yes	No	No	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Memories	200	200	100	100	392	1052	1304	1000	128	128	1000	1286	1300
Alpha	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dual RX	No	No	Yes	Sort of	No	No	Yes	Yes	Sort of	Sort of	No	No	Yes
Auto Repeater	No	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Illumi. Keypad	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Clone	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Digital	—	—	—	—	—	D-STAR, Opt GPS	D-STAR, Opt GPS	APRS/GPS	—	—	—	—	APRS/GPS
Ant, Connector	SMA	SMA	SMA	SMA	SMA	SMA	SMA	SMA	R SMA	R SMA	SMA	SMA	SMA
12 VDC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DCS	No	Yes	TBA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Power Levels	0.3 W	5.0 W	5/3 W	2 W	5.0 W	5.0W	5.0 W	5.0 W	5.0 W	5.0 W	5.0 W	3.0 W	5.0 W
Audio	0.2 W	0.5 W	0.6 W	0.3 W	0.7 W	0.6 W	0.7 W	0.7 W	0.6 W	0.9 W	0.6 W	0.4 W	0.3 W
Battery Type	Li-Ion	NiMH	Li-Ion	Li-Ion	NiMH	Li-Ion	Li-Ion	Li-Ion	Li-Ion	Li-Ion	NiMH	Li-Ion	Li-Ion
Cost	$149	$139	$TBA	$70	$239	$350	$579	$459	$99	$119	$149	$189	$349
Weight	3.2 oz	12 oz	14 oz	6 oz	13 oz	10 oz	11 oz	13 oz	9 oz	9 oz	13 oz	4.6 oz	9 oz
H_2O	Wea	Water	Wea	Wea	Wea	Water	Sub	Wea	Wea	Wea	Wea	Wea	Water

Note: In the H_2O specifications, Sub = Submersible and Wea = Weatherproof. Water = Waterproof.
Price listings are based on advertised prices as of press time and are subject to change. Please check with your dealer for updates pricing information. Water = Waterproof.
RSMA = Reverse SMA.

Reporting System (APRS). The Terminal Node Controller (TNC) uses the AX,25 protocol, providing full access to APRS mapping and position tracking on a laptop. Up to five targets can be tracked in real time. Tune in 144.390, and as soon as it detects an APRS data burst you will see all the details of the reporting station on the high-visibility LCD screen, including how fast it is moving, how far away it is, and, if it's a weather squawker, wind and temperature data as well. The D-72 simply plugs into the AVMap GPS navigation system and is a fun way to go mapping fox-hunting. The D72 will also control the Kenwood TS-2000 as an HF remote base using the Kenwood Sky Command feature. In addition, it is the only handheld that has a standard USB jack on the radio.



Kenwood's TH-D72 has GPS and APRS capabilities built in. It can also control a TS-2000 HF rig using Kenwood's Sky Command system.

The D-72 offers true dual-band operation, with two in-band receive capabilities, and is shipped with an 1800-mAh lithium-ion battery and the USB cable if you plan to tie it to your computer or iPad™.

TYT. The tiny Chinese TYT TH-UV F1A two-band transceiver ships with a 1500-mAh lithium-ion battery pack, 128 memory channels, and a healthy 700 mW of audio output.

WOUXUN. The most recognized two-band Chinese handheld is manufactured by Wouxun, model UV3 XX. the double x's standing for a myriad of models sold by various outlets in the USA.

Another new entry from China, the TYT TH-UVF1A packs two bands into a tiny footprint (handprint?) with a tiny pricetag to boot.

Also joining the U.S. ham market from China is Wouxun KG-UV3D, one of several two-band models from this manufacturer. The KG-UV3D has FCC Part 90 certification.

TIP: If you are outfitting your communications team with the new breed of low-cost *Chinese handhelds, make sure they get programmed before they get put into the field.* This includes memorizing the channels your team will most likely be using, establishing a second bank of popular channels for good net training, locking out out-of-band transmit, turning off VOX, and disabling (for good) scramblers.

For about $119 you get a two-band transceiver with VHF and UHF capabilities, plus, like the TYT, the Wouxun also allows for FM music reception from 76–108 MHz. The Wouxun ships with a 1700-mAh lithium-ion battery and the associated battery-charger cup. It comes in Part 90 compliant. Local dealers bring in the Wouxun peaked for dual-band ham radio use, plus they might also arrange for local clubs to acquire these in quantity, preprogrammed for the local open repeaters.

Remember, many of the incoming Chinese radios take a land mobile radio reverse SMA, so keep this in mind if you plan to run an external antenna on your vehicle.

TIP: *Break the Fall.* Many of us have done it—juggling a clipboard and a handheld, when the HT slides off and heads for the pavement below. Stick out your foot to break the fall of the radio and it may survive. Letting a handheld slam into the pavement, nose first, likely will break off the channel selector and/or the concentric volume/squelch knob in an instant. Try to have sturdy shoes when this happens, as your toes are also breakable!

YAESU continues with the FT-60R and its very small VX-3R. The 60R is a two-band handheld, professionally sized, with 1000-plus memories with alphanumerics. Not many handhelds tune in to the AM aircraft band, but this Yaesu *does*! The FT-60R is also easy to hand-program, its offsets are automatic, and the tone-code changing is done effortlessly. It then memorizes channels automatically to an open memory spot.

TIP: *Alphas or Frequency?* We need to know which frequency we are working. In an emergency, the communications IC (Incident Commander) may ask you to switch to 146.520, the national simplex channel. Can you get to it quickly? If your radio simply states "NAT SIM," do you know that is 146.520 MHz? Don't rely on alphanumerics if you don't know the associated frequency, or can get to the frequency with just a single button push.

MFJ-259B World's most popular Antenna Analyzer is super easy-to-use!

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Use as a signal source 1.8-170 MHz with digital dial accuracy for testing and alignment.

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Measure Inductance (uH) and Capacitance (pF) at RF frequencies not at audio frequencies used by most L/C meters.

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Velvet-smooth reduction drive tuning and precision *air-variable capacitor* makes setting frequency easy and stable.

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Cut *stubs and phasing lines accurately*
Check cable for loss and contamination
Find *value of unknown coils and caps*
Test RF transformers and baluns
Troubleshoot *filters and networks*
Find self-resonance and relative Q
Check *patterns and compare gain*
MFJ-259B does all this and more!

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MFJ-29C, $24.95. Tote your MFJ-259B anywhere with this *genuine* MFJ custom carrying case. Special foam-filled fabric cushions blows, deflects scrapes and protects knobs and meters from harm. **MFJ-39C, $24.95.** Like MFJ-29C, but for MFJ-269.

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MFJ-99, $60.85. ***Save $5!*** Like MFJ-99B, less batteries, for MFJ-259B. **MFJ-98, $60.85.** Like MFJ-99 but for MFJ-269.

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MFJ-269 ...1.8-170 MHz and 415-470 MHz plus 12-bit A/D!

The MFJ-269 does everything the MFJ-259B does - and much more!

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MFJ-269 adds UHF coverage from 415 to 470 MHz -- right up into the commercial band. With it, you can adjust UHF dipoles, verticals, Yagis, quads and repeater collinear arrays with ease -- plus construct accurate phasing harnesses and timed cables. Also use it as a signal source to check UHF duplexers, diplexers, IMD filters and antenna patterns.

Much Better Accuracy

New *12-bit* A/D converter gives much better accuracy and resolution than common 8-bit A/D converters -- *an MFJ-269 exclusive!*

Complex Impedance Analyzer

Read Complex Impedance (1.8 to 170 MHz)as series equivalent resistance and reactance (Rs+jXs) or as magnitude (Z) and phase (degrees). Also reads *parallel* equivalent resistance and reactance (Rp+jXp) -- *an MFJ-269 exclusive!*

MFJ-269
$389.95

CoaxCalculator™

Lets you calculate coax line length in feet given electrical degrees and vice versa for any frequency and any velocity factor -- *an MFJ-269 exclusive!*

Use any Characteristic Impedance

You can measure SWR and coax loss with *any* characteristic impedance (1.8 to 170 MHz) from 10 to over 600 Ohms, including 50, 51, 52, 53, 73, 75, 93, 95, 300, 450 Ohms -- *an MFJ-269 exclusive!*

Logarithmic Bar Graph

Has easy-to-read LCD *logarithmic* SWR bargraph and SWR meter for quick tuning.

Uses instrumentation grade N-connector to ensure minimum mismatch on all frequencies. Includes N to SO-239 adapter.

MFJ-269*PRO*™ Analyzer

Like MFJ-269, but has extended commercial frequency coverage in UHF range ***(430 to 520 MHz)*** and *ruggedized* cabinet that protects LCD display, knobs, meters and connectors from damage in the field/lab.

MFJ-269PRO
$419.95

MFJ-266 ...Wide range 1.5-185 MHz and 300-490 MHz!

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MFJ-266
$349.95

The compact MFJ-266 covers HF (1.5-65 MHz) in 6 bands, plus VHF (85-185 MHz) and UHF (300-490 MHz).

In *Antenna Analyzer* mode, you get Frequency, SWR, Complex Impedance (R+jX), and Impedance Magnitude (Z) *all displayed simultaneously* on a high-contrast backlighted LCD (SWR only on UHF).

In *Frequency-Counter* mode, the MFJ-266 functions as a 500-MHz counter with up to 100 Hz resolution and measures relative field strength of a signal and its frequency and can be used for tracking measurement interference.

MFJ-266 also functions as a 10 dBm signal source with digital-frequency readout. It can also measure inductance and capacitance at RF frequencies.

Features include solid-state band switching and electronic varicap tuning with a smooth 10:1 lockable vernier tuning drive.

Use eight AA *alkaline* batteries or 110 VAC with MFJ-1312D, $15.95. Includes N-to-SO-239 adapter. 3¾Wx6½Hx2¾D inches. 1.3 lbs.

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MFJ . . . The World Leader in Amateur Radio!

Yaesu's new VX-8GR (not to be confused with the VX-8DR) is a dual-bander with built-in GPS, plus 1300 memory channels.

The shirt-pocket-size Yaesu VX-3R remains popular because of its ability to transmit and receive on two bands, with nearly unlimited wide-band AM and FM reception from 500 kHz to 999 MHz. A super-thin 1000-mAh lithium-ion battery can run this radio for more than a day.

New from Yaesu is its line of APRS-ready radios, with the new dual-band, full-duplex VX-8GR featuring a built-in GPS receiver and antenna system.

Don't get confused: The VX-8**G**R is new, remembering the letter "G" for built-in GPS. The Yaesu VX-8**D**R, with four-band capability, needs the optional GPS antenna or optional GPS speaker-microphone to work APRS. The brand new 8GR, builds in everything for APRS. It also includes wide-band receive from 108-999 MHz, including wide band FM for music, AM for aeronautical and military, and FM with cellular blocked. The VX-8GR offers 1300 (!) memory channels, lithium-ion battery pack, nice loud audio output, and that fabulous LCD display which shows which APRS station is squawking on 144.390, bearing and distance to that station, and a simple way of listing all the parameters of that station, including speed, direction, and, for weather stations, everything except the nautical almanac!

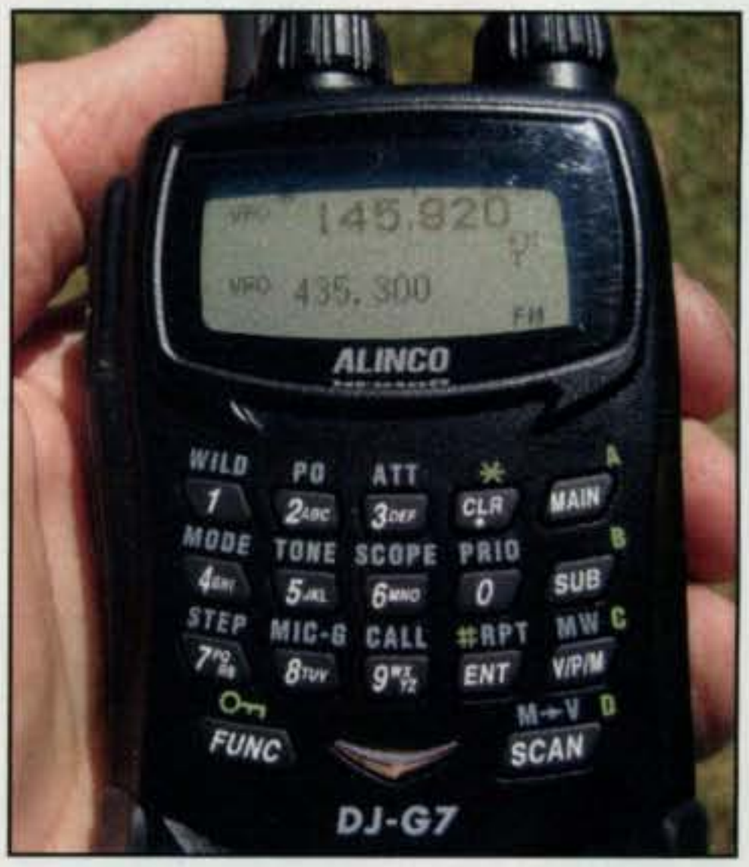
The GPS receiver is so sensitive that there is no problem with wearing it on your belt.

TIP: On the Kenwood, Yaesu, and ICOM portables that incorporate GPS, a *menu item* lets you turn off the GPS receiver when not actively using APRS. This will conserve battery power. When you *are* conducting a local event, such as working with a team of APRS-equipped operators covering a parade downtown, we suggest picking a *non*-voice UHF (*not* VHF) frequency so you don't tie up a local I-Gate with local city block radio traffic.

It is likely that 2012 will see an influx of more small two-band transceivers from China. None of these units is likely to have many of the step-up features that we have just reviewed. However, what is coming in from China should not be considered inferior in design. Explore carefully the China connection, validate your supplier, and if you plan to do the programming yourself for family and friends, or as a business, make sure you lock out full-band transmit.

Tri-Band

ALINCO offers the DJ-G7T tri-band handheld transceiver with full-duplex dual-band capability. The tri-band receiver covers 2 meters, 440 MHz, and the 1.2-GHz FM bands. It also tunes continuously from the bottom of the AM broadcast band through 1300 MHz. This full-spectrum tuning offers AM and FM reception but not single sideband.



Alinco's DJ-G7T covers 2 meters, 70 centimeters and 23 centimeters (1.2 GHz), plus a wide-band receiver ranging from the AM broadcast band through 1300 MHz (AM/FM only).

	Tri-Band			Quad Band		Digital			
Mfgr	**Alinco**	**Kenwood**	**Yaesu**	**Yaesu**	**Yaesu**	**ICOM**	**ICOM**	**ICOM**	**ICOM**
Model	**DJ-G7T**	**TH-F6A**	**VX-6R**	**VX-7RB**	**VX-8DR**	**IC-V82D**	**IC-80AD**	**IC-92AD**	**ID-31**
Bands	2m/70cm/1.2 GHz	2m/1.2m/70cm	2m/1.2m/70cm	6m/2m/1.2m/70 cm	6m/2m/1.2m/70cm	2m	2m/70cm	2m/70cm	70 cm
RX	0.5 – 1300	0.1-1300 +SSB	0.5 -999	0.5 - 999	0.5 – 999	138 -174	0.5 - 999	0.5 - 999	420 -470
Air	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No
Memories	1000	435	900	900	1003	200	1052	1304	SD card
Alpha	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dual RX	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Auto Repeater	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Illuminated Keypad	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Clone	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Digital	—	—	—	—	APRS, Opt GPS	Opt D-STAR	D-STAR, Opt GPS	D-STAR, Opt GPS	D-STAR, GPS
Antenna Connector	SMA	SMA	SMA	SMA	SMA	BNC	SMA	SMA	SMA
12 VDC	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
DCS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Power Levels	5/5/1 W	5 All	5/1.5/5W	5/5/0.3/5W	5/5/0.5/5 W	7 W	5 W	5 W	5 W
Audio	0.5 W	0.5 W	0.6W	0.5W	0.6 W	0.7 W	0.7 W	0.7 W	0.7 W
Battery Type	Li-Ion	Li-Ion	Li-Ion	Li-Ion	Li-Ion	Ni-Cd	Li-Ion	Li-Ion	Li-Ion
Cost	$279	$304	$259	$349	$399	$350	$434	$529	TBA
Weight	9 oz	8.8 oz	9.5 oz	9.2 oz	8.5 oz	14 oz	9 oz	9 oz	9 oz
H2O	Wea	Wea	Sub	Sub	Sub	Wea	Wea	Sub	Sub

Note: In the H_2O specifications, Sub = Submersible and Wea = Weatherproof.
Price listings are based on advertised prices as of press time and are subject to change. Please check with your dealer for updates pricing information.

The keypad is backlit, and the unit may hold 1000 channels, displaying your choice of frequency or alphanumerics. Power output is the customary 5 watts on 2 meters, 4 1/2 watts on the 440 band, and 1 watt up at 1.2 GHz. The DJ-G7 ships with a 1200-mAh lithium-ion battery, and the associated battery cup for a quick charge.

It is a great performer to run full duplex on an FM easy satellite. The built-in duplexer does a nice job of avoiding desensitizing during the other band's transmit. We used the G7 at the ham radio booth at our local county fair, and it worked satellites quite nicely.

TIP: *External Power.* Use only the manufacturer-recommended DC power cord when operating your handheld from a 12-volt power source. The brand-name accessory cords usually incorporate a series alternator filter to minimize alternator whine on transmit. Some power cords also step down 12 volts to a lower voltage required for DC operation. Using an aftermarket DC plug that just happens to fit could instantly toast your new investment. Stick with the brand name recommended for your specific handheld.

KENWOOD continues with its popular tri-band TH-F6A. It covers the 2-meter band, the 222-MHz band, and the 440-MHz band for transceive. Plus, it offers multimode reception from 100 kHz to 1300 MHz! That's right, the little Kenwood can act as a dandy high-frequency SSB/CW receiver when you are out mobile and just want to check the bands.

The high-frequency SSB receive side of this radio does better on a small antenna than trying to hook it up to your home antenna, which can cause significant overload.

The popular Kenwood TH-F6A covers the 222-MHz band as well as 2 meters and 70 centimeters, with broadband receive (including CW/SSB) from 100 kHz to 1300 MHz.

The Kenwood F-6 is full duplex, and it's a great unit to work the FM satellites where you can actually hear your own downlink signal. A really good headset is available for the satellite setup, and with it you won't get feedback. You can set up and memorize the satellite channels to compensate for Doppler shift, with over 400 channels open for memorizing favorite frequencies. For its small size, the supplied 2000-mAh lithium battery pack will keep this rig running for days!

The F-6 has 5 watts output on all three bands, including the 222-MHz band. The receiver is all-mode, including AM, FM, NFM, SSB, and CW. For AM broadcast radio reception, the Kenwood F-6 includes a built-in ferrite bar antenna.

TIP: *Lithium-ion Reigns.* Although a lithium-ion battery pack requires its own special charging, it offers nearly double battery capacity than older-chemistry nickel cadmium and nickel metal hydride. You must charge your lithium ion battery *only* with the recommended handheld transceiver's charging cable.

The tri-bander from **YAESU** is called the VX-6R, and it includes the 2-meter band, 1.5 watts of power on 222 MHz, and 5 watts on the 440 band. You can even add the optional barometric-pressure sensor to make sure you don't get caught out in the open when a low- pressure system blows in. The VX-6R holds 900 frequencies with alphanumeric capability, is completely submersible for the emergency responder, and ships with a 1500-mAh lithium-ion battery pack. It will tune in shortwave from the bottom of the AM broadcast band through 1000 MHz, double sideband AM and FM.

Quad Band

YAESU continues with its VX-7RB submersible quad-band transceiver with 5 watts out on 6 meters FM, 2 meters, and 440 MHz, and about a quarter watt out on the 222-MHz band. This quad-bander also offers full AM shortwave receive from 500 kHz to 1000 MHz, holding over 900 memory channels. It is fully submersible, if you plan to take it swimming. By the way, the VHF marine band is preprogrammed for receive, as well as preprogrammed for weather channels and 89 shortwave broadcast channels. It's one amazing little radio!

Another quad-bander from Yaesu is the VX-8DR portable APRS-capable transceiver, working on 6 meters, 2 meters, 222 MHz (1 1/2 watts out), and 440 MHz. The wideband receiver covers from the AM broadcast band through 999 MHz with 1200 memory channels! The VX-8DR has a built-in terminal node controller, so it is ready for you to purchase the GPS receiver antenna, or the GPS receiver antenna tied in to the plug-in external microphone. Full dual-band monitoring, including same-band-receive on both sides of the radio, is included.

Yaesu has the only quad-band HTs on the market today, the VX-7R and the VX-8DR (pictured). Both cover 6 and 2 meters, plus 222 and 440 MHz. The VX-8DR has a built-in TNC for APRS, and an optional GPS receiver is available.

This equipment features smart beaconing for APRS operation, 50 APRS station list memories, and 30 message memories. You can add the GPS function when you upgrade the equipment with a GPS antenna receiver system. The radio is well-proven in the field and is a favorite among emergency volunteer responders, because the GPS antenna receiver unit on an external mic can be placed up high on your shoulder for best GPS capture.

Digital

ICOM America is the star when it comes to *Digital Smart Technologies for Amateur Radio*, better known as *D-STAR*. The digital signaling D-STAR is not proprietary to ICOM, but only ICOM has pioneered this technology to access the internet from a ham radio. With D-STAR you can communicate with another ham in another city, coun-

ty, or state with a direct call-up to his/her radio. Your can text-message, know the callsign of the station calling you, and operate through gateways allowing the linking of D-STAR repeater sites over the internet. You can even work it in a foreign country.

Keyboard-to-keyboard text messaging plus GPS asset tracking can take place with D-RATS software.

TIP: Get started with digital *D-STAR* operation with a local D-STAR user. You can try it on your own, but local D-STAR users can help you avoid pitfalls. "Beaconing your position every minute through your local D-STAR repeater will very soon make you highly UNpopular with system users," comments Brian Roode, NJ6N, an active D-STAR "Elmer." "We recommend only sending your position report automatically along with your normal voice transmission," adds NJ6N.

For fun D-STAR voice net operation, I suggest that new D-STAR operators connect to Reflector 1, Module C, or Reflector 14, Module C. You can even monitor D-STAR activity without a radio! (See: <http:// www.wx4adx.com> and <www.radioreference.com/apps/audio/?feedId=9968>.) You can also e-mail Tim Barrett, K6BIV, at <k6biv@mac.com> for some quick D-STAR questions.

ICOM owns the D-STAR digital market in the U.S. and its newest entry is the single-band (2 meters) ID-31, which features built-in GPS and the ability to auto-load nearby D-STAR repeaters based on your location.

ICOM America offers four D-STAR handhelds, plus mobiles, base stations, and repeaters. The handhelds include the IC-V82, IC-80AD, IC-92AD, and, brand new, the ID-31. All operate traditional FM as well as D-STAR.

The V82 is a good utility D-STAR radio. It is perfect for mobilization where

The IC-80AD two-band transceiver operates D-STAR and conventional FM (like all of ICOM's other D-STAR radios). With the optional GPS mic installed, the display will point in the direction from which a D-STAR signal is arriving.

D-STAR is used simplex or on local repeaters.

The 80AD is more advanced and has an entry-level GPS/mic user interface with simple numerical latitude and longitude readouts.

The 92AD is the most advanced D-STAR handheld transceiver with the GPS/mic user interface, including a compass rose indication that can show direction and distance to a received transmission.

Each of these radios can show an alpha or frequency display, with the "92AD" including *both* alpha and frequency display!

Brand new is the ICOM ID-31, UHF (only) 5-watt D-STAR transceiver with GPS *built in.* (See details under single-banders.)

Both ICOM America and ICOM Japan have been most generous in working with organizations expanding the D-STAR repeater network into the internet.

In Closing

If you are new to ham radio, find a local club and see which radios its members are supporting. Does the club do cloning and programming before its meetings? Local amateur clubs are often associated around a specific repeater, so join in and, most importantly, support both the club and the repeater with a modest membership contribution. This will help make that new handheld an important investment in case of an emergency.

Use that handheld radio regularly. Can you work it in the dark? When an emergency hits, you'll need to find that handheld and come up quickly and automatically on your local repeater or simplex frequency. Support your local net with regular weekly check-ins. This makes you a "regular," someone to be counted on when an emergency really exists.

TIP: When operating your handheld in a vehicle, use an external magnetic antenna, and pick up 12 volts to conserve the HT battery. Next, switch to low or medium power—*never* high power. High power causes the HT to get hot, and if you are mobile using an external microphone, you could actually toast your favorite seat cover!

And finally, get your handheld from a reputable dealer who will back up the sale with service. The little HTs don't normally break, but if you need one fixed or replaced, you want that dealer to be there for you and your handheld!

For more information:

To learn more about any of these radios, visit your favorite ham dealer or the following manufacturer websites:

Alinco: <www.alinco.com/usa.html>
Baofeng: <http://powerphone.com.cn/indexn.asp>
USA: <www.hawaiiradiosales.com>
ICOM America: <www.icomamerica.com>
Kenwood: <www.kenwoodusa.com>
TYT: <www.tyt.us>
Wouxun: <www.wouxun.com>
USA: <www.powerwerx.com>, <http://wouxun.us>
Yaesu: <www.yaesu.com>

The New Yorker Hotel in midtown Manhattan was inventor Nikola Tesla's home for the last ten years of his life. (W2VU photos unless noted)

Ever heard of Wardenclyffe? Probably not. Nikola Tesla? Probably, but only because you're a ham. Here's a story about an effort by several dozen hams in four cities and two countries to focus a spotlight on efforts to save and restore Tesla's last laboratory, and how you can help.

TeslaGRAM

A Multinational Special Event for a Nearly Forgotten Laboratory

BY RICH MOSESON,* W2VU

Thomas Edison's laboratory in New Jersey is a national historic park. The tower for Edwin H. Armstrong's first FM radio transmitter (also in New Jersey) is protected as part of Palisades Interstate Park. Guglielmo Marconi has a national historic park in Canada and a state historic site in California. Nikola Tesla's laboratory in Shoreham, New York, is a vacant building on a fenced-off property, dormant since owner Agfa-Gevaert stopped manufacturing activities there in 1987. But there is an effort under way to turn the building into a science museum and that's where ham radio is playing a role.

Nikola Tesla is perhaps the least appreciated of the technological pioneers who are responsible for the way of life enjoyed by most of the world today, from his development of alternating current (AC) for generating and distributing electrical power to his many contributions to early radio. (We'll leave the question of who "invented" radio for another forum at another time.)

*Editor, CQ
e-mail: <w2vu@cq-amateur-radio.com>

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- 1052 Alphanumeric Memory Channels
- Li-ion Battery
- Free Programming Software[†]

[†] *www.icomamerica.com/amateur/DSTAR for details about free software*

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*Frequency specs may vary. Refer to owner's manual for exact frequency specs.

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The hotel's 38th-floor balcony provided an unobstructed view to the west, a key element for planned satellite contacts.

Born in what is now Serbia in 1856, Tesla came to the United States in 1884 and did most of his work here. His biggest and most grandiose laboratory was built on a 200-acre estate in eastern Long Island, which he named Wardenclyffe. It was here that he planned a massive radio transmitting facility through which he envisioned transmitting communications—and electric power—through the air to the rest of the world. It was that last part of the equation that prompted Tesla's main financial sponsor, George Westinghouse, to withdraw his support, famously asking, "Where will we put the meter?"

Today, an organization known as the Tesla Science Center at Wardenclyffe is spearheading efforts to purchase and restore the now-abandoned laboratory and make it home to a new science center. One of its activities has been the sponsorship of periodic *Tesla Conferences*, the most recent of which was held this past November 5. One component of this conference was *TeslaGRAM*, a multi-station special event on the ham bands.

Dave Clausen, W2VV, attempts a satellite QSO while Bill Ward, KD4ISF, provides coordinates and Chuck Pettis, W7AUM, watches and listens.

TeslaGRAM

The story of *TeslaGRAM* is one of typical ham radio cooperation and assistance, and grew from a simple idea by a visiting ham to help publicize the efforts to build a science center at Wardenclyffe. Hamilton Carter, KDØFNR, is a graduate student at New Mexico State University doing research at Brookhaven National Laboratory in eastern Long Island. A longtime Tesla fan, Carter was delighted to discover Wardenclyffe just a few miles from where he is living with his wife and young daughter. When he heard about the Tesla Conference, Carter came up with the idea of trying to run a special event station from the lab site. Only problem was that he'd never done anything like that before and didn't know where to start. That problem was solved with a chance CW contact with Dick Pav, K2RFP, who lived nearby.

Dick told Hamilton that November 5th was also the date that his radio club, the Radio Central Amateur Radio Club, was planning a special event station to commemorate the 90th anniversary of the opening of Marconi's (later RCA's) transmitting station at Rocky Point, New York, also on Long Island. Dick invited Hamilton to the next club meeting, where he got not only help in organizing the special event station but offers of equipment for use as well. Next, Hamilton went to the leadership of the science center group with the proposal. They not only supported the idea but proposed making it even bigger, suggesting that he try to set up several special event stations at various significant sites in Tesla's life and career.

Reaching Out Around the World

The science center folks suggested three locations—Serbia, where Tesla was born; Colorado Springs, Colorado, where he'd built a prototype of his lab at Wardenclyffe; and New York City, where the inventor lived and worked for many years.

Carter already had some engineering contacts in Serbia. He asked them for help and one promptly put him in touch with Vladimir Jelenkovic, the director of the Tesla Museum in Belgrade. Jelenkovic reached out to the Academic

Alain De Carolis, WW3WW, logs on his computer while Chuck Pettis, W7AUM, makes contacts on 20 meters as N34.

Radio-Club Mihajlo Pupin, YU1EXY, and other Belgrade hams, who arranged to put YUflTESLA on the air from the museum on November 5.

For New York City, Carter recalled reading an article by Diana Eng, KC2UHB, about operating a portable satellite station from Central Park. Even though he'd never met Diana, he sent her an e-mail and she responded enthusiastically. But neither Diana nor her friends from the NYC Resistor maker group had access to any Tesla-related locations in Manhattan. The Tesla Science Center board came to the rescue here, putting Hamilton in touch with Joe Kinney, the building engineer for the New Yorker Hotel in midtown Manhattan, where Tesla had lived from 1933 until his death in 1943. It turns out that Joe is a former ham as well as a Tesla fan, and was also enthusiastic about the idea. He arranged for Diana and friends (including this author) to operate from the balcony of a "decommissioned" room on the hotel's 38th floor. (He also gave them a tour of Tesla's old room and Tesla-era electrical equipment that is still in the hotel basement!)

The balcony has an unobstructed view to the west (particularly important since a satellite station was slated to be the highlight of the operation there) and the building itself served as a relatively effective shield for all of the RF generated all around it (the New Yorker is only a few blocks west of the Empire State Building, which houses all of New York City's television transmitters as well as many FM broadcast and other radio transmitters). Diana and the NYC Resistor crew arranged for the special event callsign N3Y for the operation. Hamilton requested and received W3T for his operation at the Tesla lab at Wardenclyffe.

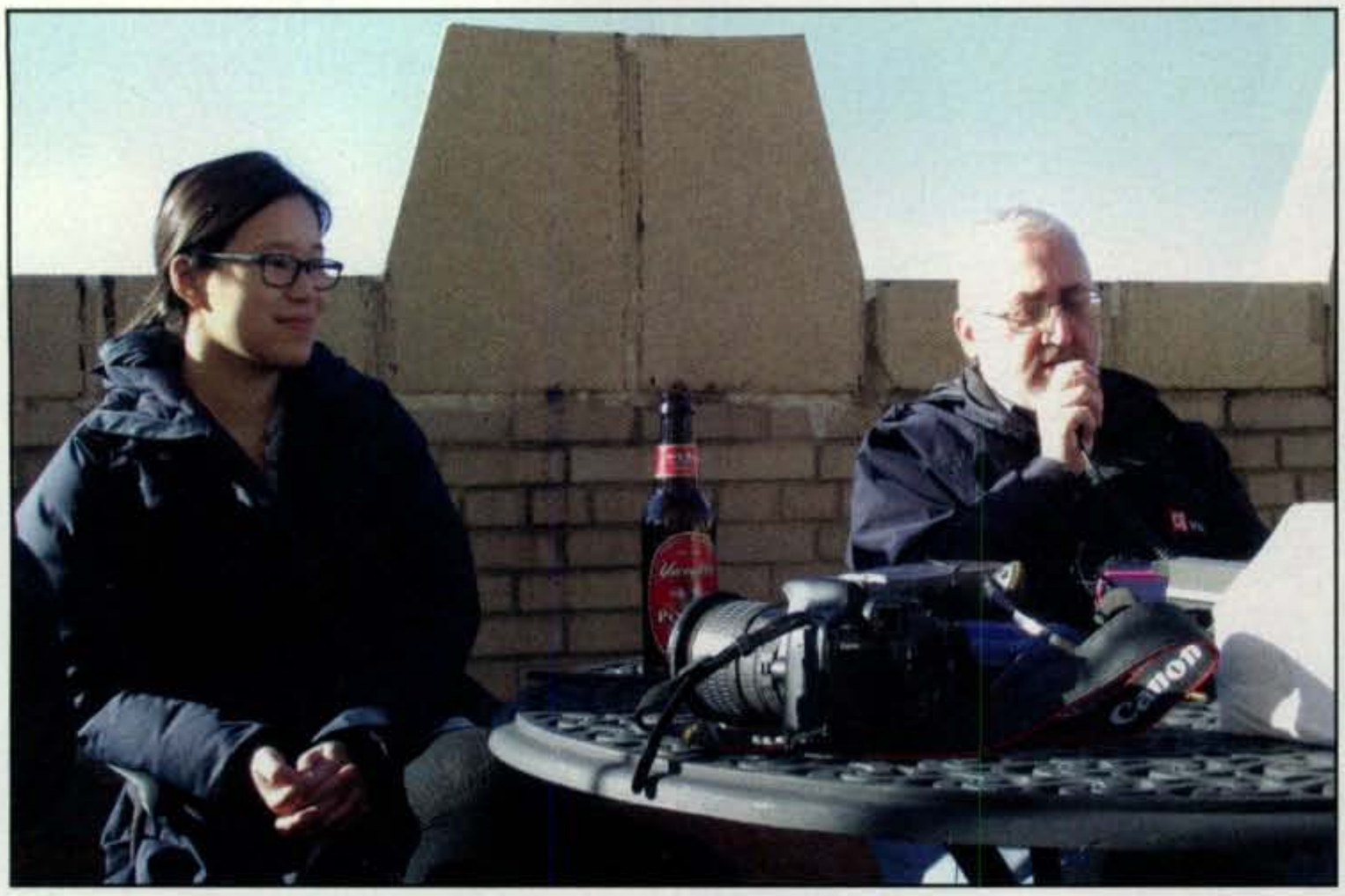
Next, Carter reached out to some hams in Colorado Springs. They also responded with a "yes," but too late to arrange for a special event call. Eight Colorado hams each operated under their own call signs. In addition, QSL cards were designed by Jeff Murray, K1NSS, who draws the ham radio comic "Dashtoons" (www.dashtoons.com) and was also an operator at W3T.

Related Operations

It turned out that two other special event stations honoring major events in radio history were also planned for the same day—the RCA station 90th anniversary mentioned above and the 76th anniversary of the first FM transmission in Yonkers, New York by experimental station W2XAG. The Yonkers Amateur Radio and Computer KidZ Club today holds that call and was planning, along with the Yonkers Police Athletic League Amateur Radio Club, to activate it on November 5 as well. The Yonkers folks joined forces with Carter and became part of the broader Tesla operation.

On the Air

This author had the opportunity to join the N3Y operation at the New Yorker, where we put two HF stations, a satel-



Diana Eng, KC2UHB, listens in while author W2VU makes a contact on 10 meters. (W2VV photo)

lite station and an APRS beacon on the air (more about this operation in a future article). The station made over 60 contacts on HF as well as six by satellite (AO-51). We had about a dozen operators there, a mix of new and experienced hams and a mix of ages as well, with the majority being younger (30-something) hams.

At Wardenclyffe, the W3T folks made over 100 QSOs on 30 and 15 meters, clustered in the US, Canada and Europe. As of this writing, summaries had not yet been received from YU0TESLA or the Colorado Springs stations. Updated information should be available online at KD0FNR's website, <http://copaseticflows.appspot.com/teslaevent>.

Sales Pitch

Since the main purpose of this event (other than an excuse to play radio from interesting locations for a day) was to raise awareness and - indirectly - funds for the possible acquisition and restoration of Wardenclyffe to use as a science center, I got in touch with Tesla Science Center Board President Jane Alcorn and asked her how much money they were trying to raise.

"The cost for purchasing the property is about $1.2 million," she replied. "We anticipate that the whole project, including gutting and restoring the buildings and grounds will take us into the $10+ million range."

Alcorn said the primary focus now is on acquiring the property, since large-scale fund-raising from charitable foundations, etc. will be more effective once the group has ownership. "We believe that once we have acquired the site, we will be eligible for a variety of grants from both the government and from private sources," she said, adding that a large grant has been promised by New York State … but only after the property has been purchased.

Right now, Alcorn concluded, "we are trying to get support via individuals. Many contributions of small amounts will add up, if we get enough of them."

If you would like to support this effort, U.S.-tax-deductible donations may be made via PayPal (go to <http://www.teslasciencecenter.org/> for details), or checks may be made out to and sent to: Tesla Science Center at Wardenclyffe, P.O. Box 552, Shoreham, NY 11786.

Observations and Conclusions

If you listen to chit-chat on repeaters or on 75 meters, read the postings on ham websites or read a lot of my mail, you would be convinced that there are no more young hams, and that those who have managed to sneak in unnoticed really don't know anything and don't want to know anything. I wish all of those people making these comments had had the opportunity to join me out on the balcony of the New Yorker on November 5. My overwhelming impression was that this reminded me tremendously of events and activities I'd gone to 20 years ago, when I was a 30-something ham—both younger and older hams, new and more experienced hams, learning from each other, trying new things, *doing* ham radio, having fun. It was nice that we managed to make some contacts and bring other hams into the fun of the event with us, but even if we hadn't, the worldwide ham camaraderie that makes this hobby so special was there in full force. Congratulations to KD0FNR for making his first effort at a special event station a multistation, multinational, success. I am proud to have been a part of it.

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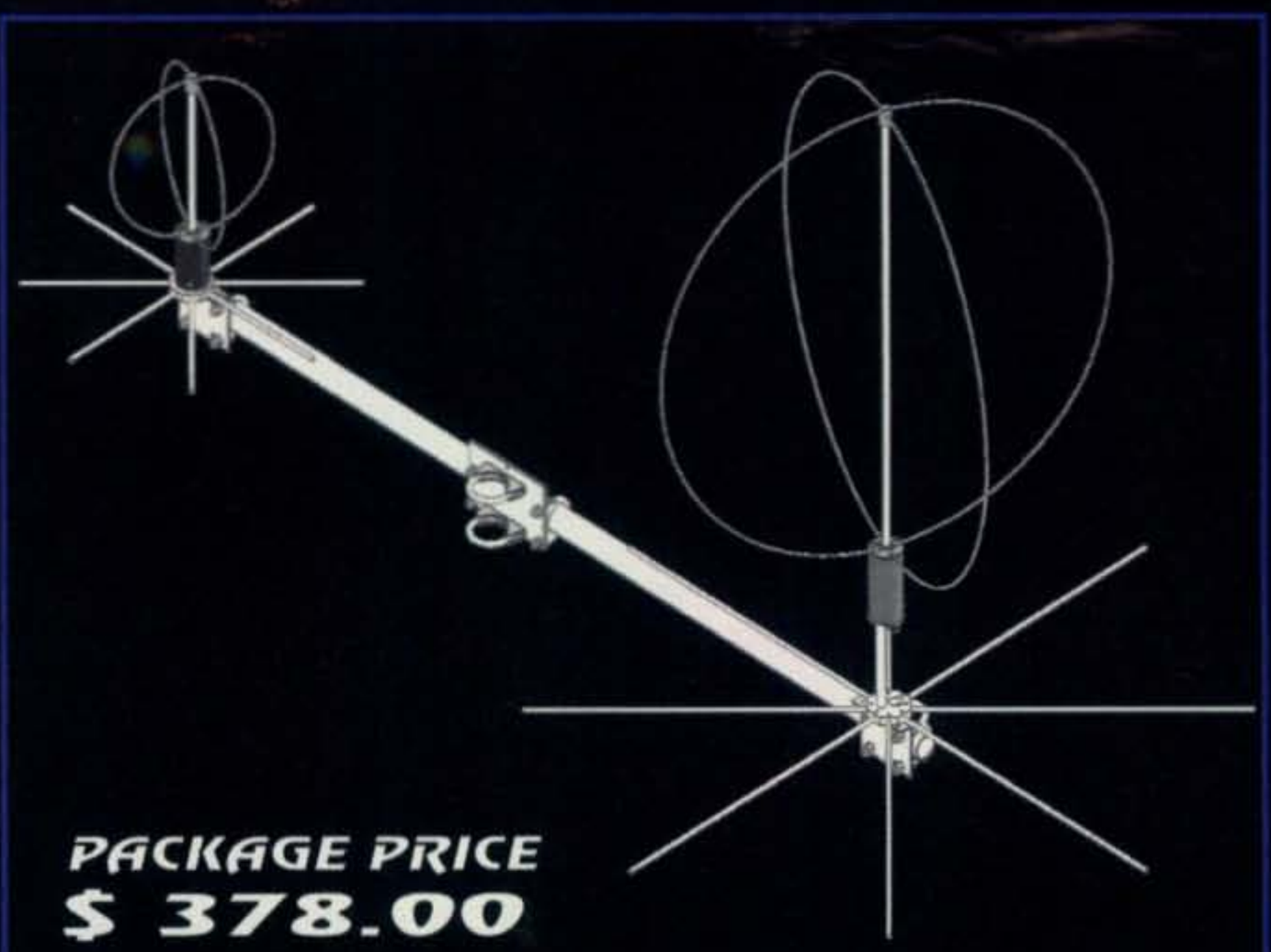

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Results of the 2011 CQ WW VHF Contest

BY JOHN LINDHOLM, * W1XX

"The important thing in life is not the triumph but the struggle. The essential thing is not to have conquered but to have fought well."

Pierre de Coubertin, founder of the modern Olympics (TNX PJ2BVU)

Prof. Olaf Pikisilmä has outdone himself! The inventor of the web-based LingonBerry, which reports VHF contest results, has now gone one step further with his ground-breaking vPad (see fig. 1). The vPad reads all VHF contest signals in real time and instantaneously determines if CFM (*C*ontact *F*orwarding *M*ode) is warranted. The heart of the system is VAC (*V*HF *A*ctivity in *C*ontests), which literally sucks a sample of all contest RF out of the ether worldwide for processing. The results of the contest are known to the vPad owner as the contest progresses in real time with the final results available just 3830 nanoseconds after the completion of the contest at 2100Z. VAC is located on a floating ice island and was last seen near former DXCC country Wrangel Island in LOC AQ10zz. Thus far the system is both date and frequency sensitive—restricted to 50 and 144 MHz and the third weekend in July.

At the fall meeting the Contest Quahogs of Rhode Island (CQRI) were the first to see the prototype of this remarkable device operating in RE-PLAY mode. Here are the CHAT results as summarized by "The Old Timer."

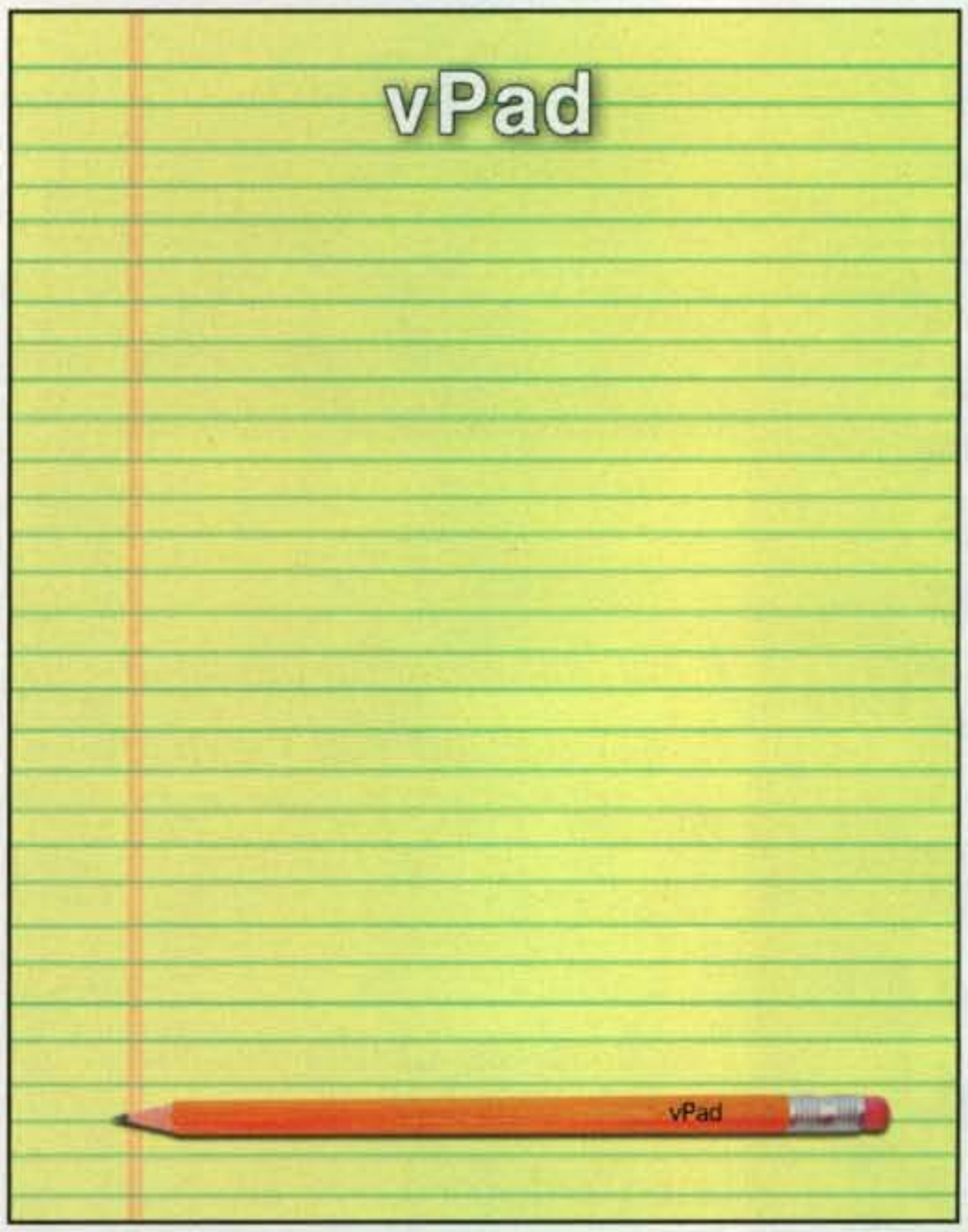

Fig.1 – For security reasons, the vPad is cleverly disguised as an ordinary yellow notepad. The pencil is really the START button, which upon activation reveals the LED backlit pale-yellow touch screen. The options are SCORES, CHAT, or PROP available in real time or playback.

Propagation Conditions

Chats about propagation conditions always predominate, with rover station *W3DHJ* coming up with the most graphic: "Saturday was a sack of rocks!" But Jonesy finished on a positive note with: "The best two hours of 6-meter *E*-skip thankfully occurred while I was in DM87." Multi-op *K2LIM* noted the same in the east with: "Band conditions were poor for the first part of the contest but 6 meters opened to the southeast USA, Caribbean, and South America about four hours before the end of the contest." Meanwhile, *TI4KD* "chanced propagation and went to rare grid EK80 with fingers crossed and *finally* got some decent openings to the U.S." Europe was no exception, as *IT9VDQ* noted, "poor propagation until Sunday around 1300Z and then—after several good QSOs—I was called by two JAs. Great!"

Newbies

First timers to CQ VHF are always a boon to activity: "This was my first CQ WW VHF contest. I worked it from FN21 while on vacation using a 3-element 2-meter homebrew beam and 6-meter Par stressed Moxon on a painter's pole."—*K1PRO*. Likewise *KJ4WLH*: "First contest ever!" And rover *N8VUR*: "First time working a VHF contest. Will do it again." In Europe, *SV1DJG/P* "entered a VHF contest for the first time to get the feeling and experience of the magic of 6 meters. Running 3 watts to a 2-element HB9CV antenna was tough but very exciting." Rookie operator *WA7KVC* "had great fun operating from a scenic hilltop in eastern Washington state on 2 meters." Next year he'll "add a 6-meter antenna to keep a lot busier."

Some Score Highlights by K9AKS

While some of the more technologically savvy Contest Quahogs continued to play with the vPad, the club was treated to a score analysis focusing on contest records by contest historian Curt Roseman, K9AKS. The Old Timer took notes, shared here with *CQ:*

In 2011, 6-meter only operators were treated to very good conditions in many areas of the world. E70T broke the all-time record for Europe with 73K points, while TA7OM broke the Asian record with 87K. Their grid multiplier totals of 196 and 185, respectively, easily surpassed the previous Europe/Asian of 154. Big news on the Magic Band was also made in Central America and the Caribbean with six of the top seven all-time high scores attained

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this year, led by VP5CW (W5CW) and XE2N, each making over 400 QSOs.

The all-band (A) category this year saw some very good scores on both sides of the Atlantic. UT8IO attained the 4th highest score ever in Europe at 37K, and four of the ten all-time high scores in Europe were posted this year. K2DRH from Illinois again trounced all U.S. scorers with 167K points. Bob once again led the U.S. in 2-meter QSOs with 169. Elsewhere, NR5M broke the record for the 5th call area and KG6IYN did the same in 6-land. All-band activity was significant in Canada, where 5 of the 15 all-time high scores were posted in 2011; and they came from disparate locations: BC, SK, ON, NB, and NS.

The highest European multi-op (M) scores also came out of Ukraine, with UT1I's 185K total the third highest ever in Europe. T48K in Cuba marked the highest multi-op score ever in the Caribbean with 32K points. K5QE & Co. was again the overall winner, although the Texans did not quite reach the 200K mark as they did in the four previous years.

QRP activity was substantial, with some very nice scores posted by the masochists who practice the art. Three of the five highest all-time EU QRP records were set. E77RW led the pack with over 20K points from Bosnia and Herzegovina. C4M scored over 29K from Cyprus, which is classified as Asia. The first significant score from south of the U.S. came from TG9ANF in Guatemala who made 101 QSOs. In the United States, the usual suspects led the way, with Chris (formerly KA1LMR) sporting a new callsign—W1MR—at 39K, again besting K9AKS and WB2SIH, both with better than a 10K score.

As usual, the 2-meter-only participation was scant in North America, but substantial elsewhere, especially Thailand, Russia, and Ukraine; ON5GS was tops with a score of 8K. Three cheers for Stan, KA1ZE/3, who forsook the glamour of 6 meters to hand out 134 two-meter Qs from his Pennsylvania hilltop for the third highest USA score ever in that category.

QRP portable stations working only 6 hours—called hilltoppers—are unique to this contest. This often affords operations from difficult to reach rare grids. In the U.S., WB8BZK gave up roving (top rover score in 2010) to operate 3 one-thousandths of a degree inside EN62 near Lake Michigan to another winning score with 2.7K points, edging out W9SZ by just 9 Qs. In Europe, HA2VR/P again combined CQ VHF with "Summits On The Air" to a world high score of 4.3K points in the hilltopper (H) category. *(For more on hilltopping see this month's "Mobiling" column.—ed.)*

In the rover (R) category, W9FZ drove ahead of the US pack with 37K points with K9JK placing second. Although rare elsewhere in the world, rover US3ITU broke the all-time European record with 246 QSOs and 26K points.

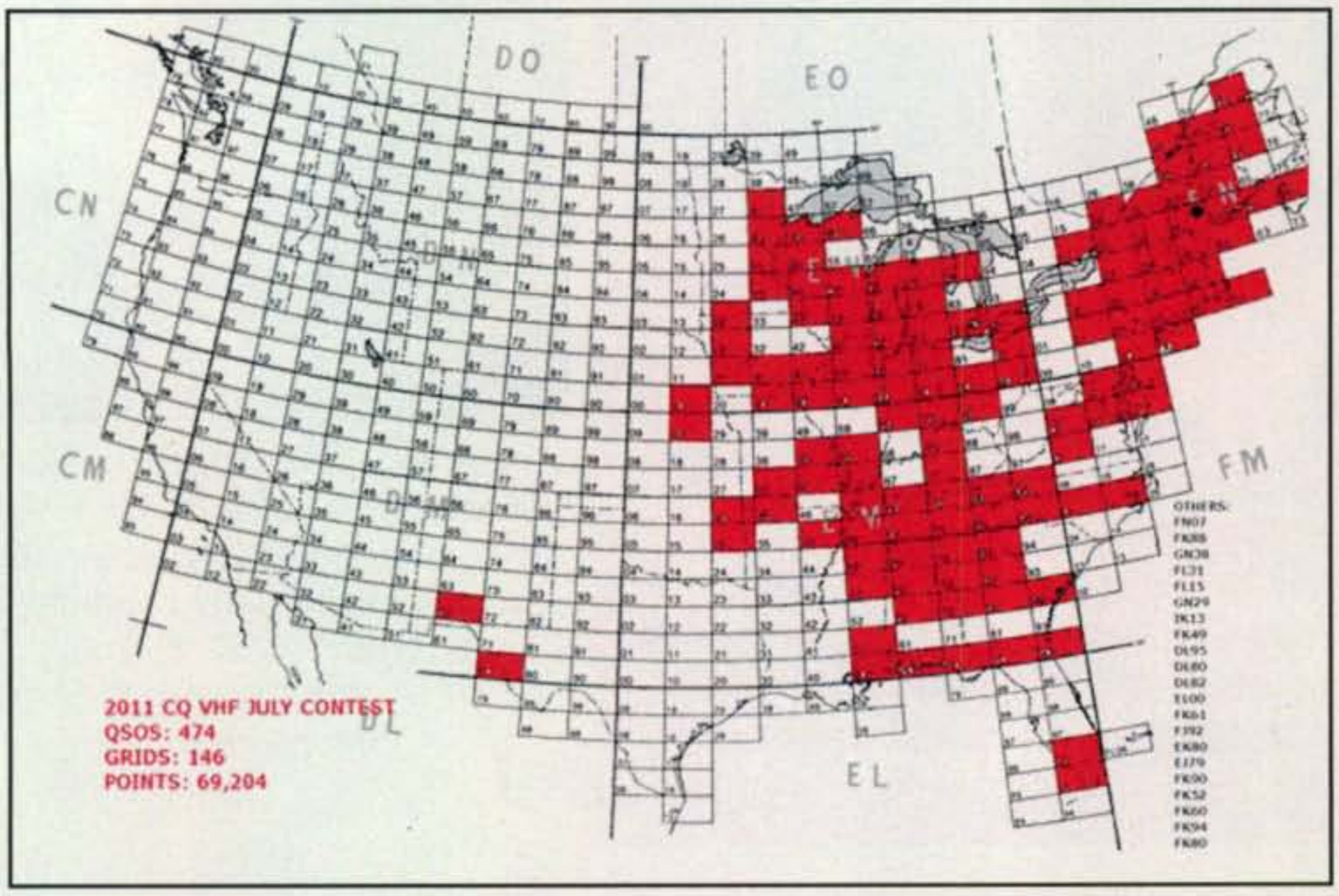
Thundrous applause in appreciation by club members eased Curt's way back to his seat.

Reflection on the Rules Change

With The Old Timer again taking notes for *CQ*, the contest director proceeded to lull the CQRI membership to la-la-land with a lengthy dissertation regarding the rules change in effect for the 2011 contest:

The CQ WW VHF Contest for 2011 incorporated a somewhat bold change in its rules. It attempted to recognize the changing landscape in VHF contesting—especially as it pertains to newer technologies—but also that there is a significant difference between HF and VHF contesting.

There were basically two aspects of this change. First was adopting what is now



K1TOL again posted the top U.S. single-op score on 6 meters. This is how Lefty's worked grid square map looked at the conclusion of the contest.

TOP SCORES
WORLD

All Band

UT8IO	37,788
DL2OM	33,109
OK1DC	30,590
UXØFF	29,480

6 Meters

TA7OM	87,690
E7ØT	73,108
VP5CW	52,393
XE3N	48,510

2 Meters

ON5GS	8,316
9A4VM	6,552
URØEQ	6,384
US6IF	5,304

Hilltopper

HA2VR/P	4,389
HG4UK/P	1,701

QRP

C4M	29,412
E77RW	20,470
HA1ZH	13,650
UT7EL	9,163

Rover

US3ITU	26,298
HS6FUJ	14,220

Multi Op

UT1I	185,310
UU9A	109,482
HG1W	42,007
UW3E	39,650

USA

All Band

K2DRH	167,400
NR5M	105,165
W1XX	87,910
N4QV	86,670
WA2FGK	85,813

6 Meters

K1TOL	68,005
N4WW	57,040
N4BP	44,280
W3EP	35,392
W2MMD	34,578
KF6A	29,539

2 Meters

KA1ZE/3	13,132
W9ZRX	2,350

Hilltopper

WB8BZK	2,697
W9SZ	2,418

QRP

W1MR	39,585
K9AKS	23,808
WB2SIH	14,204
N8XA	9,216
K3TW	4,455

Rover

W9FZ	37,506
K9JK	20,100
N2SLN	13,920
WA2IID	10,950
WW7D	7,518

Multi Op

K5QE	187,392
W3SO	121,242
W4MW	82,399
K2LIM	81,620
W4WA	54,626

QSO LEADERS BY BAND
WORLD

Single-Op 50 MHz

TA7OM	474
XE3N	385
E7ØT	373

144 MHz

HS8JNF	287
E29ICZ	230

Multi-Op 50 MHz

UU9A	440
UT1I	356

144 MHz

HS1EFA	613
HS8KFW	428
HS4DWI	407

USA

Single-Op 50 MHz

K2DRH	499
K1TOL	469

144 MHz

K2DRH	169
KA1ZE/3	134
WA2FGK	99

Multi-Op 50 MHz

K5QE	534
W3SO	322
W4NH	282

144 MHz

W4MW	206
W3SO	202
K5QE	117

CLUB COMPETITION

(Minimum of 3 entries required for listing)

UNITED STATES

Club Name	# Entries	Score
POTOMAC VALLEY RADIO CLUB	26	461,947
FLORIDA CONTEST GROUP	10	365,947
SOCIETY OF MIDWEST CONTESTERS	17	236,888
NACOGDOCHES AMATEUR RADIO CLUB	3	195,540
CENTRAL TEXAS DX AND CONTEST CLUB	4	117,198
YANKEE CLIPPER CONTEST CLUB	11	102,967
BADGER CONTESTERS	8	101,736
CAROLINA DX ASSOCIATION	6	93,393
SOUTHERN CALIFORNIA CONTEST CLUB	3	82,247
PACIFIC NORTHWEST VHF SOCIETY	16	48,707
FRANKFORD RADIO CLUB	5	45,010
NORTH EAST WEAK SIGNAL GROUP	7	36,391
ARIZONA OUTLAWS CONTEST CLUB	7	33,767
SOUTH EAST CONTEST CLUB	7	27,500
LONE STAR DX ASSOCIATION	3	19,021
ALABAMA CONTEST GROUP	4	16,987
GRAND MESA CONTESTERS OF COLORADO	5	15,998
NORTHERN CALIFORNIA CONTEST CLUB	6	15,146
MAD RIVER RADIO CLUB	4	11,844
BRISTOL (TN/VA) ARC	4	11,002
TENNESSEE CONTEST GROUP	8	7,774
MINNESOTA WIRELESS ASSN	4	4,361
WEST PARK RADIOPS	3	3,985
PORTAGE COUNTY AMATEUR RADIO SERVICE	3	288

WORLD

UKRAINIAN VHF INTERNATIONAL CONTEST CLUB	18	264,558
UKRAINIAN CONTEST CLUB	10	111,011
BOSNIA AND HERZEGOVINA CONTEST CLUB	4	101,842
GRUPO DXXE	5	70,823
BLACK SEA CONTEST CLUB	7	59,952
CONTEST CLUB ONTARIO	7	19,175
MARITIME CONTEST CLUB	3	14,818
CONTEST GROUP DU QUEBEC	3	12,621
LATVIAN CONTEST CLUB	5	3,260
BERGEN ARA	3	1,128
UA2 CONTEST CLUB	3	416

common practice in day-to-day operating and now permitted in a growing number of contests—namely, to allow single ops to utilize packet cluster "passive assistance," but not self-spotting. This was not expected to be a game changer, and in fact seems to have caused hardly a ripple. Many casual ops probably thought it was already permitted. This is what some contesters had to say about it:

"On passive assistance, the rules were clear and welcome. Recognizing that VHF contesting can benefit was a revelation and great leap forward. Rules that help increase success for single ops without detracting from, lessening, or cheapening the competition should be furthered and welcomed."—*VE1SKY*. "I enjoyed the new rules allowing internet assistance. It did seem to result in more contacts and certainly helped to track shifting propagation. It's a simple formula: more contacts = more fun. VHF is not like HF, and any aid to making more contacts is most welcome; kudos to *CQ* for its common sense."—*N1LF*. "I like the allowance of spotting use, or in my case, *DX-Sherlock*. It helps to know if I am wasting my time even listening, especially with QRP on my end. If there's no red on the map, I would just as well go work outside."—*NDØC*.

The second aspect, permitting limited "active assistance" for digital EME/MS (Earth-Moon-Earth/Meteor Scatter) modes, required a bit more discipline to stay in bounds of the rules. Again, some comments from users:

"I simply love the new rules. We made more contacts on 6-meter meteor scatter this time than usual. We did not have the

Bill, VE3CRU, created quite a bit of excitement for grid chasers as he rovered through four rare northern Maine grid squares.

usual 12–15 stations sitting on 50.260 MHz calling CQ. Once someone called me on my frequency, I almost always was able to work them. This was a major improvement. On 2-meter EME, because I could post my run frequency, there was little confusion in completing the contact. I do not recall losing any contacts once I got a good decode to my CQ. The whole digital part of the contest was much cleaner, more efficient and productive."—*K5QE.* "Some confusion occurred as some Ping Jockey users tried to set up contacts with CQ VHF contestants. Casual digital meteor-scatter enthusiasts were at a loss to explain the 'zombie-like' response if they approached a contester for a 'try' on a band. Instead of the usual welcome from the contest operator to attempt an MS QSO, only a truncated reply of callsign, sequence, and frequency was posted by the contester following contest protocol. Regardless, the contest went very well overall. This is my favorite contest of the year. Thanks for the continuing improvements."—*VE1SKY.* "I thought the rules were quite clear, as you could spot your CQ frequency, call, and calling sequence, which is what I did. From the comments on PJ, some didn't fully understand the rules and added the direction they were CQing—which was stretching things a bit. Overall, I thought it went quite well, although maybe there needs to be some minor tweaking. But I think CQ VHF is on the right track recognizing what is going on in the real world on a daily basis." – *NØKE.*

In preparing these final scores, the adjudication process involved a careful review of transcripts of the usual chat and cluster sites. Most postings consisted of harmless prattle. Although there was evidence of some stretching of the rules, none were so egregious or numerous that any significant scoring advantage was obtained. To the contrary, although there was some discussion as to what was and was not permitted, it was clear that in this first year of rules modification, compliance was remarkably good. Thus, no punitive action was warranted this time around. This required a careful look at who was in the contest, as non-contesters obviously felt no compunction to follow the restrictive contest protocol. In conclusion, the digital aspects of the rule will be carefully reviewed prior to the 2012 contest, as suggested by Phil, NØKE.

Polite applause ensued from the CQRI brethren as the contest director concluded his remarks and several who had nodded off again regained consciousness.

Finis

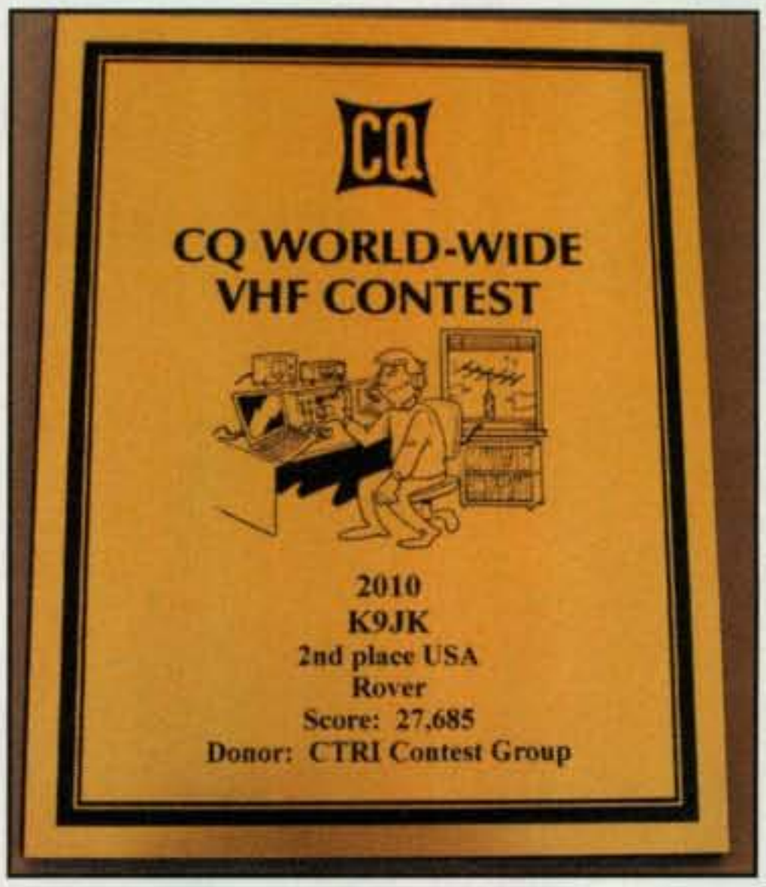
The CQRI meeting ended informally with refreshments of cider and donuts, during which the contest director added a few final comments:

The 744 log entries established another new record, an increase of 6.3% over last year. Thanks to these amateurs who have volunteered their time and skill to assist in various ways to make this a fun contest: 7L1FPU, DL8EBW, E21EIC. EA3ALV, HA2VR, K1JX, K9AKS, KW2G, LU2UF, NØUK, PY2ZX, SM3CER, UT1IC, W1PN, WA7BNM. Special mention goes out to W3KM, whose log checking program we used for the first time; K9JK, who did the 2010 certificates; LZ2FQ, who provided the Cabrillo log check for formatting logs; and most certainly N8BJQ, who masterminded all the log-checking procedures. What a team!

Reminders were made for the 2012 CQ WW VHF Contest, July 21–22, still the third complete weekend in July but a bit later than normal. The full announcement will appear in the June issue of *CQ*, and on the *CQ* website <cq-amateur-radio.com>, and on the CQ WW VHF Contest website <www.cqww-vhf.com>. A summary of the rules will also appear in various languages on many international websites.

After all the festivities had concluded, The Old Timer took charge of the vPad and made a beeline for the parking lot. While opening the door to his 1948 Hudson Hornet, he placed the vPad on the car's roof and then absentmindedly sped off as the device smashed to smithereens all over US Route 1.

73, John, W1XX



The plaque is back! Starting in 2012, sponsored plaques will again be offered to top category winners. Here's the prototype, a "brassy"-finish acrylic laminate. To sponsor a plaque go to <http://www.cqww-vhf.com/plaques.htm>.

GRID MULTIPLIER LEADERS BY BAND

WORLD

Single-Op 50 MHz		Multi-Op 50 MHz	
E7ØT	196	UU9A	189
TA7OM	185	UT1I	171
HA3DX	131		
UR5QU	130		
144 MHz		**144 MHz**	
		UT1I	42
		HG1W	34
ON5GS	42	UU9A	24
URØEQ	42		
DL2OM	41		

USA

Single-Op 50 MHz		Multi-Op 50 MHz	
N4WW	155	K5QE	174
K1TOL	145	W4WA	116
N4QV	148	W3SO	110
144 MHz		**144 MHz**	
K2DRH	60	K5QE	70
KA1ZE/3	49	W3SO	57
WA2FGK	35	W4MW	51

Expanded 2011 CQ WW VHF Contest Results

For a listing of the ops and grids activated by rover stations in the 2011 contest, "Scatter" comments, plus the operators of the multi stations go to <http://www.cqww-vhf.com/results.htm>. You can also go to the *CQ* website at <www.cq-amateur-radio.com> and look in the "Contests" section.

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Number/letter groups after call letters denote the following: Class (A = all band, 6 = 6 meters, 2 = 2 meters, Q = QRP, H = hilltopper, R = rover, M = multi-operator), Final Score, Number of QSOs, Number of grid locators, State/Province (USA/Canada only), Grid Locator or Number of grids activated (rover only). Rover scores for USA are listed separately. Certificate winners are listed in boldface.

2011 VHF RESULTS

NORTH AMERICA

UNITED STATES

W1XX	**A**	**87,910**	**517**	**149**	**RI**	**FN41**
N8RA	**A**	**40,125**	**307**	**107**	**CT**	**FN31**
AF1T	**A**	**19,988**	**206**	**76**	**NH**	**FN43**
K1TR	A	17,908	190	74	NH	FN42
N1JD	**A**	**17,238**	**192**	**78**	**ME**	**FN44**
W2DAN	**A**	**13,454**	**186**	**62**	**RI**	**FN41**
KC1MA	**A**	**8,820**	**115**	**60**	**MA**	**FN51**
W1RZF	A	4,305	90	35	MA	FN42
W1DYJ	A	3,312	75	36	MA	FN42
K1VUT	A	2,240	86	20	MA	FN41
N1OXA	A	1,995	52	35	ME	FN44
N1VVV	A	1,568	47	28	ME	FN43
N1ZN	A	1,302	51	21	CT	FN31
AA1O	A	1,071	43	21	MA	FN42
KC1V	A	820	39	20	CT	FN31
AA1I	A	322	20	14	MA	FN32
W1UJ	A	184	17	8	NH	FN43
K1TOL	**6**	**68,005**	**469**	**145**	**ME**	**FN44**
W3EP	**6**	**35,392**	**316**	**112**	**CT**	**FN31**
N1VDK	**6**	**12,648**	**186**	**68**	**MA**	**FN41**
K1DAT	6	10,268	151	68	MA	FN42
KA1R	6	5,500	100	55	MA	FN42
AB1BR	6	3,807	81	47	ME	FN43
N1BCL	**6**	**3,465**	**77**	**45**	**VT**	**FN34**
NJ1H	**6**	**3,432**	**88**	**39**	**NH**	**FN42**
W1FJ	6	351	27	13	MA	FN42
W1OUN	2	616	28	11	MA	FN42
W1QK	**H**	**736**	**46**	**16**	**CT**	**FN31**
N1PRW	**H**	**224**	**23**	**8**	**MA**	**FN42**
W1QH	H	48	8	3	CT	FN31
W1MR	**Q**	**39,585**	**316**	**105**	**NH**	**FN43**
N1WCL	**Q**	**140**	**10**	**7**	**CT**	**FN31**
N1JEZ	**M**	**19,635**	**183**	**85**	**VT**	**FN44**
K2OAK	**M**	**17,082**	**179**	**78**	**MA**	**FN32**
NE1B	**M**	**11,776**	**155**	**64**	**NH**	**FN42**
N1WK	**M**	**1,827**	**82**	**21**	**CT**	**FN41**
KB1JDX	M	986	49	17	CT	FN41

NA2NY	**A**	**9,398**	**108**	**74**	**NY**	**FN33**
W2YR	**A**	**9,288**	**102**	**72**	**NJ**	**FN20**
N2SLO	A	7,442	97	61	NY	FN30
N2MH	A	6,120	128	36	NJ	FN20
WB2LEB	A	5,368	109	44	NJ	FN20
W2AJM	A	4,512	78	47	NY	FN21
N2YBB	A	2,128	65	28	NY	FN30
W2REA	A	1,904	40	28	NY	FN02
N1IBM	A	1,566	45	27	NJ	FM29
WA3AFS	A	1,560	46	30	NY	FN32
W2JCN	A	1,222	41	26	NY	FN21
WA2BAH	A	1,200	35	25	NY	FN32
N2GKM	A	936	43	18	NY	FN31
N2CSP	A	874	30	23	NJ	FN20
K2AMI	A	795	42	15	NJ	FN20
KC2WUF	A	726	30	22	NJ	FN20
KA2OON	A	403	19	13	NJ	FN20
N2DCH	A	190	12	10	NY	FN22
KC2WGX	A	72	8	6	NY	FN31
K1PRO/2	A	40	9	4	NJ	FN21
W2MMD	**6**	**34,578**	**306**	**113**	**NJ**	**FM29**
						(Op: N2NRD)
W2JJ	6	13,986	189	74	NJ	FN21
						(Op: WA2VUN)
NP3D	**6**	**3,861**	**99**	**39**	**NY**	**FN30**
						(Op: EW1AR)
NA2R	6	1,350	50	27	NJ	FN20
WB2AMU	6	1,064	38	28	NY	FN30
W2CVW	6	510	30	17	NJ	FN20
N2FF	6	475	25	19	NY	FN30
N2TEE	6	154	14	11	NY	FN30
WA2PNI	6	117	13	9	NJ	FN20
N2RHL	**2**	**396**	**22**	**9**	**NY**	**FN02**
WB2SIH	**Q**	**14,204**	**157**	**67**	**NY**	**FN31**
W2JEK	**Q**	**216**	**26**	**8**	**NJ**	**FN20**
KC2JRQ	Q	18	3	3	NY	FN30
K2LIM	**M**	**81,620**	**408**	**140**	**NY**	**FN12**

WA2FGK	**A**	**85,813**	**434**	**161**	**PA**	**FN21**
						(Op: K2LNS)
K3ZO	**A**	**57,540**	**367**	**137**	**MD**	**FM18**
K3TUF	A	19,684	190	74	PA	FN10
K3MD	A	11,725	134	67	PA	FN10
W3GNQ	**A**	**10,640**	**135**	**70**	**DE**	**FM28**
N3ALN	A	9,632	141	56	MD	FM19
K1DS	A	9,150	130	50	PA	FN20
W3LL	A	7,488	118	52	MD	FM19
W3MEL	A	6,254	104	53	PA	FN10
N3UM	A	5,895	99	45	MD	FM18
KD3HN	A	5,252	89	52	PA	FM19
W6AAN	A	4,469	97	41	MD	FM19
K3YDX	A	3,360	75	35	MD	FM19
NA3M	A	1,127	43	23	MD	FM19
WB3IGR	A	1,025	33	25	MD	FM18
K3HX	A	920	37	23	PA	FN00
W4EE	A	874	43	19	MD	FM19
AF3I	A	486	26	18	PA	FN10
K3ISH	A	208	14	13	PA	FN21
K3OQ	A	186	24	6	MD	FM19
N3AEA	A	6	2	2	MD	FM19
W3BD	**6**	**25,152**	**262**	**96**	**PA**	**FM19**
						(Op: N3GH)
K2PLF	**6**	**18,700**	**220**	**85**	**MD**	**FM19**
W3UR	6	11,088	168	66	MD	FM19
K2PS	6	7,228	139	52	MD	FM18
WØRSJ	6	7,000	125	56	PA	FN20
W3DF	6	1,296	54	24	MD	FM19
K3YG	6	36	6	6	PA	FN10
KA1ZE/3	**2**	**13,132**	**134**	**49**	**PA**	**FN01**
N3AFT	**2**	**110**	**11**	**5**	**MD**	**FM19**
KA3KSP	2	50	5	5	PA	EN90
W3MEO	**H**	**130**	**13**	**5**	**MD**	**FM18**
W3PO	**Q**	**352**	**30**	**11**	**MD**	**FM19**
N4KD	Q	4	2	1	PA	FN00
W3SO	**M**	**121,242**	**524**	**167**	**PA**	**FN00**
KO3T	M	40,470	303	114	PA	FM19
W2GPS	**M**	**18,525**	**196**	**75**	**MD**	**FM19**

N4QV	**A**	**86,670**	**507**	**162**	**FL**	**EL96**
N2CEI	A	85,459	430	187	FL	EM80
N3LL	A	71,445	418	165	FL	EL86
N3MK	**A**	**54,397**	**356**	**133**	**VA**	**FM27**
W4AS	A	51,322	362	134	FL	EL95
W4MYA	A	49,750	326	125	VA	FM07
W4RX	A	47,904	344	96	VA	FM19
AD4Z	A	30,962	259	113	FL	EL95
KN4SM	A	21,012	165	102	VA	FM16
AF4OD	**A**	**19,584**	**190**	**96**	**AL**	**EM72**
AJ4GC	A	15,360	183	80	FL	EL96
W4PK	A	14,196	144	91	VA	FM07
K1HTV	A	12,300	143	82	VA	FM18
K4FJW	A	4,560	81	48	VA	EM86
AA4DD	**A**	**4,444**	**76**	**44**	**TN**	**EM86**
K4RW	**A**	**3,900**	**73**	**50**	**SC**	**EM92**
N4PD	A	2,436	57	29	VA	FM19
W4TUN	A	2,360	53	40	SC	EM84
KJ4OAP	A	2,242	51	38	VA	EM97
AD4TJ	A	2,016	44	32	VA	FM08
KS4YX	A	1,989	49	39	SC	EM84
K4EJQ	A	1,920	50	32	TN	EM86
KR4F	A	1,881	56	33	AL	EM64
W4AMP	**A**	**1,650**	**41**	**33**	**GA**	**EM74**
N1LF	A	1,488	40	31	AL	EM63
WA4ZKO	**A**	**1,276**	**36**	**29**	**KY**	**EM78**
W4FRA	**A**	**1,271**	**37**	**31**	**NC**	**FM15**
AJ4RW	A	1,110	36	30	FL	EM80
W1LVL	A	1,050	33	30	FL	EL99
KJ4WLH	A	966	33	23	VA	FM17
AI4GR	A	966	41	21	NC	EM85
NV4A	A	546	25	21	NC	EM95
KI4VCT	A	546	25	21	VA	FM26
N3TG	A	315	20	15	VA	FM18
K4KAY	A	315	19	15	NC	EM95
KJ4FEL	A	252	15	14	NC	EM95
N4DTF	A	88	9	8	TN	EM55
N4HN	A	30	5	5	NC	EM95
N4WW	**6**	**57,040**	**368**	**155**	**FL**	**EL98**
N4BP	**6**	**44,280**	**360**	**123**	**FL**	**EL96**
N4PN	**6**	**14,790**	**174**	**85**	**GA**	**EM82**
WB4TDH	6	11,972	146	82	FL	EL87
K4WI	**6**	**10,934**	**142**	**77**	**AL**	**EM62**
AB4GE	6	10,108	133	76	FL	EM80
KN4Y	6	7,797	113	69	FL	EM70
K2SX	**6**	**7,446**	**102**	**73**	**SC**	**FM03**
NG4C	**6**	**6,016**	**94**	**64**	**NC**	**FM16**
N4MM	**6**	**4,277**	**91**	**47**	**VA**	**FM09**
KG4JSZ	6	3,479	71	49	FL	EL98
N4GG	6	3,358	73	46	GA	EM74
K4OMG	**6**	**3,120**	**78**	**40**	**TN**	**EM66**
K9IL	6	3,036	66	46	TN	EM56
N4OX	6	2,684	61	44	FL	EM60
KS4X	6	2,584	68	38	TN	EM75
AB4SF	6	2,184	56	39	VA	FM17
WB4SQ	6	1,750	50	35	GA	EM74
K4QE	6	1,575	45	35	NC	FM05
W4UT	6	1,519	49	31	TN	EM75
KF4DVG	6	1,360	40	34	FL	EM60
N2WN	6	1,000	40	25	TN	EM86
W2OO	6	972	36	27	TN	EM85
AJ4SQ	6	702	27	26	FL	EM70
K4ORD	6	660	33	20	VA	FM07
NA4C	6	644	28	23	TN	EM65
WB5NMZ	6	306	18	17	AL	EM62
KN4QD	6	238	17	14	SC	EM94
N4JTC	6	196	14	14	FL	EM70
N3UA	6	187	17	11	VA	FM17
K1ZZI	6	176	16	11	GA	EM74
K4BAI	6	153	17	9	GA	EM72
WB3JKQ	6	110	11	10	TN	EM75
K4BSK	6	20	5	4	NC	EM95
ND1Y	6	4	2	2	GA	EM74
WK4P	**2**	**256**	**16**	**8**	**NC**	**EM96**
K3TW	**Q**	**4,455**	**80**	**55**	**FL**	**EL88**
WØPV	Q	4,134	78	53	FL	EL87
NZ1D	Q	342	19	18	FL	EL98
KI4FW	**Q**	**260**	**26**	**10**	**VA**	**FM18**
W4BCU	Q	78	9	6	TN	EM86
W4MW	**M**	**82,399**	**423**	**131**	**NC**	**EM96**
W4WA	**M**	**54,626**	**323**	**143**	**GA**	**EM84**
W4NH	M	43,152	315	124	GA	EM84
W6SAI	**M**	**10,200**	**127**	**75**	**AL**	**EM63**
KF4PCT	**M**	**9,100**	**105**	**65**	**VA**	**EM96**
K4RFT	**M**	**1,316**	**47**	**28**	**TN**	**EM56**
N4GM	M	918	34	27	NC	FM13
K4RST	M	817	31	19	TN	EM75

NR5M	**A**	**105,165**	**574**	**171**	**TX**	**EM10**
WD5COV	**A**	**22,000**	**214**	**100**	**NM**	**DM62**
WA5LFD	A	11,248	136	76	TX	EM12
AE5P	A	7,104	104	64	TX	EM21
KC5MVZ	A	2,176	64	32	TX	DM93
K5KDN	A	2,166	55	38	TX	EM00
AA5JG	**A**	**1,768**	**45**	**34**	**OK**	**EM04**
NW5Q	A	1,218	41	29	TX	EM13
W5TV	A	1,044	33	29	TX	EM21
K5WPN	A	720	26	16	OK	EM14
KC5MVV	A	280	20	10	TX	DM93
AC5O	**6**	**29,116**	**251**	**116**	**LA**	**EL49**
N5RZ	**6**	**20,826**	**267**	**78**	**TX**	**DM91**
AA5AM	6	11,972	146	82	TX	EM13
WQ5L	**6**	**8,687**	**119**	**73**	**MS**	**EM50**
WØVX	6	6,555	115	57	TX	EM12
W5GAI	6	4,947	97	51	TX	EM10
AD5A	6	4,601	107	43	TX	EM00
K5GM	6	2,516	68	37	TX	EM10
K3TD	6	2,485	71	35	TX	EM10
N5KM	6	1,218	42	29	TX	EM13
KD5J	**6**	**945**	**45**	**21**	**AR**	**EM45**
AD6D	6	805	35	23	TX	EM00
KC7QY	6	156	13	12	NM	DM64
NV4B/5	**H**	**32**	**5**	**4**	**MS**	**EM54**
N3AWS	**Q**	**480**	**23**	**20**	**MS**	**EM50**
WA5BUC	**Q**	**340**	**20**	**17**	**TX**	**EL29**
K5QE	**M**	**187,392**	**651**	**244**	**TX**	**EM31**
KBØHH	**M**	**10,496**	**142**	**64**	**OK**	**EM06**

KG6IYN	**A**	**79,245**	**437**	**135**	**CA**	**DM12**
AF6RR	**A**	**17,220**	**183**	**82**	**CA**	**CM87**
WA6ZTY	A	10,890	153	55	CA	CM98
KC6ZWT	A	5,203	93	43	CA	CM98
K6UD	A	4,042	85	43	CA	DM14
N6RZR	A	2,475	63	33	CA	CN80
KI6JJW	A	1,652	46	28	CA	CM87
N6ZE	A	912	36	24	CA	DM04
N6TCZ	A	646	32	17	CA	DM03
KG6BCL	A	407	27	11	CA	DM04
WB6BET	A	330	20	10	CA	CM98
W6OMF	A	300	18	12	CA	CM98
KI6OVJ	A	276	20	12	CA	CM88
N4DLA	A	90	11	6	CA	CM87
K6JRA	A	88	10	8	CA	CM87
KF6I	**6**	**2,680**	**67**	**40**	**CA**	**DM13**
K6CSL	6	360	24	15	CA	CM97
W5DQ	6	208	16	13	CA	DM15
N6NPG	6	168	14	12	CA	DM15
W6SZN	6	154	14	11	CA	CM99
K6OAK	6	136	17	8	CA	CM97
KI6FGV	6	80	10	8	CA	DM03
N6QQ	6	50	10	5	CA	DM03
K6KQV	**Q**	**403**	**23**	**13**	**CA**	**CM87**

WA7TZY	**A**	**6840**	**123**	**38**	**WA**	**CN87**
N7EPD	A	6216	120	37	WA	CN87
WB7BST	A	5966	107	38	WA	CN87
K7AWB	A	5320	102	38	WA	DN17
KC7I	**A**	**3270**	**78**	**30**	**OR**	**CN84**
KD7UO	A	2320	58	29	WA	CN96
K7DD	**A**	**2065**	**58**	**35**	**AZ**	**DM33**
KI7JA/7	A	1680	44	28	OR	DN04
K7ULS	**A**	**726**	**25**	**22**	**UT**	**DN41**
KG7P	A	456	35	8	WA	CN87
K7MDL	A	320	27	8	WA	CN87
W6LLP	A	180	14	10	WA	DN17
KF7CQ	A	70	7	7	ID	DN13
K7CW	**6**	**6946**	**151**	**46**	**WA**	**CN87**
AA7A	**6**	**4300**	**86**	**50**	**AZ**	**DM43**
N7CW	6	3375	75	45	AZ	DM34
NQ7R	6	3264	68	48	AZ	DM42
K7XC	**6**	**864**	**36**	**24**	**NV**	**DM09**
N7EL	6	777	37	21	AZ	DM43
WØPAN	6	726	33	22	AZ	DM43
K7WIA	6	533	41	13	WA	CN87
KØIP	**6**	**496**	**31**	**16**	**ID**	**DN32**
KD7DCR	**6**	**128**	**16**	**8**	**MT**	**DN35**
K6WSC	6	72	9	8	AZ	DM41
NI7R	6	30	6	5	AZ	DM33
N7XU	6	4	2	2	OR	CN94
WA7KVC	**2**	**60**	**6**	**5**	**WA**	**DN16**
NB1A	2	2	1	1	WA	DN17
KE7UQL	**Q**	**204**	**17**	**12**	**NV**	**DM09**
KX7L	**Q**	**84**	**21**	**4**	**WA**	**CN87**
N7QAX	**H**	**24**	**4**	**3**	**WY**	**DN64**
K7IP	**M**	**781**	**54**	**11**	**WA**	**CN88**

WN8R	**A**	**12,240**	**135**	**72**	**OH**	**EN91**
K8ROX	A	11,310	141	65	OH	EN80
N8BJQ	A	3,960	81	44	OH	EN80
K1LT	A	3,744	86	39	OH	EM89
K8AB	A	3,096	60	43	OH	EN91
KF8QL	**A**	**1,836**	**48**	**27**	**MI**	**EN72**
W8AJL	A	416	27	13	OH	EN80
KF8BT	A	160	15	10	OH	EN80
NX8G	A	40	6	5	OH	EN90
KF6A	**6**	**29,539**	**271**	**109**	**MI**	**EN73**
W8TOM	6	2,738	74	37	MI	EN74
N8AA	**6**	**2,142**	**63**	**34**	**OH**	**EM79**
AA8IA	6	1,830	61	30	OH	EN90
W8IQ	6	988	38	26	OH	EN81
K8YTO	6	920	46	20	MI	EN82
N8PPF	6	880	40	22	OH	EN80
K8ME	6	680	40	17	OH	EN91
K8GT	6	304	19	16	MI	EN82
KB8UUZ	6	242	22	11	OH	EN91
W8IDM	6	209	19	11	OH	EN81
WO3X	6	160	16	10	OH	EN91
NF8M	6	154	14	11	MI	EN82
N8OFS/P	6	7	7	1	OH	EN91
NE8I	6	1	1	1	MI	EN74
N8XA	**Q**	**9,216**	**117**	**64**	**OH**	**EM89**
AC8AP	Q	1,530	46	30	OH	EN81
N8QE	Q	6	2	2	OH	EN91
N8ZM	**M**	**35,152**	**256**	**104**	**OH**	**EN80**
W8PGW	**M**	**3,906**	**79**	**42**	**MI**	**EN82**

K2DRH	**A**	**167,400**	**668**	**200**	**IL**	**EN41**
W9GA	**A**	**18,942**	**166**	**82**	**WI**	**EN53**
N9LB	A	14,480	146	80	WI	EN52
K9CT	A	12,284	127	74	IL	EN50
KG9OV	A	10,432	132	64	IL	EM58
N9ISN	A	9,280	135	58	WI	EN44
NT9E	A	8,176	102	56	IL	EN52
WV9E	A	7,315	98	55	WI	EN43
KC9BQA	A	5,720	81	52	WI	EN63
N2BJ	A	4,539	83	51	IL	EN61
KC9ELU	**A**	**3,040**	**51**	**40**	**IN**	**EM79**
N9TZL	A	2,640	57	33	IL	EN52
W9VA	A	1,325	48	25	IL	EN62
K9VS	A	512	23	16	WI	EN52
W9FX	A	462	19	14	IL	EM57
KG9N	A	364	23	14	IL	EN50
N9GH	A	286	16	11	IL	EN51
K9SAT	A	104	10	8	IL	EN61
N9XG	**6**	**28,126**	**287**	**98**	**IN**	**EN60**
KO9A	**6**	**8,184**	**132**	**62**	**IL**	**EN52**
K3WA	6	3,608	82	44	IL	EN50
K9ZM	6	3,330	74	45	IL	EN50
NS9I	**6**	**1,960**	**56**	**35**	**WI**	**EN64**
WB9HFK	6	1,584	44	36	IL	EN50
AJ9C	6	352	22	16	IN	EN70
KB9YGD	6	132	12	11	IN	EN61
K9CC	6	9	3	3	IL	EN61
WU9Q	6	8	4	2	IL	EN41
W9ZRX	**2**	**2,350**	**47**	**25**	**IN**	**EN60**
WB8BZK	**H**	**2,697**	**60**	**29**	**IL**	**EN62**
W9SZ	**H**	**2,418**	**51**	**31**	**IL**	**EN50**
K9AKS	**Q**	**23,808**	**198**	**93**	**IL**	**EN41**
AF9J	**Q**	**6**	**2**	**2**	**WI**	**EN52**
W9RVG	**M**	**26,462**	**210**	**101**	**IL**	**EM57**

KØSIX	**A**	**32,970**	**261**	**105**	**MN**	**EN35**
KØTPP	**A**	**8,094**	**131**	**57**	**MO**	**EM48**
NØKE	**A**	**5,320**	**125**	**40**	**CO**	**DM69**
KØAWU	A	4,350	71	50	MN	EN37
KØNR	A	4,248	97	36	CO	DM78
WØETT	A	4,140	107	36	CO	DM79
WØZQ	A	3,400	61	40	MN	EN34
KV1E	**A**	**2,700**	**67**	**36**	**IA**	**EN41**
NØWJY	**A**	**2,106**	**46**	**26**	**NE**	**EN10**
KCØTDJ	A	1,537	50	29	IA	EN40
NØUY	A	1,400	38	25	MN	EN18
KØBBC	A	760	31	20	MN	EN34
NØEO	A	665	34	19	MN	EN36
						(Op: AAØAW)
KCØVFO	**6**	**5,418**	**126**	**43**	**CO**	**DM79**
KBØYH	6	3,400	100	34	CO	DM79
KFØUR	6	2,278	67	34	CO	DM78
KSØAA	**6**	**2,074**	**61**	**34**	**KS**	**EM28**
WØPPF	6	480	24	20	IA	EN41
WØEB	6	195	15	13	KS	EM17
KFØIQ	6	104	13	8	MO	EM37
KIØG	**H**	**12**	**3**	**3**	**CO**	**DM69**
NDØC	**Q**	**1,536**	**48**	**32**	**MN**	**EN23**

ROVER

W9FZ	**37,506**	**191**	**133**	**5**
K9JK	**20,100**	**146**	**100**	**7**
N2SLN	**13,920**	**138**	**80**	**2**
WA2IID	**10,950**	**99**	**75**	**9**
WW7D	**7,518**	**132**	**42**	**8**
K7HPT	**7,130**	**104**	**46**	**5**
W3DHJ	**7,040**	**110**	**55**	**6**
AB1GF	**7,020**	**111**	**52**	**4**
VE3CRU/W1	**6,600**	**89**	**66**	**4**
N6ORB	**5,658**	**103**	**46**	**2**
K6BRW	**5,633**	**86**	**43**	**4**
K8MR	**4,128**	**63**	**48**	**4**
K6EU	**3,588**	**71**	**39**	**4**
N4TZH	**3,332**	**66**	**49**	**3**
NV6C	**3,160**	**65**	**40**	**5**
KI6QEL	3,000	73	24	4
K6GEP	**2,952**	**60**	**36**	**3**
N8VUR	**2,275**	**37**	**35**	**6**
AD4IE	**1,701**	**46**	**27**	**3**
N7EIE	**1,400**	**46**	**20**	**6**
WØBL	**1,305**	**40**	**29**	**5**
ABØYM	**1,170**	**33**	**26**	**7**
K8DOG	**646**	**23**	**19**	**4**
N1KPW	480	25	16	2
AF5Q	**420**	**19**	**15**	**4**
WA4JA	150	11	10	2

CANADA

VE7DXG	**A**	**13,536**	**196**	**48**	**BC**	**CN88**
VE3ZV	**A**	**10,650**	**113**	**75**	**ON**	**EN92**
VE5UF	**A**	**10,112**	**117**	**79**	**SK**	**DO61**
VE1SKY	**A**	**7,872**	**121**	**64**	**NS**	**FN74**
VE9AA	**A**	**6,930**	**99**	**66**	**NB**	**FN66**
VE2HAY	**A**	**570**	**26**	**19**	**QC**	**FN35**
VA7FC	A	380	27	10	BC	CN79
VE3VCF	A	140	13	10	ON	FN25
VE4EAR	A	28	5	4	MB	EN19
VA2EW	**6**	**11,907**	**147**	**81**	**QC**	**FN35**
VO1KVT	**6**	**6,235**	**145**	**43**	**NL**	**GN29**
VE3IAE	**6**	**396**	**22**	**18**	**ON**	**FN25**
VE2HIT	6	144	12	12	QC	FN35
VA2RIO	6	36	6	6	QC	FN46
VE1JF	6	16	4	4	NS	FN74
VE3RKS	6	9	3	3	ON	EN93
VE3GTC	**H**	**36**	**6**	**6**	**ON**	**FN24**
VE3TLT	**Q**	**288**	**16**	**12**	**ON**	**EN92**
VE3HHT	**M**	**1,196**	**31**	**26**	**ON**	**EN92**

CAYMAN ISLANDS

ZF2EZ	**6**	**24,180**	**260**	**93**	**EK99**
					(Op: W5SJ)

COSTA RICA

TI5KD	**6**	**27,608**	**238**	**116**	**EK80**
TI2CDA	**6**	**1,638**	**42**	**39**	**EJ79**

CUBA

CO2WF	**6**	**13,098**	**177**	**74**	**EL83**
T48K	**M**	**32,864**	**316**	**104**	**FL10**

GUATEMALA

TG9ANF	**Q**	**4,646**	**101**	**46**	**EK44**

PUERTO RICO

NP3CW	6	4	2	2	FK68

MEXICO

XE3N	**6**	**48,510**	**385**	**126**	**EL60**
XE2X	**6**	**21,165**	**249**	**85**	**EL06**
XE2NBW	**6**	**16,744**	**184**	**91**	**DL95**
XE2O	**6**	**13,122**	**162**	**81**	**DL95**
XE1XOE	**6**	**3,403**	**83**	**41**	**EL00**
XE2AU	6	49	7	7	DL81

TURKS & CAICOS ISLANDS

VP5CW	**6**	**52,393**	**433**	**121**	**FL31**
					(Op: W5CW)

AFRICA

CANARY ISLANDS

EA8MT	**6**	**11,172**	**133**	**84**	**IL27**
EA8AQV	**6**	**7,500**	**100**	**75**	**IL28**
EA8ACW/P	6	6,230	89	70	IL28
EA8BQM	6	156	13	12	IL27

MADEIRA ISLAND

CT3BD/P	**A**	**120**	**11**	**10**	**IM12**
CT3FQ	**6**	**20,240**	**176**	**115**	**IM12**
CT3DZ/P	6	3,886	67	58	IM12

MOROCCO

CN8KD	**6**	**4,158**	**77**	**54**	**IM63**

ASIA

ASIATIC RUSSIA

RK9AT	**2**	**360**	**15**	**12**	**LO93**
RZ9CJ	**2**	**16**	**4**	**2**	**MO06**
RV9CQ/P	**H**	**16**	**4**	**2**	**MO06**
UA9CBB	**Q**	**16**	**4**	**2**	**MO06**
RF9C	**M**	**16**	**4**	**2**	**MO06**
R8CAA	**R**	**32**	**8**	**2**	**2**

ASIATIC TURKEY

TA7OM	**6**	**87,690**	**474**	**185**	**LN00**
TA7X	**6**	**20,703**	**201**	**103**	**KN90**
TA2AL	**6**	**7,384**	**104**	**71**	**KN40**
TA9J	**6**	**4,368**	**91**	**48**	**KN71**
TA7AB	**2**	**216**	**12**	**9**	**LN00**

CHINA

BD3CZX	**A**	**143**	**12**	**11**	**PM01**
BA4SI	**6**	**3,248**	**112**	**29**	**PM01**

CYPRUS

C4M	**Q**	**29,412**	**258**	**114**	**KM64**
					(Op: 5B4AGM)

JAPAN

JA6WFM	**6**	**2,688**	**84**	**32**	**PM52**
JE1BMJ	**6**	**1,900**	**50**	**38**	**QM05**
JK4DUJ/4	6	30	6	5	PM64
JM1NKT	6	24	6	4	PM96
JG1WKM	6	9	3	3	PM96
JF2MBF	6	6	3	2	PM85

JH3DMQ	Q	126	13	9	PM74
JA1POS	Q	16	4	2	PM95
THAILAND					
HS8JNF	2	4,592	287	8	NJ98
E29ICZ	2	2,760	230	6	NJ99
HS3TLZ/P	2	1,330	95	7	OK06
HS2TIJ	2	1,236	103	6	OK02
E29UOO	2	1,180	118	5	OJ07
HS4NOR	2	1,088	68	8	OK16
HS1AXC	2	930	93	5	OK03
HS3ANP	2	728	52	7	OK14
HS3LSE	2	560	35	8	OK14
E2ØMWE	2	536	67	4	OK03
HS8JYX	2	186	31	3	NJ98
HS8VZW	2	138	23	3	OJ08
HS7WHB	2	132	22	3	NK92
E21YDP	2	60	10	3	OK03
E21QEB	2	52	13	2	OK03
HS1EFA	M	13,486	613	11	OK03
E22KSJ	M	13,056	384	17	OK04
HS4DWI	M	13,024	407	16	OK16
E22SSS	M	7,470	249	15	OK04
HS8KFW	M	6,848	428	8	NJ99
E22NCF	M	5,160	215	12	OK16
HS9YZT	M	4,448	278	8	OJ06
HS9JGQ	M	4,280	214	10	OK04
HS4AK	M	4,000	200	10	OK16
HS8FLU	M	3,444	287	6	NJ98
HS9XUF	M	2,304	192	6	OJ06
HS4WKA	M	1,540	77	10	OK06
HS9MMM	M	1,184	148	4	OJ07
HS3WWB	M	828	69	6	OK16
HS7ZQK	M	760	76	5	OK03
E22XUA	M	530	53	5	NK99
HS6FUJ	R	14,220	237	30	6
HS9XDF	R	1,312	82	8	3
E21EIC	R	560	28	10	5
HS4ROI	R	518	37	7	4
E2ØYLM	R	104	13	4	2
HS3NWD	R	72	18	2	2
UNITED ARAB EMIRATES					
A65BP	6	9	3	3	LL75
EUROPE					
AUSTRIA					
OE4VIE	6	10,500	125	84	JN87
OE6HLF	6	63	9	7	JN77
OE1CWA/P	H	420	21	10	JN88
BELGIUM					
ON5GS	2	8,316	99	42	JO21
ON2AD	Q	2	1	1	JO21
BOSNIA AND HERZEGOVINA					
E7ØT	6	73,108	373	196	JN84
E74A	6	5,984	88	68	JN93
E77RW	Q	20,470	164	89	JN84
E71A	Q	2,280	57	40	JN93
E73DPR	M	13,013	143	91	JN92
BULGARIA					
LZ1IQ	Q	1,050	35	30	KN12
LZ1FH	Q	418	22	19	KN12
CROATIA					
9A3QB	A	3,813	67	41	JN95
9A3VM	6	5,544	88	63	JN92
9A6B	6	3,450	69	50	JN75 (Op: 9A2EU)
9A1DL	6	121	11	11	JN95
9A4VM	2	6,552	126	26	JN85
CZECH REPUBLIC					
OK1DC	A	30,590	205	95	JN69
OK1KZ	A	2,616	68	24	JO70
OK1AME	6	13,366	163	82	JN69
OK1KCF	M	96	12	8	JO70
ENGLAND					
MØMCV	6	754	29	26	JO01
ESTONIA					
ESØTJC	2	60	6	5	KO18
ES5NHC	Q	2	1	1	KO38
ES5E	M	6,840	74	60	KO38
EUROPEAN RUSSIA					
UA6AX	2	2,340	45	26	KN84
R7NP	2	1,824	57	16	LN17
UA3WM	2	1,638	39	21	KO72
RW7A	2	1,560	39	20	KN95
RN4AT	2	1,540	35	22	LN29
RA6A	2	1,386	33	21	KN96
RA3SI	2	1,258	37	17	LO04
UA4ALU	2	1,240	31	20	LN29
RL3QDD	2	1,026	27	18	KO91
RW6AH	2	1,026	27	19	LN05
RA4A	2	988	26	19	LO20
UA7C	2	864	24	18	KN96
RW6HP	2	736	23	16	LN24
RL3D	2	720	40	9	KO85
RL3F	2	630	35	9	KO95
UA6AQN	2	560	20	14	KN96
RA3XX	2	494	19	13	KO84
RA3EL	2	384	16	12	KO82
UA6HHE	2	364	14	13	LN05
RK6BBB	2	352	16	11	KN96
RK6AXN	2	336	14	12	KN94
RV2FW/1	2	256	16	8	KO59
RA6EAG	2	140	10	7	LN14
RA4WO	2	72	6	6	LO76
UA4BI	2	60	6	5	LN28
RW4WE	2	40	5	4	LO66
RA4SD	2	18	3	3	LO36
RL3ZH	2	8	2	2	KO80
UA4HQI	2	8	2	2	LO53
RA4WX	2	2	1	1	LO67
RA6LGV	Q	1,638	39	21	KN97
UA6AGK	Q	198	11	9	KN96
RK6ARD	M	1,080	30	18	LN05
RZ6AZA	M	456	19	12	KN96
EUROPEAN TURKEY					
TA1DK	6	7,412	109	68	KN41
FRANCE					
FØFEK	2	1,276	29	22	JN19
GERMANY					
DL2OM	A	33,109	197	113	JO30
DL1ET	6	594	27	22	JO31
DH5MM	Q	315	21	15	JO52
DL1DBR	2	756	27	14	JO41
GREECE					
SV2IPF	6	14,415	155	93	KN10
SV2HWR	6	6,976	109	64	KN10
SV2FLQ	6	1,290	43	30	KN10
SV1DJG/P	H	56	8	7	KM17
J48KEF	M	22,363	189	107	KM08
HUNGARY					
HA5OO	A	7,250	92	50	JN97
HA3DX	6	28,820	220	131	JN96 (Op: HA5XH)
HGØA	6	24,380	212	115	JN96 (Op: HA5JI)
HA3LI	6	5,229	83	63	JN96
HA5PT	6	300	20	15	JN97
HA2VR/P	H	4,389	79	33	JN87
HG4UK/P	H	1,701	44	27	JN86
HA1ZH	Q	13,650	134	75	JN86
HG1W	M	42,007	254	119	JN87
HA5KDQ	M	28,542	220	71	JN97
HG6Z	M	20,176	194	52	JN97
ITALY					
IV3KKW	6	3,332	68	49	JN66
IZ3DBA	6	1,020	34	30	JN55
I2AZ	6	360	20	18	JN45
IV3AOL	Q	168	14	12	JN65
KALININGRAD					
UA2FL	Q	128	8	8	KO04
RU2FM	Q	32	4	4	KO04
LATVIA					
YL3DR	A	660	24	20	KO26
YL3FT	6	2,268	54	42	KO26
YL2CP	6	1,073	37	29	KO27
YL2AO	6	754	29	26	KO16
YL3DX	6	463	36	13	KO27
YL2PP	6	144	16	9	KO26
YL2FZ	6	80	10	8	KO37
YL2EC	6	1	1	1	KO06
YL3AGV	2	108	9	6	KO37
YL2CV	Q	240	16	15	KO16
LITHUANIA					
LY2SA	6	2,106	54	39	KO14
LY1R	6	750	30	25	KO14
LY7Z	Q	1,107	41	27	KO15
MACEDONIA					
Z35F	6	5,280	88	60	KN11
MOLDOVA					
ER1DA	Q	323	19	17	KN47
ER5DX	Q	20	5	4	KN46
POLAND					
SP9DSD	A	6,880	99	40	JO90
SP7OGP	A	406	17	14	KO01
SP7AWG	6	5,952	96	62	JO91
SP7VC	6	1,488	48	31	JO91
SO2F	6	792	33	24	JO93 (Op: SP2CNW)
SP3YM	6	132	12	11	JO91
SP7FDV	6	49	7	7	JO91
SP3GHC	6	9	3	3	JO82
PORTUGAL					
CT1BOL	6	910	35	26	IN51
CT1DZY	6	72	9	8	IN51
CR5M	Q	868	31	28	IN61 (Op: CT1DHM)
ROMANIA					
YO3DDZ	A	5,824	78	56	KN34
YO8BGE	A	208	13	13	KN36
YO5LD	6	4,930	85	58	KN17
YO2BCT/P	6	2,419	59	41	KN05
YO8DDP	6	1,599	41	39	KN36
YO2LEL/P	6	1,386	42	33	KN05
YO6ADW	6	289	17	17	KN36
YO5CRQ	6	132	12	11	KN17
YO7CWP	6	36	6	6	KN14
SERBIA					
YT7WE	2	2,310	55	21	KN05
YT2F	M	21,681	163	99	KN03
SICILY					
IT9VDQ	6	5,192	88	59	JM68
SLOVAK REPUBLIC					
OM3DX	6	1,110	37	30	KN08
OM5FA	Q	1,904	56	34	JN97
SPAIN					
EA3AR	6	8,190	117	70	JN12
EA5DIT	6	8,092	119	68	IM99
EB5CS/P	6	5,700	95	60	IN90
EA1AR	6	5,605	95	59	IN70
EA1WX	6	2,006	59	34	IN63
EA5BY	6	1,242	46	27	IM98
EA5YU	6	1,140	38	30	IM97
EA5HT	6	1,036	37	28	IM98
EB2RA	6	8	4	2	IN92
EC4AA	Q	221	16	13	IN80
EA3FHP	Q	6	3	2	JN11
SWEDEN					
SA1A	6	16	4	4	JO97 (Op: SM1TDE)
SM7I	2	16	4	2	JO65
SM6WET	M	1,927	47	41	JO68
SWITZERLAND					
HB9VID	6	323	19	17	JN36
THE NETHERLANDS					
PA8KM	A	680	25	20	JO32
PA5WT	6	4,400	80	55	JO22
PA8O	6	1,365	39	35	JO33
PA1TK	2	2,520	42	30	JO22
UKRAINE					
UT8IO	A	37,788	241	134	KN87
UXØFF	A	29,480	206	134	KN45
UY5QO	A	10,488	106	76	KN77
UY1HY	A	8,640	122	50	KO60
UY9VY	A	7,935	88	69	KN68
UZ5Q	A	7,260	89	66	KN77 (Op: UY5QZ)
UT7EW	A	6,240	86	60	KN78
UT5VD	A	2,345	44	35	KN68
UT/R3BM	A	434	19	14	KN19
UR5ITU	A	250	17	10	KN88
UR5QU	6	30,810	237	130	KN77
UT7QF	6	26,741	221	121	KN77
UY5LW	6	12,104	136	89	KN89
UZ4E	6	11,954	139	86	KN77 (Op: UT5ERP)
UT7Y	6	7,245	115	63	KN27 (Op: USØYW)
UX6IB	6	5,429	89	61	KN87
UZ5U	6	5,246	86	61	KO72 (Op: UT4UO)
UT8IM	6	4,218	74	57	KN87
EMØK	6	3,744	72	52	KO30 (Op: USØKW)
UT3UA	6	2,150	50	43	KO50
UW8SM	6	2,193	51	43	KN28
UY5YA	6	1,656	46	36	KN77
UT4XU	6	986	34	29	KO40
UT7UW/P	6	986	34	29	KN58
UX4U	6	918	34	27	KO50
UW7LL	6	806	31	26	KO80
UR5KO	6	288	18	16	KO30
UT1IA	6	9	3	3	KN87
URØEQ	2	6,384	76	42	KN78
US6IF	2	5,304	102	26	KN87
UT5DV	2	4,860	81	30	KN18
UR3EE	2	4,080	60	34	KN88
US7IA	2	2,720	68	20	KN88
UT5JCW	2	2,700	45	30	KN64
UT3EK	2	1,330	35	19	KN78
UR5FFC	2	1,260	30	21	KN56
UT8LN	2	972	27	18	KN89
UT4EK	2	546	21	13	KN67
UT5IL	2	340	17	10	KN88
US5WU	2	240	12	10	KO20
US3ITD	2	230	23	5	KN98
UR4ISL	2	204	17	6	KN88
UR5WCE	2	198	11	9	KN29
US6ITX	2	130	13	5	KN88
US5EY	2	128	8	8	KN67
US7IIV/M	2	16	4	2	KN98
UT7EL	Q	9,163	116	77	KN77
US5iD/P	Q	4,590	85	27	KN97
US1IY	Q	3,360	84	20	KN98
UY5ON	Q	1,480	37	20	KN89
UT5UUV	Q	1,408	36	32	KO50
UT5ER	Q	1,320	34	20	KN78
UU6JF	Q	690	23	15	KN85
UT7LK	Q	598	26	23	KO80
UR6EC	Q	540	18	15	KN78
UR7IM	Q	480	24	10	KN88
US4ICL	Q	348	29	6	KN98
UY2IW	Q	276	23	6	KN98
UT3IK	Q	276	23	6	KN98
UR7INK	Q	180	18	5	KN88
US2IY	Q	170	17	5	KN88
US7IGN	Q	130	13	5	KN88
UT2IY	Q	60	10	3	KN98
US8ITS	Q	8	4	1	KN98
UT1I	M	185,310	613	213	KN98
UU9A	M	109,482	477	213	KN64
UW3E	M	39,650	240	130	KN78
UT2G	M	7,600	76	50	KN66
UT4UWR	M	7,040	90	64	KO50
UT1IZZ	M	190	19	5	KN97
US3ITU	R	26,298	246	54	9
US5ID	R	4,590	85	27	4
US6ISA	R	24	6	2	2
WALES					
MWØTDQ	6	25	5	5	IO81
SOUTH AMERICA					
ARGENTINA					
LU1BJW	6	1	1	1	GF05
BRAZIL					
PU2VGS	A	30	8	2	GG66
PV8ABC	6	3,840	80	48	FJ92
PV8AZ	6	3,015	67	45	FJ92
PV8ADI	6	2,394	57	42	FJ92
PV8DR	6	984	41	24	FJ92
PV8AX	6	32	8	4	FJ92
PU2MDY	2	4	2	1	GG66
PV8RR	Q	8	8	1	FJ92
PU8TLS	Q	6	6	1	FJ92
PV8MM	Q	3	3	1	FJ92
ZV2K	M	84	13	4	GG66
CURACAO					
PJ2BVU	6	4,386	86	51	FK52

CHECK LOGS

The following submitted check logs: AI9K, CU2JT, EA1HRR, EA3TA, EA3WD, EA8BEX, K7BX, KC2NKU, KE7UQL/P, KU8E, OK1SKJ, PV8CQ, PY2REK, R7NP, UR8IF, W2CH, YO3FOU, YO5KAS.

What You've Told Us...

Our November survey asked for your views on the state of amateur radio technology, particularly after reading some of the articles in our Technology Special. Two-thirds of you who responded found no surprises there and feel that amateur radio technology is about at the level you already thought it was. However, nearly a quarter of you said the issue showed you that ham radio today is *more* hi-tech than you thought, while two percent feel it is *less* hi-tech than you thought before.

Asked which of the following statements most accurately describes your view of technical knowledge among today's hams, two-thirds of you feel that "Hams' technical knowledge runs the gamut: novice to wizard," while 16% believe most hams are fairly up-to-date on technology, 10% think hams generally are *not* technically knowledgeable, 5% feel hams' technical knowledge is leading edge, and 3% think many hams seem to be stuck in the 20th century.

The next question asked about your own technical skills, and nearly two-thirds (63%) say that you consider yourself moderately skilled, while 21% say you are highly skilled, 13% say not very skilled, and 3% describe yourselves as totally non-technical.

Technical employment among *CQ* readers is very high, with 53% of you reporting working (or having worked) in technical jobs in private industry, 20% in the military and 17% in other government jobs. Roughly one-third (32%) do not or did not work in technical fields.

Among our Technology Special features, the greatest number of readers (27%) found the Radio Arcala (OH8X) article to be the most interesting, followed by Radio Ubuntu (Linux) (18%), High-Performance Software Defined Radio (17%), and Building a 1930s transmitter in 2011 (16%). Asked which of the articles was *least* interesting, the greatest number of readers (22%) responded "None."

This month's winner of a free *CQ* subscription is Francis Drake, KL7IPV, of Las Vegas, Nevada.

Reader Survey February 2012

We'd like to know more about you—about who you are, where you live, what kind(s) of work you do, and of course, what kinds of amateur radio activities you enjoy. Why? To help us serve you better.

Each time we run one of these surveys, we'll ask a few different questions and ask you to indicate your answers by circling numbers on the Survey Card and returning it to us. As a bit of incentive, we'll pick one respondent each month and give that person a complimentary one-year subscription (or subscription extension) to *CQ*.

It's been five years since the FCC dropped its code test requirement for all levels of ham radio licenses in the U.S. So we're repeating a survey from 2007 to see how things may have changed.

Please answer by circling the appropriate numbers on the reply card. You may also take this survey online at <www.surveymonkey.com/s/CQFeb12> [From the digital edition, just click on the link].

1. Do you currently operate Morse code (CW) on the radio?
- Yes 33
- No 34

2. Has your level of on-air CW activity changed since the code test requirement was dropped?
- Increased 35
- No change 36
- Decreased 37
- Licensed after code tests were dropped 38
- Not active on CW 39

3. Has your perception of the general level of on-air CW activity changed since the code test requirement has dropped?
- There seems to be more CW activity 40
- The level seems to be about the same 41
- There seems to be less CW activity 42
- Don't know 43

4. If you are relatively new to CW operating on HF, which experience(s) most closely match(es) yours?
- I find plenty of people to contact at slow speeds 44
- I have trouble finding people to contact at slow speeds 45
- People I contact on CW generally are patient with me 46
- People I contact on CW generally are *not* patient with me 47
- I have gotten help and advice from other hams on CW operating 48
- I have *not* gotten help or advice from other hams on CW operating 49
- I am not a new CW operator 50
- I do not operate CW 51

5. If you are an experienced CW operator, have you ...
- Slowed down to accommodate newer, slower, ops? 52
- Made special efforts to contact newer, slower, ops? 53
- Offered help and advice to new CW ops, either on or off the air? 54
- I am not an experienced CW operator 55
- I do not operate CW 56

6. Have you purchased a new telegraph key in the past 12 months?
- Yes, hand key 57
- Yes, semiautomatic "bug" 58
- Yes, keyer paddles 59
- No 60

Thank you very much for your replies. We'll be back next month with more questions.

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Announcing:

The 2012 CQ World-Wide WPX Contest

SSB: March 24–25 CW: May 26–27

Starts: 0000 GMT Saturday Ends: 2359 GMT Sunday

I. Objective: For amateurs worldwide to contact as many amateurs and prefixes as possible during the contest period.

II. Period of Operation: 48 hours. Single Operator stations may operate 36 of the 48 hours—*off times must be a minimum of 60 minutes* during which no QSO is logged. Multi-operator stations may operate the full 48 hours.

III. Bands: Only the 1.8, 3.5, 7, 14, 21, and 28 MHz bands may be used. *Observance of established band plans is strongly encouraged.*

IV. Terms of Competition for All Categories:

(a) All entrants must operate within the limits of their chosen category when performing any activity that could affect their submitted score. Only the entrant's callsign may be used to aid the entrant's score.

(b) A different callsign must be used for each entry.

(c) Entrants must not exceed the maximum output power specified by their license, or the power limit of their entry category, whichever is less, on any band. Power is measured at the final output connector of the transmitter.

(d) Self-spotting or asking other stations to spot you is not allowed.

(e) Use of QSO alerting assistance is limited to the Single Operator Assisted and Multi-Operator categories. QSO alerting assistance is the use of any technology or outside method that provides callsign and frequency information regarding any other station to the operator. It includes, but is not limited to, use of DX cluster, packet, local or remote callsign and frequency decoding technology (e.g., CW Skimmer), Internet chat rooms or websites, and operating arrangements involving other individuals.

(f) All operation must take place from one operating site. Transmitters and receivers must be located within a 500-meter diameter circle or within the property limits of the station licensee, whichever is greater. All antennas must be physically connected by wires to the transmitters and receivers used by the entrant.

(g) The entry location of a remote station is determined by the physical location of the transmitters, receivers, and antennas. A remote station must obey all station and category limitations.

V. Entry Categories:

A. Single Operator Categories: All operating and logging functions are performed by one person (the operator). Only one transmitted signal is permitted at any time. QSO alerting assistance of any kind places the entrant in the Single Operator Assisted category (see subsection B below).

(a) Single Operator High (All Band or Single Band): QSO alerting assistance is not permitted. Total output power must not exceed **1500 watts.**

(b) Single Operator Low (All Band or Single Band): QSO alerting assistance is not permitted. Total output power must not exceed **100 watts.**

(c) Single Operator QRP (All Band or Single Band): QSO alerting assistance is not permitted. Total output power must not exceed **5 watts.**

B. Single Operator Assisted Categories: All operating and logging functions are performed by one person (the operator). Only one transmitted signal is permitted at any time. Entrants in this category may use QSO alerting assistance.

(a) Single Operator ASSISTED High (All Band or Single Band): Total output power must not exceed **1500 watts.**

(b) Single Operator ASSISTED Low (All Band or Single Band): Total output power must not exceed **100 watts.**

C. Single Operator Overlay Categories: Single Operator entrants may *also* submit their log for *one* of the categories shown below by adding an additional line in the Cabrillo log file header called CATEGORY-OVERLAY. All Overlay entries are grouped into high power and low power in the results.

(a) Tribander/Single Element (TB-WIRES): During the contest an entrant shall use only one (1) tribander (any type, with a single feed line from the transmitter to the antenna) for 10, 15, and 20 meters and single-element antennas on 40, 80, and 160 meters.

(b) Rookie (ROOKIE): To enter this category the operator must have been licensed as a radio amateur three (3) years or less on the date of the contest. Indicate the date first licensed in the SOAPBOX field.

D. Multi-Operator Categories (All Band, High power only): More than one person can contribute to the final score during the official contest period. Select category based on number of transmitted signals. Total output power of each transmitted signal must not exceed **1500 watts.**

(a) Single-Transmitter (MULTI-ONE): Only one transmitted signal is permitted at any time. A maximum of ten (10) band changes may be made in any clock hour (00 through 59 minutes). For example, a change from 20 meters to 40 meters and then back to 20 meters counts as two band changes. Use a single serial number sequence for the entire log.

(b) Two-Transmitter (MULTI-TWO): A maximum of two transmitted signals is permitted at any time on different bands. Either transmitter may work any and all stations. A station may only be worked once per band regardless of which transmitter is used. **The log must indicate which transmitter made each QSO** (column 81 of CABRILLO QSO template for CQ contests). Each transmitter may make a maximum of eight (8) band changes in any clock hour (00 through 59 minutes). For example, a change from 20 meters to 40 meters and then back to 20 meters counts as two band changes. Use a separate serial number sequence for each band.

(c) Multi-Transmitter (MULTI-UNLIMITED): No limit to transmitters, but only one transmitted signal (and running station) allowed per band at any time. Use a separate serial number sequence for each band.

VI. Exchange: RS(T) report plus a progressive contact serial number starting with 001 for the first contact. Note: Multi-Two and Multi-Unlimited entrants use separate serial number sequences on each band.

VII. Contact Points:

(a) Contacts between stations on different continents are worth three (3) points on 28, 21, and 14 MHz and six (6) points on 7, 3.5, and 1.8 MHz.

(b) Contacts between stations on the same continent, but different countries, are worth one (1) point on 28, 21, and 14 MHz and two (2) points on 7, 3.5, and 1.8 MHz. Exception: For North American stations only—contacts between stations within the North American boundaries (both stations must be located in North America) are worth two (2) points on 28, 21, and 14 MHz and four (4) points on 7, 3.5, and 1.8 MHz.

(c) Contacts between stations in the same country are worth 1 point regardless of band.

VIII. Prefix Multipliers: The prefix multiplier is the number of valid prefixes worked. Each PREFIX is counted only once regardless of the band or number of times the same prefix is worked.

(a) A PREFIX is the letter/numeral combination which forms the first part of the amateur call. Examples: N8, W8, WD8, HG1, HG19, KC2, OE2, OE25, LY1000, etc. Any difference in the numbering, lettering, or order of same shall count as a separate prefix. A station operating from a DXCC country different from that indicated by its callsign is required to sign portable. The portable prefix must be an authorized prefix of the country/call area of operation. In cases of portable operation, the portable designator will then become the prefix. Example: N8BJQ operating from Wake Island would sign N8BJQ/KH9 or N8BJQ/NH9. KH6XXX operating from Ohio must use an authorized prefix for the U.S. 8th district (/W8, /AD8, etc.). Portable designators without numbers will be assigned a zero (Ø) after the second letter of the portable designator to form the prefix. Example: PA/N8BJQ would become PAØ. All calls without numbers will be assigned a zero (Ø) after the first two letters to form the prefix. Example: XEFTJW would count as XEØ. Maritime mobile, mobile, /A, /E, /J, /P, or other license class identifiers do not count as prefixes.

(b) Special event, commemorative, and other unique prefix stations are encouraged to participate. Prefixes must be assigned by the licensing authority of the country of operation.

IX. Scoring: A station may be worked once on each band for QSO point credit. Prefix credit may be taken only once.

(a) Single-Operator:

(i) All-Band score is total contact points from all bands multiplied by the number of different prefixes worked.

(ii) Single-Band score is total contact points on the band entered multiplied by the number of different prefixes worked on that band only.

(b) Multi-Operator: Scoring is the same as Single-Operator, All-Band.

X. Awards: Only logs submitted in electronic format are eligible for awards. A single-band log will be eligible for a single-band award only.

To be eligible for an award, a Single Operator station must show a minimum of 4 hours of operation. Multi-operator stations must operate a minimum of 12 hours.

(a) Plaques are awarded to recognize top performance in a number of categories. View the current list of plaques and sponsors at <http://www.cqwpx.com/plaques. htm>.

Only one plaque will be awarded per entry. A station winning a World plaque will not be considered for a sub-area award. That award will be given to the runner-up for that area if the number of entries justifies the award.

(b) Certificates will be awarded to the highest scoring station in each category listed under Section V . . .

(i) In every participating country.

(ii) In each call area of the United States, Canada, Russia, Spain, and Japan.

(iii) At the discretion of the contest director second- and third-place awards may be made.

XI. Club Competition: A plaque will be awarded each year to the club that has the highest aggregate score from logs submitted by its members. To be listed in the results, a minimum of three logs must be received from a club.

(a) The club must be a local group and not a national organization (e.g., ARRL or DARC).

(b) Participation is limited to members residing in or operating

from a local geographic area (exception: DXpeditions specially organized for operation in the contest and manned by members).

(c) Single-operator entries can only contribute to one club. Multi-operator scores may be allocated to multiple clubs as indicated with the entry. Please spell out the full club name in your entry.

XII. Instructions for Submission of Logs: We would appreciate receiving all logs in electronic format. Electronic submission of logs is **required** for anyone competing for an award and for all who use a computer to log the contest or prepare contest logs.

(a) The log MUST show the following for each contact: correct time in UTC, frequency (or band), call, serial number sent, and serial number received. A log without all required information may be reclassified to checklog.

(b) Single band entrants are required to include all contacts made during the contest period, even if on other bands. Only contacts made on the band specified in the Cabrillo header or summary sheet will be considered for scoring purposes. Logs with contacts only on one band will be classified as single band entries.

(c) The CABRILLO file format is the standard for logs. For detailed instructions on filling out the CABRILLO file header, see the WPX Contest website <www. cqwpx. com>. Failure to fill out the header correctly may result in your entry being placed in the wrong category or reclassified as a checklog. Note: U.S. stations must indicate the location of where you operated from in the CABRILLO header (e.g., LOCATION: OH).

(d) E-mail or web upload is the expected method of log submission. SSB logs in CABRILLO format should be sent to <ssb@cqwpx.com>. CW logs in CABRILLO format should be sent to <cw@cqwpx.com>. Include only your callsign in the "Subject:" line of your e-mail. Web upload of logs is available on the CQ WPX website at <www.cqwpx.com>. All logs received via e-mail will be confirmed via e-mail. A listing of logs received can be found on the CQ WPX website.

(e) Instructions for NON-CABRILLO electronic logs: If you are not able to submit a CABRILLO format log, please contact the Contest Director for assistance with submitting another format.

(f) Instructions for paper logs: Paper logs may be mailed to Paper Logs, CQ WPX Contest, P.O. Box 481, New Carlisle, OH 45344. Each paper log entry must be accompanied by a Summary Sheet listing all scoring information, the category of competition, and the entrant's name and mailing address in BLOCK LETTERS.

XIII. Rule Violations: Violation of amateur radio regulations or the rules of the contest; unsportsmanlike conduct; taking credit for excessive unverifiable QSOs or multipliers; use of any non-amateur means of communication to SOLICIT, ARRANGE, or CONFIRM any contacts during or after the contest will be deemed sufficient cause for disqualification.

An entrant whose log is deemed by the Contest Committee to contain rule violations may be issued a Yellow or Red card depending on the seriousness of the infraction. If the entry is in a multi-operator category, all listed operators are so affected.

YELLOW card: Any entrant or operator issued a yellow card is not eligible for an award and will be listed at the end of the published results.

RED card: Any entrant or operator issued a red card is not eligible for an award, will be listed at the end of the published results, and will be ineligible for any *CQ*-sponsored contest award for a period of one year beginning with the publication of the violation in *CQ* magazine.

XIV. Declaration: By submitting an entry in the CQ WPX Contest you agree that: (1) you have read and understood the rules of the contest and agree to be bound by them; (2) you have operated according to all rules and regulations of your country that pertain to amateur radio; (3) your log entry may be made open to the public; and (4) all actions and decisions of the WPX Contest Committee are official and final.

XV. Deadline: All entries must be emailed or postmarked NO LATER than April 18, 2012 for SSB section and June 20, 2012 for the CW section. Logs emailed or postmarked after the deadline may be ineligible for any awards.

Questions pertaining to the WPX Contest may be e-mailed to the WPX Contest Director, Randy Thompson, K5ZD, at <k5zd@cqwpx.com>.

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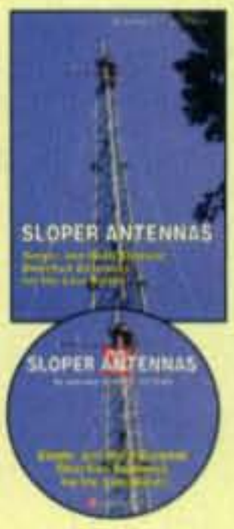

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CQ Reviews:

West Mountain Radio RIGblaster Advantage

BY DAVID T. WITKOWSKI,* W6DTW

Being technophiles, it was inevitable that the computer revolution would have a profound effect on the amateur radio hobby. I'm sure that the first ham to own a personal computer immediately thought, "I wonder how I can use this thing with my rig?"

Today, connecting rigs to PCs involves several different interface methods: data channels for rig control and monitoring, switching systems for actuating discrete inputs such as CW key inputs, and audio input/output for a wide variety of uses such as remote station operation and digital modes for keyboard-to-keyboard QSOs. However, connecting rigs to PCs creates several challenges:

- Audio levels can be mismatched, and mismatches can create problems
- Most rigs still use serial interfaces, but modern PCs no longer have serial ports
- PC power supplies can generate a lot of RF noise, which can raise the rig's receiver noise floor

The solution to these problems is known as a *rig interface*. A rig interface can simply consist of a pair of audio isolation circuits and necessary cables/plugs, or be as complex as a full-featured interface system which will buffer the audio levels and provide a method for easy adjustment, plus provide ways to control the rig (and possibly also power the interface) via USB, actuate the CW key, and PTT lines, etc. West Mountain Radio's new RIGblaster Advantage is one example of a rig interface that addresses these functions, and does so in a powerful yet elegant way.

The RIGblaster Advantage is a compact device (approximately 6.5"W × 4.0"D × 1.5"H, including knobs, switches, etc.), which can be used in both fixed and portable/mobile setups. The name "RIGblaster" is somewhat synonymous with rig interfaces, and the RIGblaster Advantage is yet another evolution of West Mountain's product line. In terms of function and intended market, the RIGblaster Advantage is positioned between the larger RIGblaster Pro and

*1525 Altamont Ave., San Jose, CA 95125
e-mail: <w6dtw@arrl.net>

Photo A– Front view of West Mountain Radio's RIGblaster Advantage.

Photo B– Rear panel of the RIGblaster Advantage. Note both USB and serial ports.

the basic RIGblaster Plug & Play. Like the Pro, it has LEDs to display status and front-panel knobs for quick and easy adjustment of audio levels (see photos A and B).

The RIGblaster Advantage interfaces with your PC via a single USB port, which adds both a USB audio device (aka a "soundcard") and a serial port (aka "COM port"). Rather than require a separate power source, the RIGblaster Advantage's USB circuit derives its power from your PC's USB port. The USB devices allow applications such as contest loggers to send CW or assert PTT under software control, and/or provide rig control of frequency/mode and menus—eliminating the need for a separate serial data interface. The USB audio device handles the transmit and receive audio for AFSK/APSK modes or remote audio interfacing.

Having both an audio device and a serial port on the same USB connection is a big plus, especially if you're running on smaller notebooks or netbooks which often have only one or two USB ports. The serial port on the RIGblaster Advantage can be used in several ways. The interface's back panel includes a DB-9 port (male pin configuration) for rigs such as the Kenwood TS-2000 which offer direct RS-232 control. The DB-9 port can also be wired up as a PTT and/or CW keying interface. The RIGblaster Advantage also provides a 3.5-mm (1/8-inch) TRS phone jack (identical to that used on other RIGblaster products) which can be used for TTL-level control of Yaesu CAT or ICOM CI-V rigs. Cables that convert from 3.5-mm TRS plug to various mini-DIN plugs can be ordered from West Mountain Radio, or you could build your own. Keying your transmitter can be done via the DB-9 signaling pins or via the interface's internal VOX circuitry.

Photo C– Closeup of Instant Setup Connectors, or ISCs, with one installed on the RIGblaster Advantage.

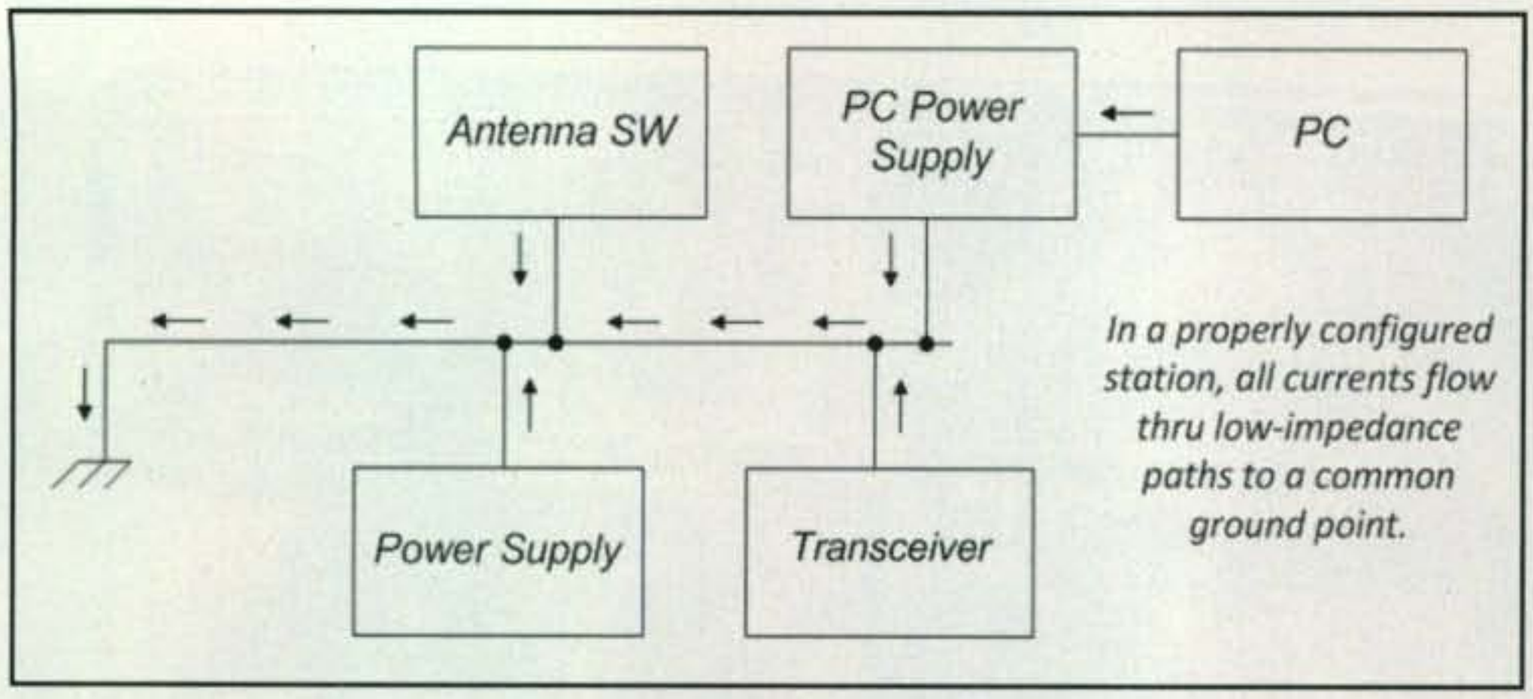

Fig. 1– Proper station grounding

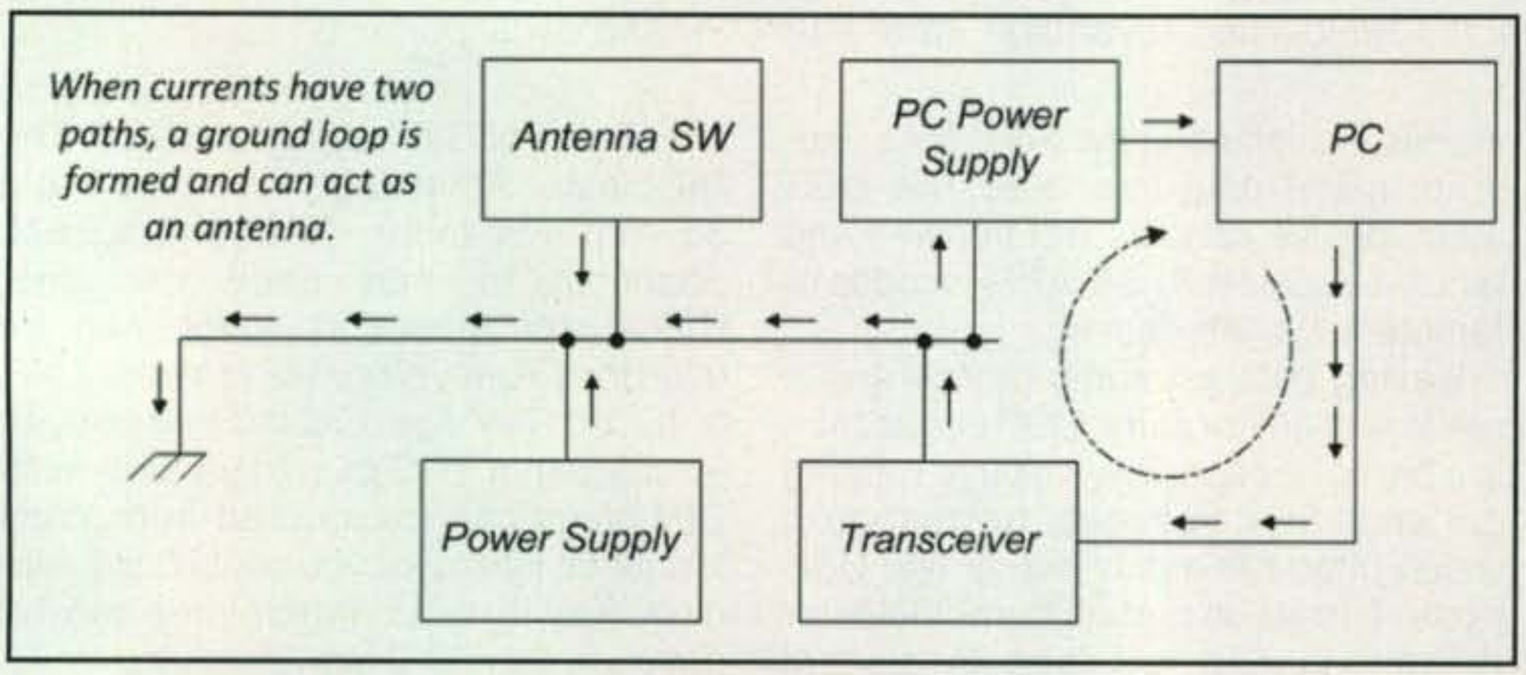

Fig. 2– Improper station grounding can set up a ground loop.

The interface also offers a VOX delay function that holds the PTT on for a settable period of time after the transmit signal goes away.

In addition, having a separate "sound card" can prevent unintentional transmissions of PC audio over the air and improve the *rate accuracy* of digital audio. For more on these two important subjects, see "Digging Deeper: Benefits of a Separate Sound Card for Digital Modes" at: <www.cq-amateur-radio.com/diggingdeeper/USB_audio>.

On the audio side, the primary interconnection method is a cable that goes between the device and your rig's microphone jack. The RIGblaster Advantage cleverly offers a way to handle both types of common microphone jacks; it comes standard with a jumper with an 8P8C (commonly and erroneously referred to as "RJ45") plug on one end and an 8-pin Foster jack on the other. The RIGblaster Advantage has an 8-pin Foster plug on the front panel and an 8P8C jack on the back, so by simply reversing the cable you can interface to any rig.

Typically, configuring a rig interface's internal wiring to match up with your rig's unique microphone pin-out has required the installation of several small jumpers across a set of pin headers, but West Mountain Radio has provided a unique solution in the form of its *Instant Setup Connectors* (photo C). ISCs are essentially small PC boards attached to 100-mil pin sockets which are mated onto a pin header block. Each ISC circuit board has traces that make up the wiring pattern needed to interface a rig into the RIGblaster Advantage's circuitry. The RIGblaster Advantage comes with six ISCs which will cover most standard setups, as well as a set of discrete wire jumpers if you need or want to create a custom configuration. A clever idea! ISCs allow you to quickly change the configuration of your interface, so using it for both home station and portable/rover use—even on different rigs—is fairly quick and easy. It takes more time to remove/replace the screws and open/close the case than it does to swap the ISCs.

I was pleased to note that the RIGblaster Advantage was designed with a key feature needed for proper setup and operation of your station—electrical (including ground) isolation of the rig from the PC. The problem with interfaces that provide a ground path between your rig and the PC is that you're in danger of creating ground loops and introducing PC noise or RFI into your audio paths (see figs. 1 and 2). Under normal circumstances, your rig is (hopefully) tied to a single station ground, along with your other gear. Your PC is (hopefully) plugged into a grounded outlet which is also tied to your station ground. Single-ground is a mantra in the RF world, and for good reason. If you connect your PC's ground to the rig's ground you've created a ground loop, and any digital "hash" generated by the PC now has a low-impedance path right into your rig's ground system. The ground loop can also act like an antenna and introduce RF into your transmit audio, causing major problems. A newly licensed ham I know recently spent eight hours trying to work PSK31 with an S7 noise floor only to discover that his laptop power adapter was spewing noise into his rig. The culprit? A direct-wired rig interface.

Ground loops can also allow RF to intrude on your transmit audio and create other problems. The right way to isolate the interface between your rig and PC is with either 600-ohm 1:1 isolation transformers or opto-isolator chips. These allow the audio to pass unimpeded while ensuring that the grounds on either side of the audio path are kept separate. The Rig Blaster Advantage does a good job of isolating grounds.

In addition to isolating the PC's ground so that the typically noisy power supply doesn't get into the rig's receiver, it's also important that the rig interface itself does not generate noise. I tested the RIGblaster Advantage using the spectrum analyzer in an Anritsu S412E LMR Master™ and found that the RIGblaster Advantage is very quiet; it doesn't radiate or conduct any measurable RF in the amateur bands and did not raise the receiver's noise floor in either HF or VHF/UHF bands.

Field-Testing the RIGblaster Advantage

While unboxing the RIGblaster Advantage (photo D), my initial impression was that the product and accessories clearly were designed to provide maximum flexibility across a wide range of possible applications. The inclusion of the ISCs and various accessory pieces is key to this flexibility; if your rig offers receive audio via a 1/8-inch (3.5-mm) "phone" jack, it's highly unlikely that you'll be able to get on the air without the need to dig up additional parts. I found it fairly easy to set up the interface for various purposes, without really needing to refer to the manual. (To be fair, I have a lot of prior experience experimenting with rig interfaces, and so I was hardly coming into the process with no "a priori" understanding.)

On the downside, I noted that the manual contained no diagrams showing how the RIGblaster Advantage would interconnect between any of my rigs and PCs. West Mountain Radio has done a good job of labeling the jacks on the RIGblaster Advantage, and the descriptive text in the manual is helpful, but my feeling is that some illustrations would likely be welcomed by less experienced operators or those (like me) who tend to think visually. Suggestion: WMR may want to consider creating a tutorial website that would show interface diagrams for popular rigs.

Another suggestion I'd make to WMR involves the ISC pin header system. Seeing this led me to start thinking about how I might build circuits that would plug onto the interface's pin headers. For example, a while ago I built a TX audio conditioner using the Analog Devices SM2166. It was fairly easy to build, but I spent more time constructing a durable hardware/cable interface than I did the circuit itself. I realized that if I'd had a RIGblaster Advantage at the time, it would have served as a perfect platform for my design; I could simply have wired the circuit into a pin header

Photo D– The West Mountain Radio RIGblaster Advantage as it first comes out of the box.

socket, inserted that in place of the ISC, and attached the circuit to a suitable power/ground point inside the case. A nice idea, but unfortunately WMR doesn't provide a diagram or schematic for the ISC pin header. I suggest WMR provide information on the ISC to encourage this kind of experimentation.

I encountered no problems when installing the required PC drivers under Windows® XP. (Since the RIGblaster Advantage converts from USB to serial data and audio, PC drivers *are* needed.) In fact, quite the opposite. I didn't even have to use the included CDROM; I simply allowed the Windows® installer to connect to the internet and it downloaded the drivers from the Microsoft driver website.

I tested the RIGblaster Advantage in several configurations:

- Portable station with a Yaesu FT-900
- Remote station with a Kenwood TS-2000
- Mobile/Rover station with a Yaesu FT-857D

Portable Station

For the portable station (photo E), I configured an audio-only interface; the Yaesu FT-900 has a CAT control port with a non-standard mini-DIN jack configuration. I probably could have hunted up the correct mini-DIN plug and hacked one from junk-box parts, but I decided against doing that. The RIGblaster Advantage proved to be a great help when operating the FT-900; oddly enough, Yaesu didn't put an RF gain knob into that rig and so operating JT65 is always a challenge due to the mode's requirements for relatively tight control over received audio level. In the past I've had to fuss with on-screen sliders for my laptop's audio device, which is a slow and somewhat annoying process. Adjusting the levels using the interface's receive audio knob made operating JT65 on the FT-900 a *lot* easier.

Remote Station

In the remote station setup (photo F), I configured the interface to handle both audio and rig control, and built a remotely controlled HF station. (This setup is essentially an updated version of the one I described in my blog back in 2007: <http://sparqi.blogspot.com/2007/12/ts-2000-remote-control-w-audio.html>) I routed the RIGblaster Advantage to a PC running the Skype™ VOIP client, and configured my Skype client to auto-answer when receiving a VOIP call. I set up the RS-232 interface for rig control via Ham Radio Deluxe's IP server, and configured the IP server to accept connections from a LogMeIn Hamachi™ peer-peer VPN client. Keying of the transmitter was done via rig control commands from HRD. Using this setup the RIGblaster Advantage allowed me to control all functions and menus of my TS-2000, send and receive audio, and successfully operate HF phone via a laptop while in a hotel over 500 miles away from home station.

Mobile/Rover Station

For the mobile/rover station (photo G), I configured the RIGblaster Advantage to handle the audio interface and CAT control of the FT-857D from the driver's seat of my car while parked on Skyline Boulevard overlooking Stanford University and the San Francisco Bay area. I already have a microphone extender kit and a 3.5-mm TRS extension cable (for CW paddles) running from the driver's seat back to the FT-857D mounted in my rear cargo space, so I repurposed the TRS extender for CAT and

Photo E– Portable station setup using the RIGblaster Advantage with a Yaesu FT-900 transceiver.

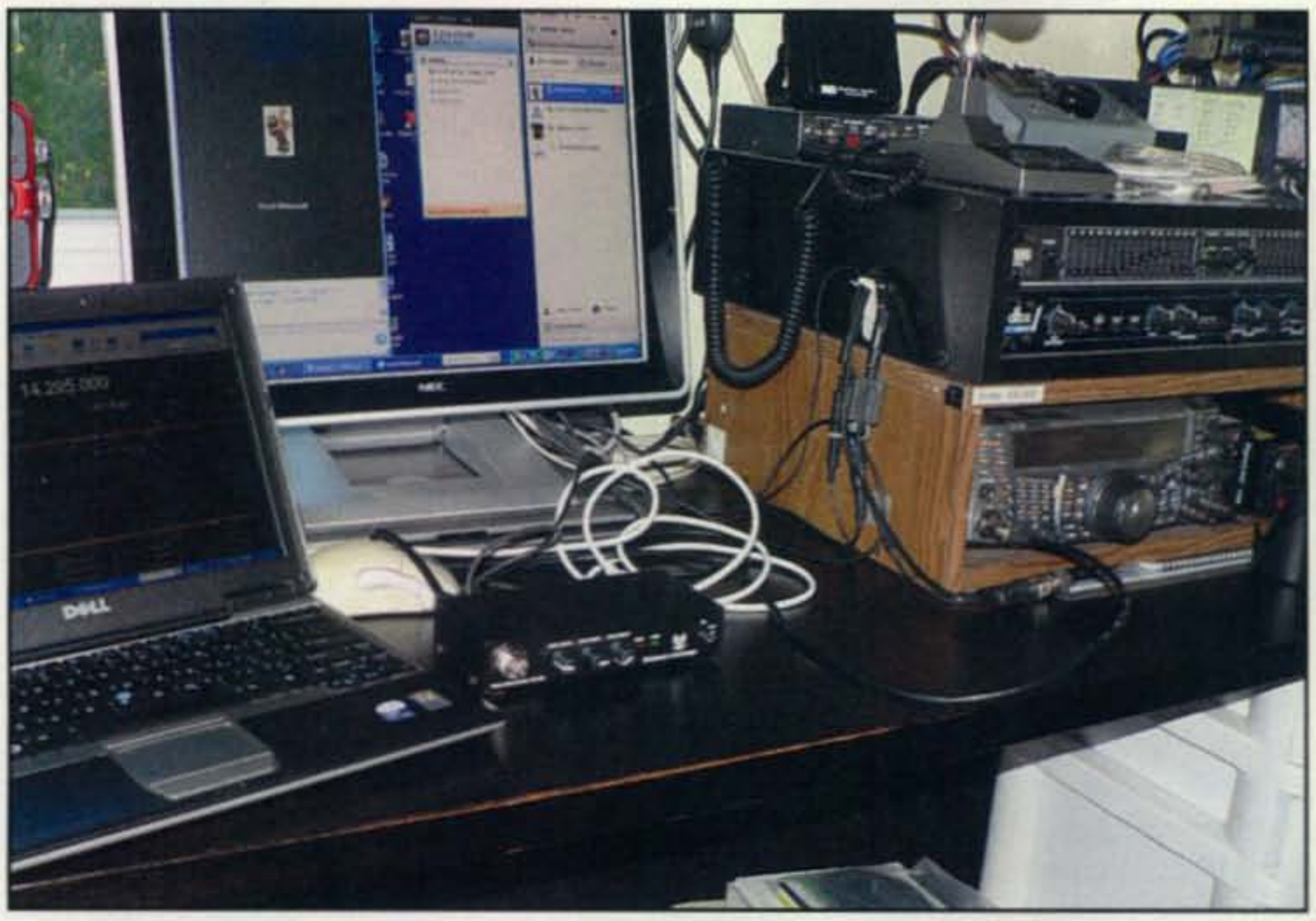

Photo F– Remote station setup using a Kenwood TS-2000. This allowed the author to operate HF phone from a hotel 500 miles away from his home station.

was quickly on the air running PSK31 as a rover.

Conclusions

Overall, I found the RIGblaster Advantage to be a well-designed, flexible, and enjoyable addition to my on-the-air activities. It performed well under a variety of scenarios and was easily reconfigured when I wanted to do so. In creating the RIGblaster Advantage, I think West Mountain Radio has combined performance and features into a useful amateur station accessory at an affordable price (list price is $200). With some additional documentation, it also has the potential to be an audio experimenter's platform, and I encourage WMR to support this use model in the future.

For more information, visit your favorite West Mountain Radio dealer or visit the RIGblaster Advantage webpage at <http://bit.ly/rJOMik>.

Photo G– The Mobile/Rover station setup used the RIGblaster Advantage and a Yaesu FT-857D for operating PSK-31 from the author's car, overlooking Stanford University.

math's notes

BY IRWIN MATH,* WA2NDM

Relays vs. Diodes: The T-431

This month we would like to pass on a couple of items that you might find useful (or at least interesting).

In past columns we described how a simple diode placed in series with a battery-operated device could prevent connecting an external battery or power supply to the device with the wrong polarity. This is shown for reference in fig. 1. The circuit works properly but has two drawbacks. The first is that there is a drop of anywhere from 0.5 to 1 volt across the diode due to the physics of the diode. If the required voltage at the input of your device can tolerate such a drop, there is, of course, no problem except perhaps at low battery voltages. Secondly, if the current drawn by the device is small, then the dissipation of the diode can be neglected. If it is high, however, then you must pay attention.

Keep in mind that 1 ampere of current flowing through a diode such as a 1N4002 (its upper limit, by the way) will develop 0.7 to 1 watt across the diode (0.7 volts × 1.0 ampere). This will cause it to get hot! Heavier current flows through larger diodes will develop even more heat since the forward voltage drop is always there, so just be aware.

Fig. 2 is a way to obtain the same reverse polarity protection but with virtually no drop or heat dissipation at all in the series pass element. Here we simply have replaced the diode with a relay. Notice that the coil of the relay is connected to a diode that will only conduct when the input voltage is of the wrong polarity. When the polarity is correct, the relay will not pull in and there will be no voltage drop through the relay's contacts. No voltage drop means no heat is produced and everyone is happy. The purists will, of course, be quick to indicate that relay contacts actually do have some resistance, and a resulting minute voltage drop would occur. Rest assured, though, that it is magnitudes less than with a diode. In addition, the extra contact can even be used to indicate wrong polarity if you connect it to an LED and suitable dropping resistor with the LED's cathode toward the contact. Also note that for the correct polarity the relay does not pull in and therefore wastes no additional power.

I am sure that many of you who are homebrewers have used Zener diodes in some of your projects and from time to time wish that you could have a selection of various voltages. To address this situation I would like to introduce you to a unique device that we recently have started to use. I am speaking about the TL-431. This is normally called a "shunt regulator" by the various manufacturers, but in reality can be thought of as an "adjustable Zener diode." Fig. 3 shows the basic application circuit of the device. Just like a Zener, there is a series resistor and the device itself, which has an anode (A) and a cathode (C). Where the difference occurs is the presence of a third input (Adj) which is used to control the voltage where the device conducts. This voltage is determined by the following simple formula:

$$Vo = \left(1 + \frac{R1}{R2}\right)2.5$$

For a 5-volt "Zener" R1 would equal R2, so the result would be (1+1)2.5 = 5. The values of R1 and R2 can vary greatly, even up to hundreds of Kohms, so they are not critical at all. However, the series resistor, Rs, should be chosen so that the minimum current through the TL-431 is a couple of milliamperes and the maximum current does not exceed the dissipation of the device.

The TL-431 comes in a convenient TO-92 package (the same as a typical plastic transistor such as the 2N3904) and can work up to 36 volts and conduct as much as 100 ma. Pin connections for the TO-92 version are given in fig. 3. Other packages are also available, so be sure to consult the data sheets for information on these. Power dissipation is rated at 700 mw, but if you think of it as a 500-mw Zener equivalent, you should have no problems.

There are many applications for the TL-431 beyond simple Zener replacements, and a visit to the TI (www.ti.com) or ON Semiconductor (www.onsemi.com) website will show several of

*c/o CQ magazine

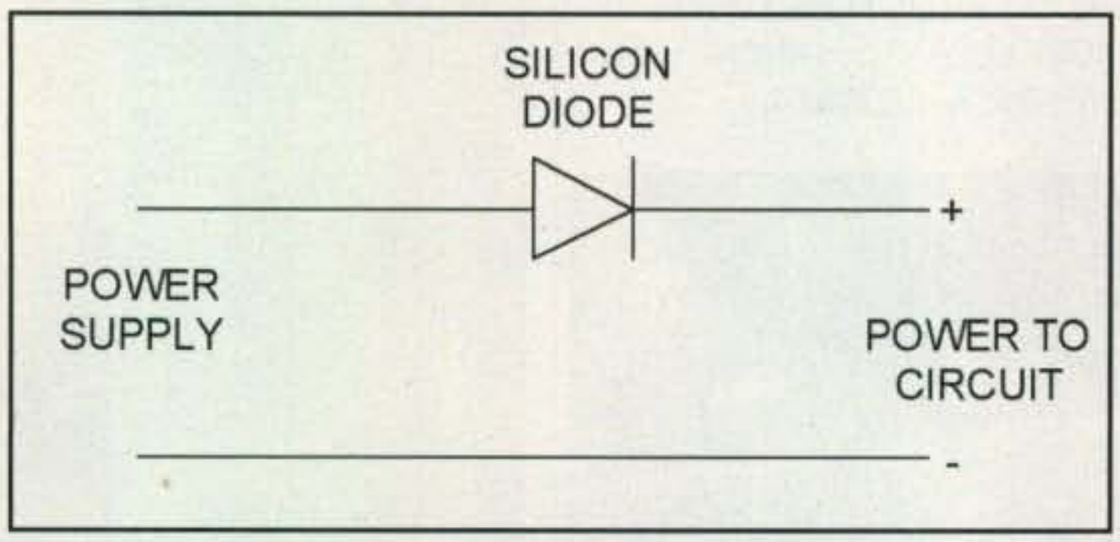

Fig. 1– Simple diode polarity protection.

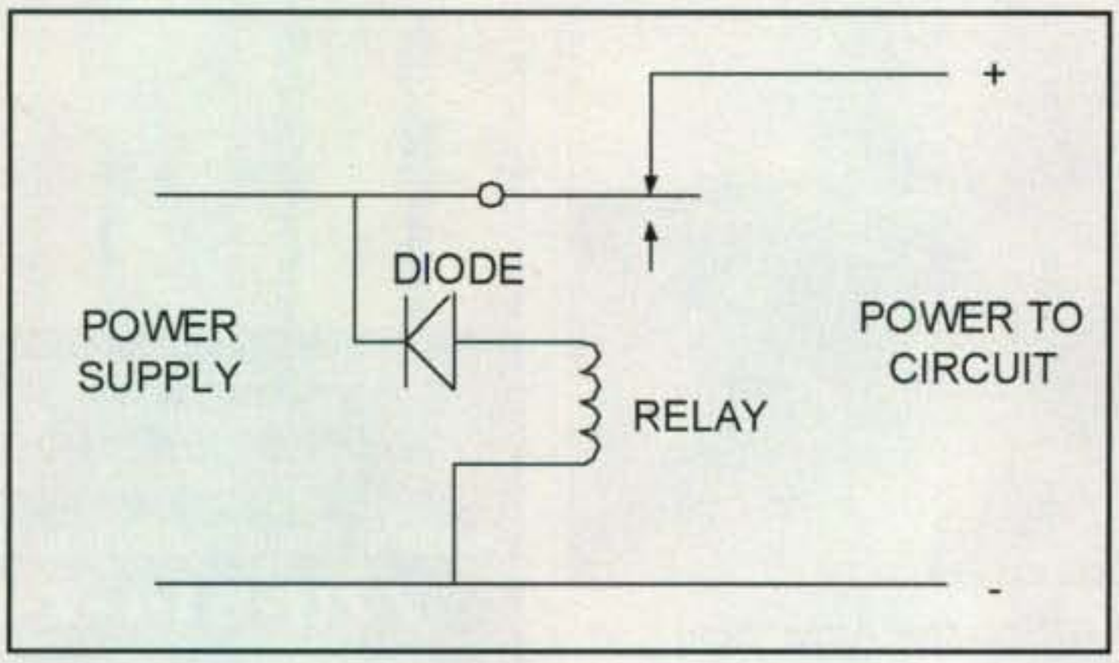

Fig. 2– Simple relay polarity protection.

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- High-grade water-resistant materials compatible to IPX7
- Alinco's unique user-selectable PTT delay option eliminates the annoying squelch tail noise that some repeaters retransmit at the end of receiving non-reverse burst tone-encoded CTCSS signals
- Great audio with large 32mm internal speaker
- Easy-to-read backlit alphanumeric display
- Large screen full-matrix LCD with easy-to-read icons and battery charge level
- Patented ChannelScope function allows visual monitoring of nearby signals
- "Wild key" lets you quickly change to frequently used setting
- 39 CTCSS tone squelch (encode + decode) and 104 DCS
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- Keypad selectable multi-step receiver attenuator
- Cloning capability between DJ-G29T units or through PC (optional cable needed)
- Quick-write memory channels
- Direct frequency input through illuminated keypad
- DTMF encode and auto-dialer
- 500 Memories with memory banks
- Automatic repeater-setting function
- Keylock function
- Multiple scan functions: VFO, Memory, Program, Tone, DCS & Sweep
- Crossband repeater feature

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these. Fig. 4 shows one unique application of the device as an audio amplifier. Here the adjustment input is varied by an incoming audio signal and drives a speaker to room-filling volume.

The Incandescent Lamp

Regarding my column on the demise of the incandescent lamp (November 2011 issue), I would like to paraphrase several engineering comments I have read recently regarding this decision. While it is true that the efficiency of an incandescent lamp is low, the wasted power is heat. In the winter, particularly in the northeast when the days are short, lamps are usually kept on longer than during other seasons. The "wasted heat" from such lamps adds to the normal heat generated to heat our homes and actually reduces our heating bill to some degree. By using a more efficient lamp this savings (whatever it is) is reduced. In summer the situation is reversed. Now less time a lamp is on means less light but also less heat, so the overall savings due to the greater efficiency is less.

It would be interesting to somehow calculate the overall savings for a total replacement of bulbs, also taking into account the higher cost for the energy-efficient lamps. I'll bet it is not as high as the manufacturers (and government) would like us to believe. The lowly incandescent is an elegant and simple solution and perhaps deserves a second chance!

I hope the above is of interest to you and that you will consider experimenting with the unusual applications of various semiconductors as well as the TL-431.

73, Irwin, WA2NDM

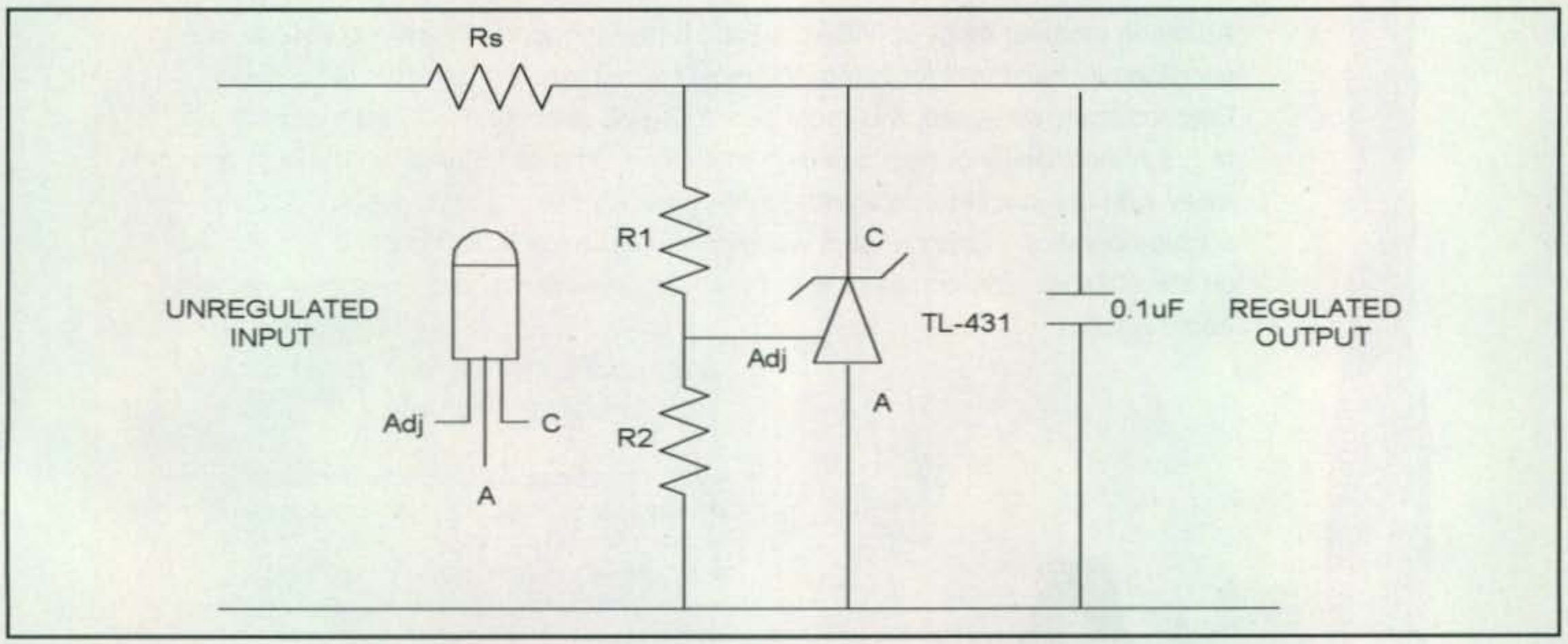

Fig. 3– Basic TL-431 circuit.

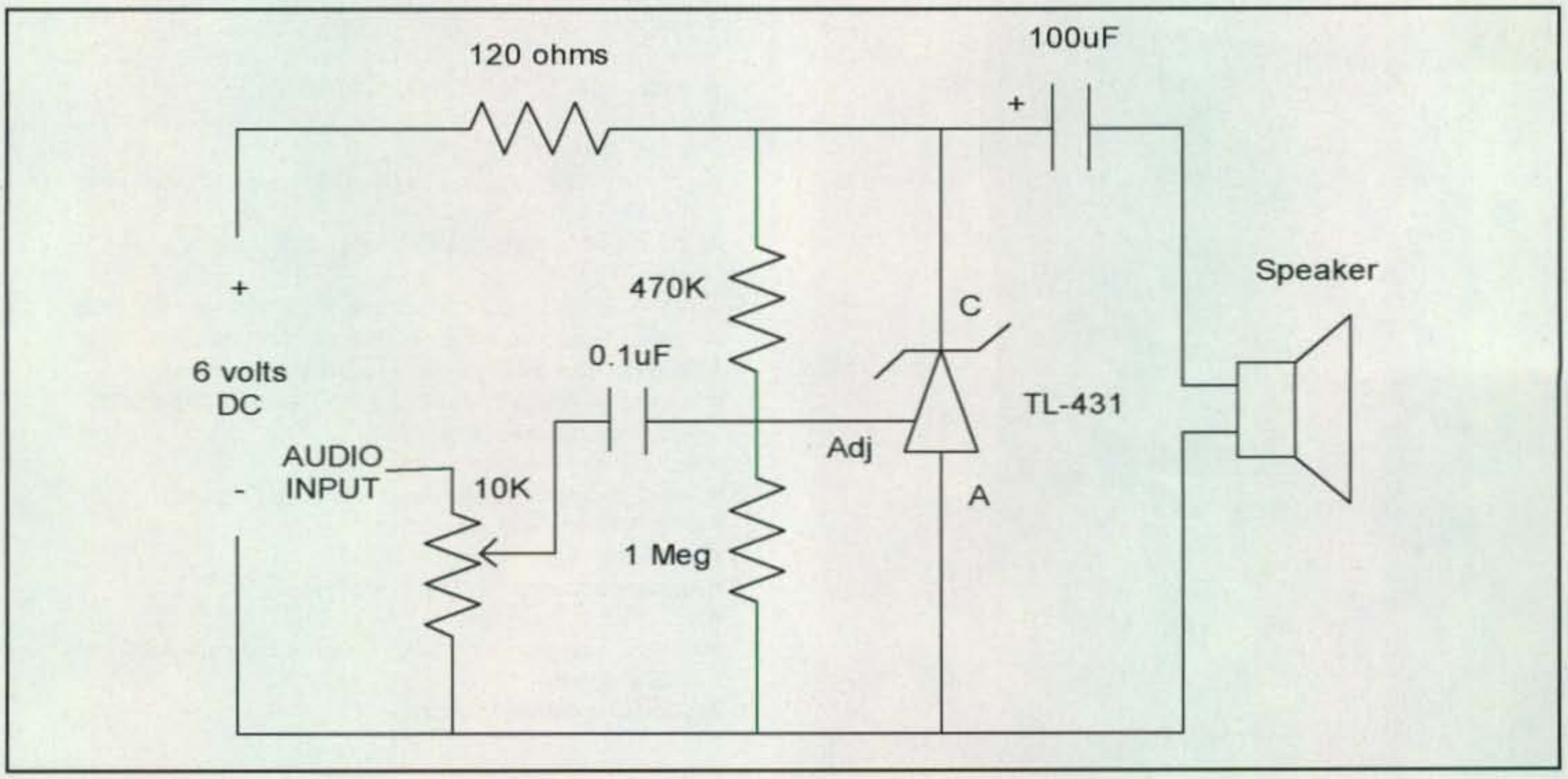

Fig. 4– Audio amplifier using the TL-431.

From the Great North:
A Great Story about A Great Story

BY RICHARD FISHER,* KI6SN

"Ham operators are an interesting group. Though unpaid, they're deeply committed to public service. Although they willingly take to the airwaves, some prefer to be heard, not seen—a characteristic WL7MR likens to 'bull elk in hunting season.'"

—Jill Burke, Alaska Dispatch.com

Not too long ago there was a story on Alaska Dispatch.com about radio amateurs' emergency communications support when a particularly nasty near-perfect Bering Sea storm slammed into the state's coastline in late 2011. It recounts the misery residents endured and the tenacity, ingenuity, and expertise hams used to help the region's citizens get through it.

In early November 2011, this weather system developed into one of those brutal events that put amateurs on high alert and many people in Alaska in mind of amateur radio's legacy of public service in the state, notably dating to the 1964 Earthquake almost a half-century ago (photo A).

In her online magazine piece, Dispatch reporter Jill Burke not only accounted for radio amateurs' vital support in the aftermath of the November 2011 storm, but added historical perspective to our hobby's public service in the state.

(READ: In full, Jill Burke's Alaska Dispatch.com story "As Howling Storm Battered Alaska, Ham Operators Provided Vital Link" at: <http://bit.ly/rXlW9G>.—ed.)

We cite her piece not because it is particularly complimentary to amateur radio, but because it is so thorough and filled with sharp insight. It is a lesson in public-service reporting for journalists and "wannabes."

(WATCH: Home video of Alaska's "superstorm" taken along the Bering Sea in Nome on November 9, 2011: <http://bit.ly/uCD8vm>.—ed)

"When All Else Fails . . . "

In describing this jet-stream-fed "wintery sea-spun tempest that sideswiped Alaska's western coast" (photo B), Burke observed what public service-oriented hams wish everyone knew—because *they live it:* "When other communications failed, ham radio operators came to the rescue. Throughout the storm, they were the eyes for scientists in Fairbanks and Anchorage who otherwise would have been blind to weather conditions they could predict but not see."

**1940 Wetherly Way, Riverside, CA 92506*
e-mail: <ki6sn@cq-amateur-radio.com>

Burke, a former reporter for local KTUU TV who transitioned to online reporting with Alaska *Dispatch.com*, photo C, sought out Carven Scott, National Weather Service forecaster in Anchorage, for a non-ham's perspective on amateur radio's EmComm contribution: "They [amateurs] were providing critical observations. We don't have a lot of meteorological observations in the west. We don't have the instruments out there."

Data such as wind direction and velocity, sea-level and wave height, air temperature and snowy or rainy observations were vital, Scott said. Messages from small villages that "were deceptively simple," Burke wrote, provided the NWS with critical pieces to the puzzle. "Whatever you do, don't cut it off, because this stuff is really helping us," Scott told the radio amateurs.

Little Things Mean a Lot

"Those seemingly unimportant pieces of information help us characterize where the front is," Scott told Burke. "Without that information, it would impact our ability to execute our mission, which is the protection of life and property and enhancement of national commerce."

The Amateur Radio Emergency Service (ARES®) in Alaska leaned on the services of

Photo A– The Alaska Earthquake of 1964 is recalled as a crowning moment for amateur radio emergency communications support in Alaska. (Courtesy of Wikimedia Commons)

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NEW! AT-200Pro II

The AT-200ProII now includes LEDs to show antenna position and if the tuner is in bypass. A two position antenna switch stores 2000 memories per switch. Handles up to 250 watts SSB or CW on 1.8 to 30 MHz and 100 watts on 54 MHz. Rugged and easy to read LED bar graphs simultaneously show RF power and SWR. Includes a six foot DC power cable.

Suggested Price $259.99

Z-11Pro II

Meet the Z-11ProII, everything you always wanted in a small, portable tuner. Designed from the ground up for battery operation. Only 5" x 7.7" x 1.5", and weighing only 1.5 pounds, it handles 0.1 to 125 watts, making it ideal for both QRP and standard 100 watt transceivers from 160 - 6 meters. The Z-11ProII uses LDG's state-of-the-art processor-controlled Switched-L tuning network. It will match dipoles, verticals, inverted-Vs or virtually any coax-fed antenna. With an optional LDG balun, it will also match longwires or antennas fed with ladder-line. Includes six foot DC power cable.

Suggested Price $179.99

radio not included

Z-817

The ultimate autotuner for QRP radios including the Yaesu FT-817(D). Tuning is simple; one button push on the tuner is all that is needed - the Z-817 takes care of the rest. It will switch to PKT mode, transmit a carrier, tune the tuner, then restore the radio to the previous mode! 2000 memories cover 160 through 6 meters. The Z-817 will also function as a general purpose antenna tuner with other QRP radios. Just transmit a carrier and press the tune button on the tuner. Powered by four AA internal Alkaline batteries (not included), so there are no additional cables required.

Suggested Price $129.99.

radio not included

AT-897Plus
for the Yaesu FT-897

If you own a Yaesu FT-897 and want a broad range automatic antenna tuner, look no further! The AT-897Plus Autotuner mounts on the side of your FT-897 just like the original equipment and takes power directly from the CAT port of the FT-897 and provides a second CAT port on the back of the tuner so hooking up another CAT device couldn't be easier. ***Suggested Price$199.99***

AT-600Pro

The AT-600Pro handles up to 600 watts SSB and CW, 300 on RTTY (1.8 – 30 MHz), and 250 watts on 54 MHz. Matches virtually any kind of coax-fed antenna and will typically match a 10:1 SWR down to 1.5:1 in just a few seconds. You can also use it with longwires, random wires and antennas fed with ladder line just by adding a balun. Two antenna ports with a front-panel indicator, and separate memory banks for each antenna. LED bar-graph meters shows RF power, SWR and tuner status, tactile feedback control buttons and an LED bypass indicator. Operates from 11 – 16 volts DC at 750 mA. Includes six foot DC power cable.

Suggested Price $359.99

Z-100Plus

Small and simple to use, the Z-100Plus sports 2000 memories that store both frequency and tuning parameters. It will run on any voltage source from 7 to 18 volts; six AA batteries will run it for a year of normal use. Current draw while tuning is less than 100ma. The Z-100Plus now includes an internal frequency counter so the operating frequency is stored with tuning parameters to make memory tunes a blazingly fast 0.1 seconds; full tunes take an average of only 6 seconds. Includes six foot DC power cable.***Suggested Price $159.99***

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NEW! Z-817H

The ultimate autotuner for QRP radios including the Yaesu FT-817(D) with addition of the Tokyo High Power HL-45B. Interfaces to the CAT port (ACC) on the back of the radio with the provided cable. One button push on the tuner and the Z-817H takes care of the rest. Will also function as a general purpose antenna tuner with other QRP radios or QRP radios with up to 75 watt HF amps. Powered by four AA internal Alkaline batteries (not included). 2000 memories cover 160 through 6 meters.

Suggested Price $159.99

- ***RF Sensing***
- ***Tunes Automatically***
- ***No Interface Cables Needed***

AT-100Pro II

This desktop tuner covers all frequencies from 1.8 – 54 MHz (including 6 meters), and will automatically match your antenna in no time. It features a two-position antenna switch with LEDs, allowing you to switch instantly between two antennas. The AT-100ProII requires just 1 watt for operation, but will handle up to 125 watts. Includes six foot DC power cable.

Suggested Price $229.99

AT-1000Pro

The AT-1000Pro has an Automode that automatically starts a tuning cycle when the SWR exceeds a limit you set. Operates at any power level between 5 and 1,000 watts peak. RF Relay protection software prevents tuning at greater than 125 watts. Tunes from 1.8 to 54.0 MHz (inc. 6 meters), with tuning time usually under 4 seconds, transmitting near a frequency with stored tuning parameters, under 0.2 seconds. 2000 memories. 2 Antenna connections. Includes six foot DC power cable.

Suggested Price $599

IT-100

Matched in size to the IC-7000 and IC-706, for either manual or automatic tunes, and status LEDs. Control the IT-100 and its 2000 memories from either its own button or the Tune button on your IC-7000 or other Icom rigs. For your Icom radio that is AH3 or AH-4 compatible. ***Suggested Price $179.99***

YT-100

For Yaesu FT-857, FT-897 and FT-100 (and all D models) an integrated tuner, powered by the interface. Press the tune button on the tuner, and everything else happens automatically. ***Suggested Price $199.99***

KT-100

For AT-300 compatible Kenwood transceivers (except TS-480HX). The KT-100 actually allows you to use the Tune button on the radio. 2,000 memories for instant recall of the tuning parameters for your favorite bands and frequencies. ***Suggested Price $199.99***

YT-450

Designed for Yaesu's newest 100 watt radios. Interfaces directly with the Yaesu FT-450 and FT-950 radios. Press the tune button on the tuner and the rest happens automatically. It will quickly match nearly any kind of coax fed antenna with an SWR of up to 10:1. 2000 memories recall settings in an instant! Seamless connection to a PC.

Suggested Price $249.99

YT-847

YT-847 Autotuner is an integrated tuner for the Yaesu FT-847. An included CAT/Power cable interfaces with your FT-847. Just press the tune button on the tuner and everything else happens automatically!

Suggested Price $249.99

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20-6 meters *Fixed or Portable Operation*

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S9RP $39.99

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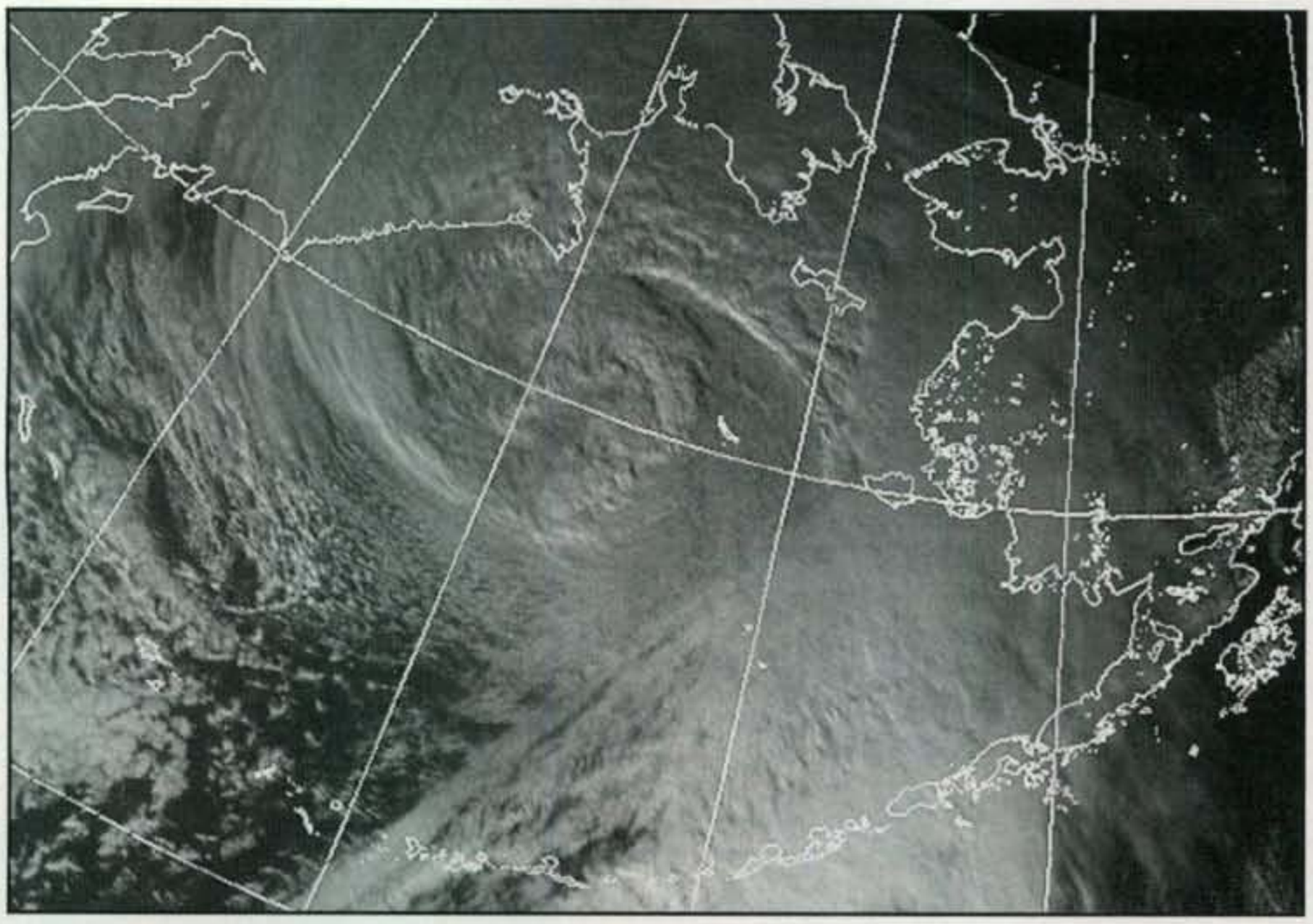

Photo B– In this November 8, 2011 satellite view, a wicked storm system moves across the Bering Sea on its way to the Alaska coastline, where hams were called into action. (Courtesy of NASA)

Martin Ruud, WL7MR, to be an information clearing house from his home station in Nome.

"Working from Tuesday night, as the storm descended, until Thursday morning, Ruud manned his home-based station," Burke wrote. "He draped sleeping bags over his windows to protect himself and his equipment in case a wind gust shattered the glass. Outside, a 160-meter loop . . . stood ready atop four telephone poles the city of Nome gave to him for free, knowing he could put people in contact when other methods failed."

Radio Amateurs: "An Interesting Group"

In her story, Burke observes: "Ham operators are an interesting group. Though unpaid, they're deeply committed to public service. Although they willingly take to the airwaves, some prefer to be heard, not seen, a characteristic Ruud likens to 'bull elk in hunting season.' That may explain Ruud's preference to conduct an interview by e-mail instead of over the phone."

Many smaller communities relied on the internet or phone connections to report to Ruud, who then put observations into an e-mail format that was transmitted via ham radio to processing centers, "sometimes with pictures attached."

Burke cited amateur radio's advantage of self-reliance: "They don't need AC power nor an internet or satellite connection. Generators and car batteries can power the equipment, making them independent of any community's power or communication grid. And with receiving stations spread throughout the world, it's relatively easy to find a way to get the message through."

Making It Happen

Describing Ruud's messages' circuitous route, the *Dispatch* story said his dispatches were "first picked up in Petaluma, Calif.—rather than monitoring stations in Fairbanks or Anchorage—before being sent to their intended recipients in Alaska. This network allowed the village of Shishmaref to get word out near 11 o'clock one night that none of its residents had been injured, phones still worked, there was no known damage, the gym was open, businesses were closed, and help

Photo C– An Alaska Dispatch *story from December 11, 2011 describes amateur radio operators' value and expertise in providing EmComm during a dangerous Bering Sea storm in November. (Internet screen grab from Alaska* Dispatch*: <http://bit.ly/rXlW9G>.)*

Photo D– Alaska Dispatch.com *reporter Jill Burke talks with Shelia Conlin on Vimeo.com about her transition from television to online journalism. (Internet screen grab from Vimeo: <http://vimeo.com/11574306>)*

wasn't needed." Then the critical weather information: "Calm winds, water still rising, lots of water in lagoon slowly getting into homes."

Ruud, WL7MR, "was able to distribute a picture sent from the village of Koyuk showing ice beginning to build, as well as this message: 'Blizzard conditions set in 10 PM, winds 15 from SE, gusts up to 25. Tide has not come in yet. Tide receded about 3.5 feet from the highest tide. No property damages as of last update or personal injury. Still haven't heard if the school or businesses will close tomorrow. Business are open normal hours this evening. So far, so good.'"

Always There, Never Giving Up

"For nearly 48 hours, Ruud kept at it, funneling messages to and fro," Burke said. "By early Thursday morning, he and the rest of the hams stood down."

In adding historical perspective, Burke used the 1964 Alaska Earthquake as a touchstone: " . . . When state and military communication grids were interrupted, the amateur operators stepped in to help Alaskans get messages to family and loved ones *outside.*"

During the November 2011 storm, (ARES®) showed "it's a good complement to the state's emergency system," she said. "More than a back-up, it demonstrated it can fill information gaps—though it will never replace the communication used by those in command. Ham operators always defer to official responders during any crisis."

Alaska state, local communities, and military authorities have taken note and begun to include amateur radio in the way they respond to disasters, Jim Larsen, AL7FS, told Burke. "We actually hope we never get used. But we want to help our communities, so if they need us, we want to be as prepared as we can," he said. "We are a force multiplier for the management."

In conclusion, Burke observed that radio amateurs "don't seem to want pats on the back. Mostly, they seem to only want to help."

"Ham operators do this all the time," Ruud said via e-mail to Burke. "The volunteers in the village(s) are the real heroes who are willing to help out their communities."

(IN DEPTH: Watch and listen to Alaska Dispatch.com reporter Jill Burke [photo D] talk about her transition from TV to online journalism at: <http://bit.ly/uwcPCM>.—ed.)

Delaware Ops Step Up for Hurricane Irene

In a hurricane with as massive a footprint as 2011's Irene (photos E and F), it should not be surprising that *CQ*'s "Public Service" columnist is still catching up with reports from EmComm groups who answered the call.

This month, it's Sussex County (Delaware) ARES® front-and-center, recounting its activity in support of "served agencies over the weekend of August 27–28," bringing vital communications to two area hospitals and two local shelters.

Herb Quick, KF3BT, reports that during a 30-hour period, "33 amateur radio operators . . . volunteered a total of 357.5 person-hours in service to ARES® assignments. A total of 60 hams participated in the hurricane net."

On the Cover

Chasing DX is the primary passion of Tom Lutz, WØZR, of Minnetonka, Minnesota. His current focus is on 160 meters, on which he'd confirmed 194 countries at press time. The 72-foot crank-up tower behind Tom in the photo is shunt-fed to serve as his 160-meter transmit antenna. He has a K9AY receiving loop to pick up incoming top-band signals. The tower also hosts several other HF antennas, including a Hy-Gain TH-11 DX for 10-20 meters*, a 2-element Cushcraft beam for 40 and a rotatable dipole for 80 meters.

Tom's main radio is an ICOM IC-7600, but his shack consists of a mix of current and vintage gear. Prominent in his collection are a pair of Collins 75A4 receivers and a 32V3 transmitter, rigs he used when he was first licensed at age 12 back in 1957. (If you're wondering how a 12-year-old managed to start out with Collins gear, it's because Tom and his dad discovered ham radio together when they built a superhet receiver featured in *Boy's Life* magazine. They learned code together and got their Novice licenses together. Tom says he and his father maintained regular radio contacts until his father passed away.)

Over the years, Tom has managed to earn 5-Band DXCC, the ARRL's #1 Honor Roll and CQ's 5-Band Worked All Zones, which he termed his most coveted and most difficult award to earn. DXing has been a constant in Tom's ham radio career, and even survived a 15-year absence from the hobby from the mid-1960s to 1980. Another constant has been CW, which Tom calls "a long-time passion," even though he feels that today, it's "kind of becoming a lost art." *(Main cover photo by Larry Mulvehill, WB2ZPI)*

Inset: The K6RPT-11 balloon that flew from California to the Mediterranean in mid-December. See "VHF-Plus" on page 91. *(Inset photo by KG6TBY)*

**This photo was taken before the TH-11 replaced Tom's Force 12 20-meter monobander at the bottom of the stack on his tower.*

Photo E– A view from outer space shows the massive footprint of Hurricane Irene as her eye takes aim at the U.S. East Coast. (Courtesy of NASA)

Quick said more than 600 people, many with pets, were evacuated from flood zones to shelters during the hurricane. "Tactical communications were coordinated by a highly efficient net," he said, "with control operators serving three-hour shifts."

Following requests for support received in the days prior to Hurricane Irene's landfall, "ARES® leadership drafted an operations plan based on normal storm procedures. Communications teams were assigned to Beebe Medical Center (Lewes, Delaware), Nanticoke Memorial Hospital (Seaford), Beacon Middle School Shelter (Lewes), and Sussex Technical High School Shelter (Georgetown)," Quick said, adding, "early planning and coordination prior to the weather event was crucial to the success of the ARES® operation."

Quick said VHF, UHF, and WinLink links were quickly established at the hospitals and "all amateurs cooperated to make sure that radio systems were established and operated as necessary to support the served agencies."

In addition to high winds associated with Irene, "a tornado touched down in Lewes, a major Sussex County coastal town," Quick said. "EchoLink was activated in receive mode to allow local amateurs, who were away from their Sussex County homes, an opportunity to keep abreast of the local conditions."

Quick said Sussex County ARES® and other local radio amateurs "did an excellent job supporting their communities in southern Delaware. Many lessons were learned and incorporated into ARES after-action to improve future operations and service."

"Synergy" in Michigan Put to Good EmComm Use

Michigan has been one of the country's leaders in recognizing "the need for amateur radio operators to be cross-trained in both ARES® and RACES protocols," according to Dale Williams, WA8EFK, of the Amateur Radio Emergency Service.

As a result, the state's Amateur Radio Public Service Corps (ARPSC) has been developed to bring "synergy" to ARES®, the Radio Amateur Civil Emergency Service (RACES) and SKYWARN®, according to the *ARRL Letter.*

"This aids the process of assistance provided in the sense that cross-trained individuals who start out activated as an ARES® operator can just change hats and continue operations wearing the RACES hat as the situation evolves," Williams told the ARRL. "This has worked very well, and is due in no small part to several individuals in the 8th Region—Ohio and Michigan, in particular—and most especially to George Race, WB8BGY, former SEC, Section Manager and Great Lakes Division Director, as well as others."

The *ARRL Letter* story explains:

• ARES® is activated primarily for any event where a communications need exists within the framework of the FCC rules.

• RACES is activated for an incident that the government sees a need for additional communications support. "Generally, the governor of a state or their duly appointed representative makes the call. It is a program administered by FEMA."

• SKYWARN® is administered by the National Weather Service, which has four sites in Michigan: Detroit/White Lake, Grand Rapids, Gaylord, and Marquette.

The Michigan program's mission statement is: "(To) develop the Michigan ARPSC Program into a fully-integrated communications team ready, willing and able to provide radio communications support to public service agencies and the citizens of Michigan."

That's it for this month. Next time we will continue with more on how hams serve the public in many ways, including "when all else fails."

73, Richard, KI6SN

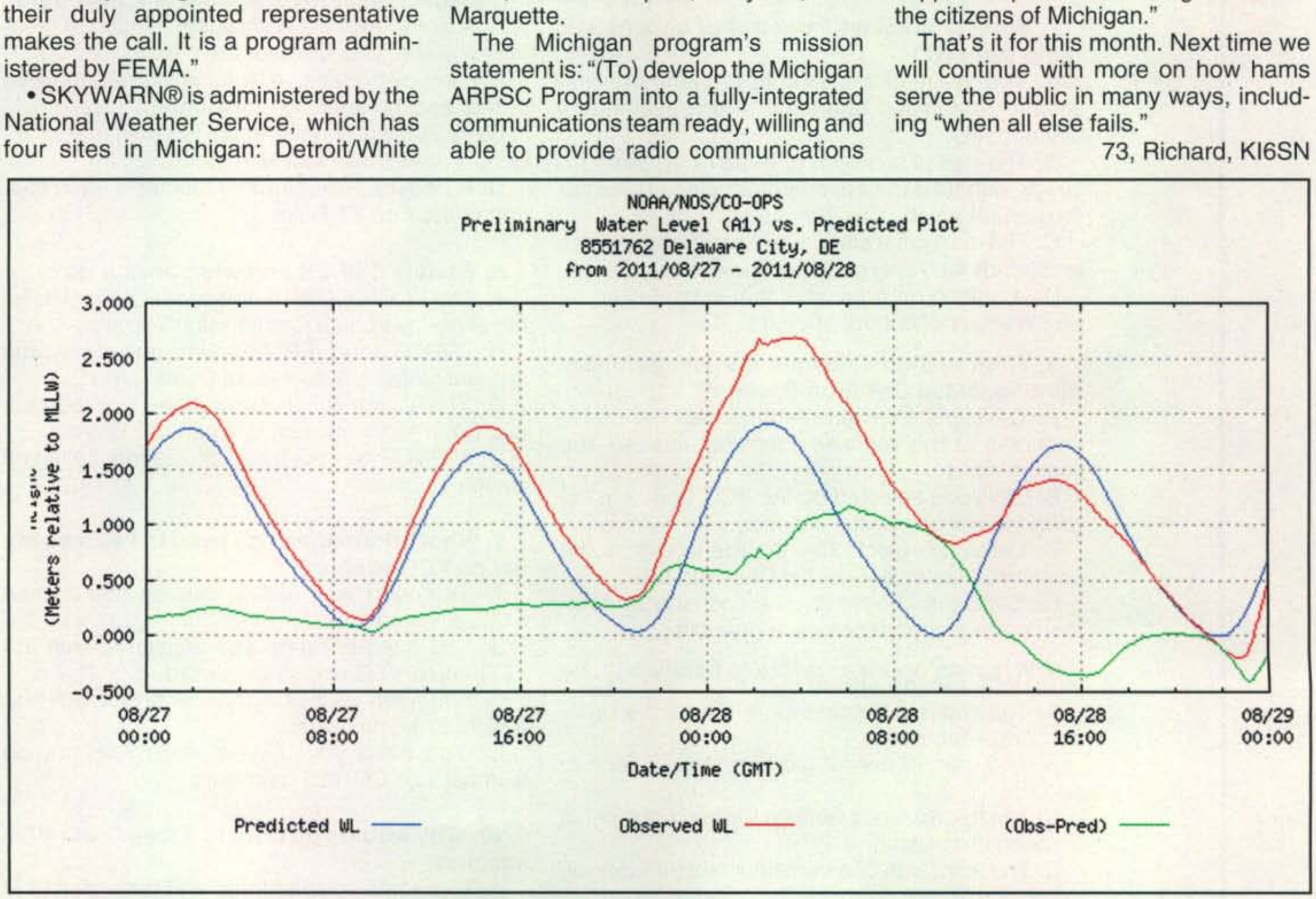

Photo F– Tide data gathered for Delaware City shows actual height (red line) vs. those predicted (blue) during Hurricane Irene on August 27–28, 2011. (Courtesy of NOAA)

How Knowledgeable are You about Ham Radio Procedures?

BY FREDERICK O. MAIA,* W5YI

Based on inquiries we get, radio amateurs frequently misunderstand or are confused by what appears to be routine FCC procedures and policies. This month we have put together a series of questions to determine how you rate when it comes to understanding the administrative side of ham radio. Most of these questions have been covered in previous columns.

To take this test, simply number 1 through 25 on a sheet of paper and insert answer A, B, C, or D. Get 20 or more right and you go to the top of the class. You'll find the answers on beginning page ##. Don't peek until you have answered all 25 questions. Good luck!

1. What regulatory group initially determines which frequency bands may be used by ham radio operators?

A: The U.S. Congress and Department of Commerce.

B: Federal Communications Commission (FCC).

C: National Telecommunications and Information Administration (NTIA).

D: International Telecommunication Union (ITU).

2. What is automatic control of an amateur radio station?

A: The ability of a station to properly transmit without manually operating the transmitter's adjustments.

B: The use of a device to transmit on the ham bands without a control operator being present at the control point.

C: The ability of a station to change frequencies and bands with only digital or spoken commands.

D: A station on a network that is controlled by an external net control operator.

3. What station callsigns are issued under the Sequential Call Sign System?

A: Callsigns from an alphabetized list corresponding to the licensee's mailing address and license class.

B: Callsigns selected by the FCC from a list of callsigns chosen by the licensee.

C: Callsigns selected by the licensee from the preferred Master Sequential Call Sign List.

D: Callsigns chosen by the licensee to commemorate a special occasion or event.

4. When an operator refers to bandwidth, he is usually talking about:

A: The width in megahertz of one of the amateur radio bands.

B: The ratio of one of the ham radio bands to another.

C: The approximate width in kilohertz of most of a transmitted signal.

D: The amplitude of an amateur radio frequency.

5. What are two of the five purposes of the Amateur Radio Service?

A. To protect historical radio data and help the public understand radio history.

B. To help foreign countries improve communication and technical skills and encourage visits from foreign hams.

C. To modernize radio schematic drawings and increase the pool of electrical drafting people.

D. To increase the number of trained radio operators and electronics experts and improve international goodwill.

6. What document contains the rules and regulations for the Amateur Service in the U.S.?

A. Part 97 of Title 47 CFR (Code of Federal Regulations).

B. The Communications Act of 1934 (as amended).

C. *The Radio Amateur's Handbook*.

D. The Radio Regulations of the International Telecommunication Union meetings.

7. What is an FRN and what is it used for?

A: A Frequency Radio Number is used to identify an authorized amateur radio band.

B: Frequency Reserve Nomenclatures indicates authorized transmitting emissions.

C: A Federal Registration Number identifies people doing business with the FCC.

D: A Federal Rule Number identifies each section of the Part 97 Rules.

8. What is CORES and what does it do?

A: The FCC's CORES is responsible for verifying eligibility to be a Commission licensee.

B: CORES issues FRN numbers and passwords and maintains a database of those issued.

C: The Commission Operations, Resources, and Emergency System is a part of FEMA.

D: CORES keeps track of station callsigns issued by class.

9. What information do I need to I access my online FCC account?

A: You need your station callsign and license expiration date.

B: You need the date you registered with the FCC and a VEC-issued password.

C: You need your Social Security Number and a self-issued password.

D: You need your Commission Registration Number and CORES password.

10. Why would you want to access your FCC account?

A: To update your address and other personal information.

B: To file for a vanity station callsign and pay the FCC fee.

*1020 Byron Lane, Arlington, TX 76012
e-mail: <w5yi@cq-amateur-radio.com>

C: To request a duplicate license that you lost.

D: All of the above.

11. What type of FCC-issued license or permit is required to transmit amateur communications from a ship registered in the U.S. while in international waters?

A. Any amateur license with an FCC Marine or Aircraft endorsement.

B. Any amateur license authorizing operation in the U.S.

C. Any General class or higher license.

D. An Extra class license.

12. If an amateur station interferes with the reception of broadcast stations on a well-engineered receiver, during what hours shall the amateur station NOT be operated on the interfering frequencies?

A. Daily from 8 PM to 10:30 PM local time and additionally from 10:30 AM to 1 PM on Sunday.

B. Daily from 6 PM to 12 AM local time and additionally from 8 AM to 5 PM on Sunday.

C. Daily for any continuous span of at least 2.5 hours and for at least 5 continuous hours on Sunday.

D. Daily for any continuous span of at least 6 hours and for at least 9 continuous hours on Sunday.

13. How do you determine if a wanted callsign is available for reassignment under the Vanity Call Sign program?

A: Consult QRZ.com to see if the call sign is currently in use.

B: Check the ARRL's database of radio amateurs.

C: Use the Application Search function on the FCC's Universal Licensing System.

D: Check the FCC database of radio amateurs to determine if the callsign has been canceled or has expired for more than two years.

14. Who may accept compensation when acting as an amateur radio control operator?

A. All licensed radio amateurs participating in charity or special event communications.

B. Classroom teachers at educational institutions.

C. Amateurs who posess an FCC Emergency Communications Permit (ECP).

D. All radio amateurs who are members of RACES or ARES organizations.

15. With what other organization must an amateur station be registered before RACES operation is permitted?

A. The Amateur Radio Emergency Service (ARES).

B. The U.S. Department of Defense.

C. A civil defense organization.

D. Federal Emergency Management Service (FEMA).

16. Where do the questions come from that are used in the written U.S. amateur license examinations?

A. From questions originated and administered by teams of volunteer examiners.

B. From question pools maintained by Volunteer Examiner Coordinators (VECs).

C. From various question banks developed by the FCC.

D. From the updated FCC Report and Order written examination listings.

17. Unless close to an airport, how high may you install an antenna structure without needing FCC or FAA approval.

A. 50 feet.

B. 100 feet.

C. 200 feet.

D. 300 feet.

18. What is the maximum transmitting power an amateur station may use?

A. The minimum transmitter power necessary to carry out the desired communications.

B. 200 watts PEP output.

C. 1000 watts PEP output.

D. 1500 watts PEP output.

19. What license class must you hold to temporarily use a one-by-one format special event callsign.

A: Any license class.

B: Technician.

C: General Class or above.

D: Amateur Extra Class.

20. Which of the following types of communications are specifically prohibited by the rules?

A: One-way communications.

B: Communications transmitted for compensation.

C: Remote control of model aircraft.

D: Offering privately owned radio equipment for sale.

21. Which of the following types of communications are permitted by the rules?

A: Playing music on the ham bands.

B: Transmitting on other than amateur radio frequencies.

C: Broadcasting to the general public.

D: None of the above are permitted.

22. What does it mean when the Amateur Service is a secondary user of a frequency band and another service is a primary user?

A. No special meaning, since all users of a frequency band have equal rights to operate.

B. Amateurs are only allowed to use the specified frequency band during emergencies.

C. Amateurs are allowed to use the frequency band only if they do not cause harmful interference to primary users.

D. Amateurs must reduce transmitter power to minimize interference to primary users.

23. What is the FCC's "Red Light Display" (RLD) system.

A: The RLD system is a database of entities that owe money to the federal government.

B: Red lights are assigned to rules violators by the FCC's Enforcement Bureau.

C: Amateur frequencies are relegated to the red light list when they are excluded from use.

D: The RLD system keeps track of radio amateurs whose operating authority has been suspended.

24. What is "Line A" and what does it indicate?

A: "Line A " is the first explanatory footnote to all FCC Report & Orders.

B: It is the first section of the Radio Amateur's Code of Ethics.

C: Part 97.1, Line A through Line E states the Basis and Purpose of the U.S. Amateur Service.

D: It is a boundary line that protects northern U.S. and Canadian non-amateur operations.

25. Why does the FCC collect my Social Security Number (SSN)?

A: Like the IRS, the FCC uses it to positively identify applicants for its benefits.

B: Your SSN is coupled with your CORES password to access your FCC account.

C: It must be used in conjunction with your FRN to file applications online.

D: The U.S. Congress mandates that Taxpayer Identification Numbers (TINs) be supplied to federal agencies.

To see how well you did, go to page ### in this issue. If you did well, great!. If not, you need to study some of the important aspects of the routine FCC procedures and policies.

73, Fred, W5YI

(Answers on page 112)

kit-building

BY JOE EISENBERG,* KØNEB

Building the Vectronics VEC-1340 QRP CW Transceiver

A name sometimes overlooked when it comes to kits is MFJ Enterprises. MFJ's Vectronics division produces a number of easy-to-build kits. One of these kits is the VEC-1340 QRP CW transceiver (photo A). The VEC-1340 is the 40-meter band version of the kit. It is also available for the 20-, 30-, and 80-meter bands. The only thing that differentiates them is the frequency-determining parts and the number of turns on the two toroids. Yes, the 1340 has two toroids, one of which is a transformer, but the toroids are on relatively large cores and are easy to make. A very nice custom case is offered for this kit and is relatively easy to assemble.

The directions have the builder first mount the resistors, then capacitors, then the semiconductors, followed by the frequency-determining parts. The frequency-determining parts consist of some capacitors, some RF chokes, and the toroids and wire with which to wind them. The order of construction allows for parts to be mounted before others that might make assembly more difficult.

This method, however, does not allow for stage-by-stage testing of the board. I have become fond of the stage-by-stage method as it serves two purposes: It assures the builder that all work so far has been completed correctly. It also allows for an educational look at the circuit at hand.

There are some boards, however, where assembly by stages is not possible due to component-mounting issues. When assembling by component type, the advantage is that the parts inventory clearly reveals whether or not the parts have been mounted. When the builder reaches the end of the resistors, for example, there should be no resistors left, unless they are for a special purpose, such as for use in testing or options.

The VEC-1340 circuit board (photo B) is single-sided, which makes use of solder wick for desoldering a lot faster than a double-sided plated-through board. The main disadvantage of a single-sided board is the requirement to place jumpers to make certain connections, depending on the circuit design. In this kit, there are five jumpers used on the circuit board, and all can be made by using short wires left over from mounting the resistors and capacitors. Make sure you keep your longer leftover leads to make these jumpers as well as other needs later on in the building process of this kit.

The two toroids are relatively easy to wind. The T1 transformer (photo C) is made by winding a number of turns using enameled wire, followed by winding just two turns of the supplied hookup wire on the other end away from the enameled leads. The other toroid is simply made by winding enameled wire for the prescribed number of turns. I discovered that the kit supplied plenty of wire in two gauges, #24 and #22. The instructions don't tell you how to pick the correct one, so for less experienced builders, that can be confusing. It is important to use the correct gauge of wire to create the desired inductance when winding toroids. A rule of thumb is to always remember that the higher the number of the wire gauge, the thinner the wire. In this case, since there are only two thicknesses of wire supplied, where the directions call for using #24 wire, you use the thinnest of the two wires supplied.

Alignment of the VEC-1340 is quite simple, as there is only one trimmer capacitor to adjust to trim the antenna for a peak on receive. For the 40-meter version of this kit, that is 7.040 MHz, and using a simple signal generator, such as the Elecraft XG2 or Norcal S9, is more than adequate. Testing of the transmitter is done with a small dummy load and a QRP wattmeter if you have one.

The case for this transceiver comes pre-drilled but is not pre-labeled. The front- and rear-panel labeling (photo D) is supplied via an adhesive label. I found it easiest to use a light from behind the panels, observe the locations of the holes, and line up the circles on the adhesive label to match. Then I

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e-mail: <k0neb@cq-amateur-radio.com>

Photo A– Front panel of the 40-meter transceiver kit.

Photo B– Board with all parts mounted and ready for mounting in the case.

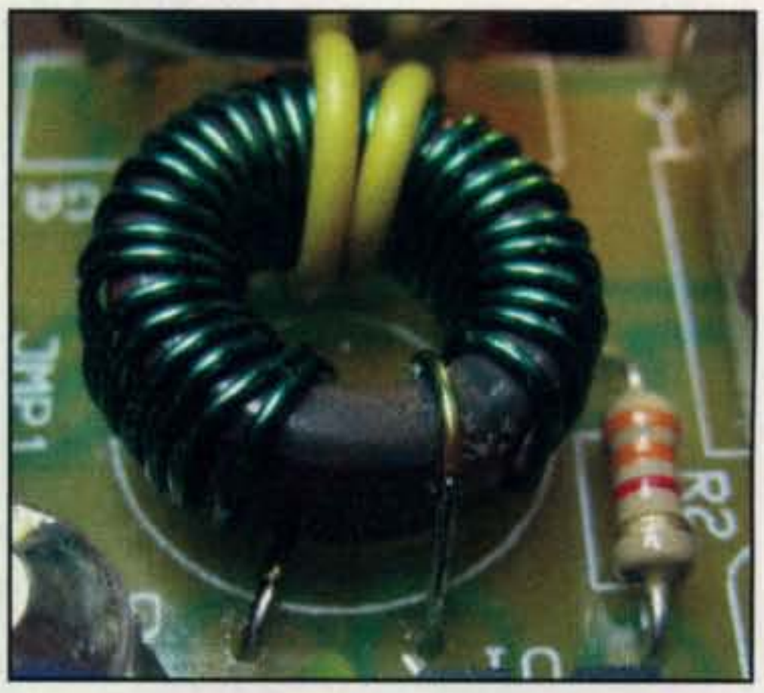

Photo C– Close-up of toroid T1.

used a hobby knife to open and trim the holes and remove the excess label material on the edges. The key and speaker jacks are supplied with the case. If you use your own case, be sure to have the 1/8- or 1/4-inch jacks needed to connect the key and speaker. The power and antenna connections are already mounted on the board.

All in all, it was a fun way to spend an afternoon building this kit. You can view the full Vectronics line of kits at <http://www.vectronics.com>. MFJ also pro-

Photo D– Finished VEC-1340 rear panel.

duces other kits under the MFJ name. See <www.mfjenterprises.com>.

Red Hot Radios

Doug Hendricks, KI6DS, of Hendricks Kits, informed me that he has acquired the David Fifield, AD6A, lineup of Red Hot Radio kits which ceased to be produced a few years ago. Doug is bringing them back, along with their distinctive red cases. The first kit to be available is the Red Hot 40, with the SMK-1 surface-mount kit to follow shortly. Look for the full line of Red Hot Radio Kits available soon at <http://www.qrpkits.com>.

As of this writing, the much-anticipated new kits from Heathkit have not appeared yet, but hope is alive for them to be available this spring. Also this spring on the second weekend of April will be the annual Ozarkcon QRP convention in Branson, Missouri. Ozarkcon always has at least one new kit introduced by the 4-State QRP Group, and a buildathon is always a part of the festivities. Branson is the place to be this April for kit-building fun. See more information at <http://www.ozarkcon.com>.

With the 2012 Dayton Hamvention® fast approaching in May, now is the time to get your wish list ready. The Four Days In May QRP gathering will have plenty of kits to look at and buy, plus there will be plenty of other goodies you will find at the Hara Arena, including a stroll through the giant fleamarket area.

Ready for My Close-Up

Finally, about a year ago, I had the privilege of not only leading a great club in a group kit-building experience, but it was filmed by a crew creating the new ARRL video "The DIY Magic Of Amateur Radio." It was a fun experience, not only helping the members of the Escondido Amateur Radio Club build a direction-finding kit, but participating in a fox hunt using the completed kits right afterwards as well. Look for the video on YouTube and at <http://www.arrl. org> . During the filming, I burned a finger when reaching across the table for a soldering iron. Luckily for me, I did not utter language inappropriate for TV! That embarrassing segment did not make it into the final version of the video, and for that I am grateful. Yes, even experienced kit builders can burn a finger!

Please, don't burn your fingers while building and let me know when you find a great kit that you have enjoyed building. Until next month . . .

73 de Joe, KØNEB

Going Fishing with QRP

BY CAM HARTFORD,* N6GA

I've often thought that ham radio is like fishing. You toss in your line, never knowing what you're going to catch. Call CQ or answer a CQ. You just don't know who you're going to meet or what you're going to learn. What follows are two recent radio fishing stories, followed by a story of two tiny tuners. Enjoy!

A Version of VOACAP I Can Use

After a chance QSO on 40 meters CW one evening with Dave Richards, AA7EE, Dave and I exchanged e-mails lamenting the fact that there is very little activity on 80 meters CW in the evenings here on the "left coast." We both had come to the same conclusion independently after having built Ft. Tuthill 80 transceivers. These are fine little CW ragchew machines, but not very useful if there's nobody to chew the rag with. I thought that in the evenings, even with just 3 watts, I should be able to make contacts out to several hundred miles. Dave suggested using VOACAP Online to see what kind of coverage I could realistically expect.

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e-mail: <qrp@cq-amateur-radio.com>

I remember having looked at VOACAP briefly several years ago, but found myself getting tied in knots before throwing in the towel and moving on to a new subject.

The difference today is that there are two versions of VOACAP, one you can download and another that runs online from the website. Once I finally decoded what Dave had told me, the light came on. The downloadable version is the harder of the two to use, requiring more information to get set up but delivering more accurate results. The online version is easier to use, but limits your flexibility. After trying both, I decided the online version was more my speed.

When you first bring up <www.voacap.com>, you'll see a page entitled VOACAP Quick Guide. In the Online Prediction Services there are two modes of usage: Coverage Maps and Point-to-Point Predictions.

Let's start with the coverage area maps. Click on the legend underneath the map, "VOACAP Online Coverage Area Map Predictions," to get to the data input screen. Here you'll need to supply information about your location, your antenna, and the power, band, and mode you intend to run. You'll also be able to change the date and time to reflect when

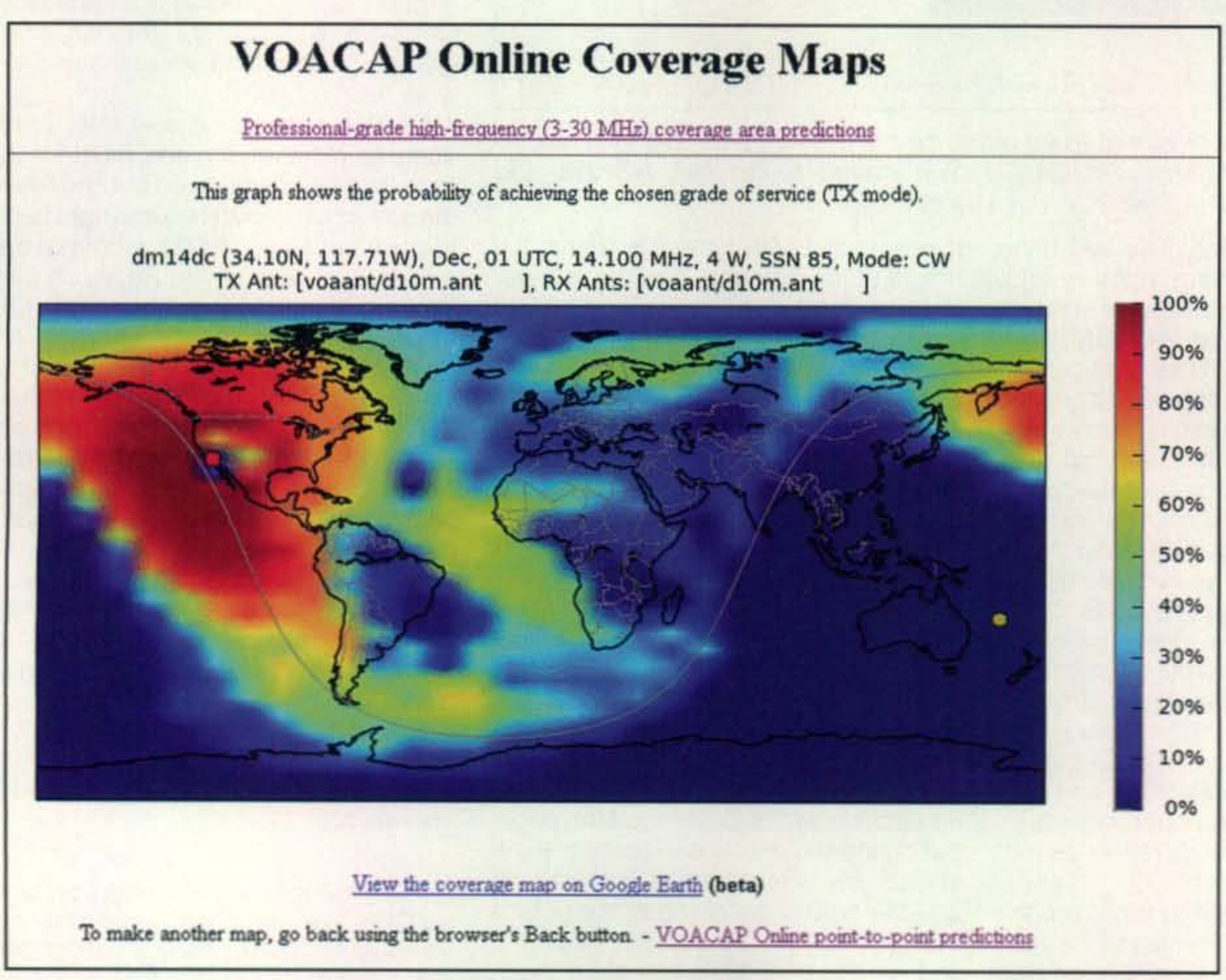

Fig. 1– This is VOACAP Online's prediction of the coverage from my QTH for 20-meter, 5-watt CW operation using a dipole at 10 meters height and a smoothed sunspot number of 85. (VOACAP.com images © OH6BG, HZ1JW, and OH8GLV, used by permission)

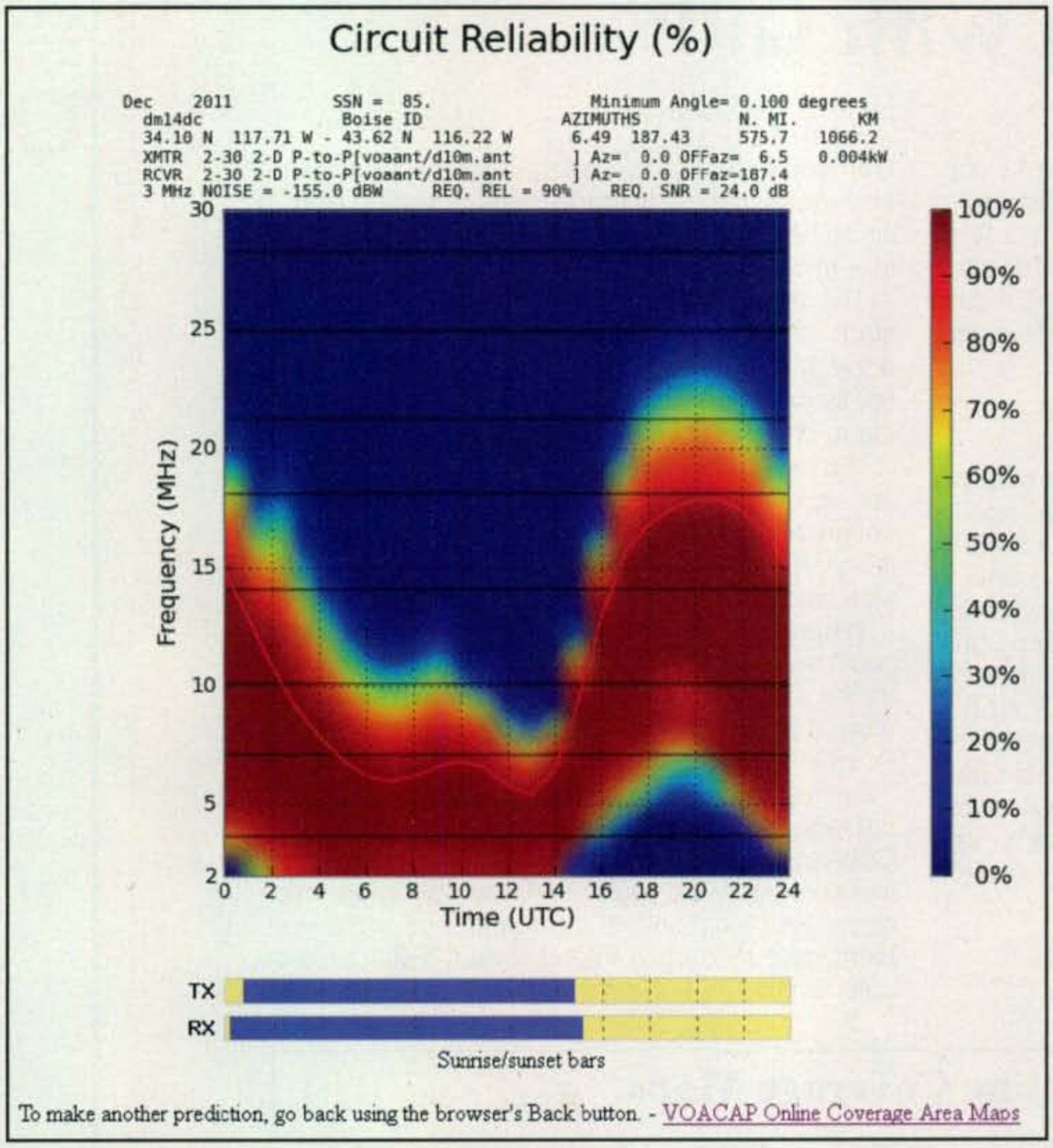

Fig. 2– The VOACAP Point-to-Point result for the Los Angeles, CA to Boise, ID circuit. See text for details. (VOACAP.com images © OH6BG, HZ1JW, and OH8GLV, used by permission)

you plan on operating. The last thing needed is the receiving antenna info. You'll notice that the choices of antenna are somewhat limited, but that's the tradeoff for the ease of use of this online version of the program. Once you've input all this info, you can tell it to run the prediction. The result is a world map which is colored to represent the "probability of achieving the chosen grade of service." The accompanying map (fig. 1) indicates the coverage I should get on 20 meters CW running 5 watts into a dipole at 5 PM local time. The result seems to bear out reality—that time of day my coverage is leaning out into the Pacific and signals from the eastern U.S. are starting to weaken. These predictions are based on historical and predicted smoothed sunspot numbers, which may not accurately reflect current conditions.

Having successfully run that prediction, I began to see the value of this tool. One of the things I've always wondered is whether the antenna we use for 20 meters at Field Day is doing a reasonable job. With this program I can adjust things such as the type of antenna, the height of the antenna, and the number of elements. Maybe a dipole at 30 feet would do just as well as a 3-element Yagi at 60 feet? It sure would make assembling and hoisting the antenna easier, but by playing with the parameters in this program it becomes obvious that the more difficult course has its payoffs. We'll stick with the Yagi, thank you.

What if I want to check probable propagation between two specific points, such as between my QTH and that of my buddy Fred, who lives near Boise, Idaho? Go back to the voacap.com page and click on the "VOACAP Online Point-to-Point Predictions" legend under the graph on the left side of the page. This input screen requires most of the same information as the Coverage Map page, but in addition needs the location of the station you want to make contact with and the type of receiving antenna he's using. Once you've supplied that info and run the prediction, you get a graph such as the one in fig. 2. This plots UTC time versus frequency. In the evening, around 0400 hours, the graph suggests that either 80 or 40 meters would provide the necessary propagation. At noon my time, 2000 hrs, 20 meters or 30 meters would be the best bands to try. Seventeen meters probably also would be worth a try, but 15 meters looks to be marginal.

Once I got comfortable with this online tool there seemed to be no end to the different scenarios I could dream up. Give it a try, but beware: You can find yourself carried off by the time bandit. Best to wait until the bands are dead.

Encounter with a Rogue QRPer

As I was finishing a 40-meter QSO one evening last summer, I heard a fairly weak CQ just off frequency. The call sounded vaguely familiar. How often have you heard a weak CQ somewhere around 7040 or 7030 and wondered whether it might be QRPer or a 100-watter with poor propagation? On occasions such as this I envision a guy with an optimist sitting on one shoulder and a pessimist on the other, lending their unsolicited advice. "Go on, give the guy a call. Chances are good it's a QRPer and he'd be thrilled to work you!" says the optimist. From the other shoulder comes the "Fuggetaboutit! It's just some QRO guy with a lousy antenna who'll give you a hard time about making him work for the QSO!"

On this occasion it was late. I was about to pull the plug and head for the sack, but the optimist won out and I gave the guy a call. Wow! He came right back. It was Allan Taylor, K7GT, whom I'd met a few years back at the Pacificon convention. Usually when I hear Allan on the air he's in a contest and putting in a seriously QRO signal, but not this evening. It turns out he was on a rafting trip on the Rogue River in southern Oregon. It also turns out that I had rafted that same segment of the Rogue back in the early 1990s, and my memory is of a very deep, narrow canyon from which radio signals would have a tough time escaping. I pressed Allan for details, but the QRN and QSB won out. At least I was able to give him a signal report, letting him know that he was indeed getting out from his campsite.

A week later we made contact by e-mail. Here's Allan's description of his operation:

I wasn't in a particularly deep canyon for our QSO. The path to SoCal had (probably) ridges up to 15 degrees or so above horizon. If you follow the river through the wild and scenic portion, we were at Horseshoe Bend. The river goes in all different directions and at that location veers north, circles

around west, and then goes straight south before veering more or less west again. We were on the north-going side of Horseshoe Bend and the peninsula between north- and south-bound segments was quite low. I probably could have worked JA if I had been patient, as that direction was clear.

So he was camped at a fairly wide, flat spot next to the river. So much for my memory. Allan continued:

I was using an Elecraft KX1. For our QSO I was using the internal batteries at (maybe) 9V. The antenna was a multiband center-fed dipole with jumpers to allow 20, 30, or 40m operation, fed with RG58. The KX1 is new to me. I got it from a local ham clearing out in a pre-estate sale. The antenna was pulled up into a Douglas fir tree on a cord thrown over a short dead limb sticking out from the trunk at 18–20 feet. The element ends dropped down inverted-V fashion to convenient tall bushes at perhaps 10 feet each side. I was using the American Morse paddles. I had 8-cell battery packs with me. I used one of them on the next QSO (N6FMF) and got more like 3W output from the little rig. It did help a bunch.

Thus, for our QSO he was running one watt, maybe one and a half. Nice haul for 650 miles.

One thing I was interested in was how someone can go on a rafting trip and keep the precious cargo dry. This would be important if you were using an Elecraft KX1, more so if you were tempting fate by taking (Heaven forbid!) your new KX3. Allan's answer:

All gear you care to keep dry needs to be in a dry bag. These are heavy-grade, serious bags that will keep things *dry* as long as you properly seal the top by folding/rolling the top flaps and snapping the ends down to the sides. (All this is part of a modern dry bag.). I wrapped the KX1 in a kitchen hand towel and placed it, along with headphones, paddle, a few battery packs, etc., in a pouch I once used where I worked (Lawrence Livermore National Lab). It zips closed, so provides only a modicum of water protection. That bag was inside and at the bottom of a dry bag.

Obviously, this was not Allan's first outdoor QRP trip:

I have taken QRP gear on six river trips now. The rigs varied from a NC40A to a K2/100. Sufficient battery power was a serious issue with the K2/100, as the voltage sagged seriously above about 20W. I was using a 15Ah sealed battery. One trip (Middle Fork of the Salmon, 2010), I was never able to put up an antenna: daily or more frequent T-storm cells! You just don't tempt fate with copper wire in the air!

With the inevitable very low antennas and canyon locations, I have found it difficult to have a reasonable signal for a good QSO. When I operated from the Sierra Nevadas in the 1999–2001 years, a low antenna could get you to many more stations (Central Valley, San Francisco Bay area, etc.) that are almost NVIS-close. But from the back country of Idaho or Oregon, NVIS doesn't get you to anyplace with a reasonable population of hams. On *this* trip, as it happens, my first QSO (of three) was with KJ7LB in nearby Coos Bay, Oregon. We both exchanged 579 signal reports. This confirms my NVIS conclusions. I had wondered why N7XJ always used 20 meters for his Utah desert ops and never 40 meters, while I always used 40 rather than 20. My experience was based on the Sierra (mountains) and his on the Utah deserts.

Interesting conclusions: My first thought when I made contact with Allan was that we had to be communicating via NVIS, because the depth of the canyon was such that only an NVIS signal going almost straight up would have worked. However, his location was on a relatively flat piece of terrain and at about 650 miles; we were just a little far for NVIS to work. I guess, then, it pays to consider many things before embarking on an outdoor radio adventure, including time of day for operations, availability of antenna supports, height of supports, and what mode of propagation an antenna at that height will support.

Note to self: Always answer those weak CQs. Chances are good it could be one of your fellow QRPs, out on the trail, looking for a contact!

Two Tiny Tuners

I don't know if it's just me, but it seems like more and more ops are taking their rigs out into the wild these days. This is not surprising, since operating outdoors in beautiful locations can be quite a pleasure. No doubt helping the trend is the fact that there are so many portable rigs from which to choose.

There are also many choices in the antenna world. An outdoor op first needs to consider his or her destination and whether there are natural antenna supports available. If not, the portable op needs to carry supports. Typical choices are a vertical supported by a fishing pole or some kind of fiberglass pole. Also popular is a pole holding up dipole or inverted Vee.

If there are supports such as trees, the choice becomes one of orientation and manner of launch. Again, dipoles and inverted Vees are pretty easy choices. So is a vertical. Becoming more popular nowadays is the End Fed Halfwave, EFHWA (usually pronounced eff-wa!). This antenna has certain advantages—only one support needed, no ground plane needed, the high current point in the antenna is elevated somewhat above ground. Disadvantages? It's twice as long as a quarter-wave vertical and the feed point impedance is very high, usually too high for most common tuners.

Never fear, as it's quite an easy matter to make a tuner specifically tailored for EFHWA duty. And if designing and building one from scratch isn't your thing, the items presented below are two kits currently available to help you along the path.

EFHWA tuner by KI6J. Stu Schreiber, KI6J, is a hiker who enjoys bagging peaks for SOTA credit. SOTA stands for Summits on the Air. (Google search Summits on the Air, or SOTA.) Stu is the manager of the 6-land SOTA region. He designed this tuner to allow him to take advantage of the many natural antenna supports he encounters during SOTA ventures. The tuner is simplicity personified. It consists of one circuit board with the tuner components mounted on one side and the SWR bridge on the other. The tuner portion of the circuit is made up of a tapped toroid paralleled with a polyvaricon variable capacitor. The SWR bridge side of the board consists of what's commonly known as a Tayloe SWR bridge, named

Photo A– The Endfed Halfwave tuner offered by KI6J.

Photo B– Hendricks QRP Kits SOTA tuner, small in size and just over 2.5 ounces.

after its inventor, Dan Tayloe N7VE. It consists of an absorptive-type SWR bridge which drives an LED indicator. The tuner is housed in a small plastic box (see photo A) and weighs in at a shade over 3 ounces, not a big load for a backpacker! Operation of the tuner couldn't be simpler. Attach the antenna, put the switch in the Tune position, tune the capacitor until the LED goes out, and then throw the switch to the Operate position and make Qs!

I field tested Stu's tuner in my antenna test range (a tree in my front yard, which is a fairly good representation of the trees one would find in the wild). There's just one knob to adjust, so you crank it until the LED extinguishes and you're done. Nothing could be simpler.

Stu has been selling his tuner mostly through word-of-mouth advertising, but as of press time he was in the process of setting up a website. Look for his products on www.BetterQRP.com. He sells the tuner kit for $26 shipped and the enclosure is $7.

Hendricks QRP Kits SOTA Tuner. Hendricks QRP Kits (www.qrpkits.com) recently has introduced its SOTA Tuner (photo B). Aimed at the hiking/backpacking/hilltopping crowd, this tuner is small, lightweight, sturdy, and simple. This little handful of tuner is housed in one of Hendricks' signature brushed-aluminum cases that feels, if the unfortunate were to happen and it went swinging off into the woods at the end of a flailing piece of wire, as if it would return unscathed, ready to tune once again. (Don't ask how that scenario comes to mind.) It's designed to match the high impedance of an end-fed halfwave antenna by use of a tapped toroidal inductor and a polyvaricon capacitor. The tuner will cover 40 through 15 meters, although when I finished building mine it wouldn't cover 15. Fortunately, a little tweak of the trimmers built into the polyvaricon was all that was needed to restore full coverage. I also ran this tuner through its paces in the Front Yard Antenna Test Range and am happy to report it never met a halfwave piece of wire it couldn't tune with a simple twist of its single knob. Hendricks sells this tuner for $30 plus shipping.

Counterpoises. At this point a word about counterpoises would be in order. The instructions that come with the Hendricks tuner suggest that a quarter-wave counterpoise is necessary for proper operation. The literature supplied by KI6J with his tuner suggests that either no counterpoise or a very short wire of about 3 feet is needed. Why the difference? To try to make sense of it, I went hunting on Google and ended up at Steve Yates', AA5TB, website, <http://aa5tb.com/efha.html>. This is a rather lengthy discussion of the subject. I suggest that you take the time to go to Steve's site and read it for yourself, but in the meantime, here's a short summary: "If you adjust your coupler into a resistive load on the bench first and then adjust the antenna for a proper match *(trim the antenna's length, without changing the setting of the tuner's capacitor—ed.)*, then you should have a resistive match that will minimize current through the coupler and through the counterpoise."

The end result will be very little, if any, ground current flowing. In many cases, the coax lead from tuner to rig will be all that's needed for a counterpoise. On the other hand, a quarter wavelength of wire acts as an impedance inverter. If you attach a quarter-wave wire to the tuner ground terminal and leave the far end unterminated, the near end will present a low-impedance path for any RF present at the ground terminal or case. I tried this and found that the quarter-wave counterpoise slightly changed the required tuner setting, but there was no RF present at the rig.

Unfortunately, an end-fed halfwave antenna erected in one particular location and configuration most likely will not provide the same impedance in another installation. To deal with all possibilities that might arise in the field, it would be no trick to carry several pieces of wire, cut to different lengths, to use as counterpoises as needed. A 3-foot piece, one that's a quarter wave at 20 meters and one that's a quarter wave at 40 meters, would probably be all you needed. Those pieces cut from something like #22 wire would weigh practically nothing and take up almost no space. These wires plus one of the tiny tuners mentioned above would be all you'd need to put out a monster QRP signal from the wilds!

QRT for Now

My next column will appear in the April 2012 issue. We have lots of QRP-related articles lined up for that issue, one you certainly won't want to miss! 72/73, Cam, N6GA

learning curve

BY RICH ARLAND,* K7SZ

Ferraris and Other Stuff

I'm writing this column about two weeks before Christmas: Therefore, it's time to take a few minutes and reflect on the past year. 2011 was a great year for both my wife Patricia and me. In addition to obtaining more emergency communications (EmComm) training, we managed to acquire a set of new dual-band micro-HTs to augment our EmComm go-bags. Several new antennas were added to our Bent Dipole Ranch, increasing our capabilities for HF communications.

My Dream Rig: The Elecraft K3

With my new book on QRP wrapped up and all the new gear I got to play with, it was a grand time at K7SZ. Thanks to an advance on royalties, I was able to purchase my dream rig, an Elecraft K3. While the K3 is not an entry-level rig by any means, I want to discuss it here in "Learning Curve" for two reasons: (1) because not everyone who reads this column is a beginner, and (2) because a good number of new hams or new upgrades to General feel that they will learn more, more quickly, by starting their HF careers with a super-fancy, super-expensive rig. More money doesn't always lead to more satisfaction, though, especially if you're just starting out. The K3 is a kit, but not in the conventional sense, and it offers high-end performance at a mid-range price.

Over the last ten years I have built several Elecraft kits, including two K2s, a K1, a KX-1, and now a K3. I love the performance specs of the K2, and the K3's specs are even better! Ken Evans, W4DU, allowed me the honor of borrowing his K3 for about a month. It took about three days and I was hopelessly in love with it. When the money was available, I jumped at the chance to procure the K3.

While the K3 is billed as a kit, there are no circuit boards to build/solder, so it only took several hours to assemble the various modules and install them into the motherboard. The hardest part of the build was sorting out the various screws, nuts, washers, standoffs, etc.

Owning a K3 is a bit like owning a Ferrari! A Ferrari is sleek, sexy, blood red, and F-A-S-T! It's the ultimate "boy-toy," for those "boys" who have the money to spend. Do you really *need* a Ferrari? No, but it's ultra-cool to have! While the K3 is not a Ferrari, it is sleek, with a smokin'-hot receiver (for hams, that translates into "sexy"), featuring a powder-coated black finish with orange display, and like the Ferrari, it definitely doesn't disappoint. Do you really need a K3? *Only* if you want to ratchet up your ham radio game a few notches!

One thing I have noticed about the K3 in using it for almost six months is that every time I fire it up, I learn something new about the rig, or I learn how to use one of its features to do something spectacular. This radio has a constant learning curve. I have compared notes with Ralph Bates, K1ZZI, and Mike Weathers, ND4V, two friends from the Southeast DX Club who both own K3s, and we all agree that we never stop learning about this wondrous DX machine!

Looking Back and to Today

Over the years I have been in ham radio engaged in QRP (nearly 50!), I am amazed at the evolution of radio gear. Back in the late 1960s the only commercial low-power transceivers on the market were the Power Mite series by Ten-Tec. These rigs had direct-conversion receivers and were subject to all sorts of intermod and interference. At 1–3 watts RF output, they were not even considered a full "QRP gallon" (5 watts)!

Now we have radios such as the FT-817ND, K2, K3, Flex 1500, the SDR Cube, the SoftRock and AT-Sprint series of SDRs, along with others that have taken the humble QRP radio and pushed it into the 21st century! The performance of today's rigs is light years ahead of what we had 35–40 years ago. It is truly amazing, and it's what keeps me actively involved with QRP.

There is nothing wrong with staying abreast of technology. It is well in keeping with the ham radio code of operating an efficient station. The digital technology available today offers all of us the chance to participate in many different modes of communications without a massive investment in hardware. If you own an SDR (Software Defined Radio), you have a piece of gear that will never be obsolete. A simple tweak of the software reconfigures the radio hardware! Now that is truly neat!

While I still don't own a Ferrari, there is always hope! Until that time, my K3 keeps me focused on becoming a better QRP operator. After all, when the equipment is first class, the only other answer for not making QSOs is operator skill!

What is 2 dB Worth?

I have discovered a very interesting book: *Array of Light* (3rd edition), by Tom Schiller, N6BT, copyright 2010. This fascinating book is a self-published tome of extremely useful information on all sorts of antennas. Tom certainly has the *credentials* to write an antenna book. He is a co-founding member of Team Vertical, and prior to that, he and his father co-owned and operated Force 12 Antennas! Tom has a wealth of information concerning the practical side of antennas and he does a splendid job of presenting it in *Array of Light*.

What I like most about this antenna book is the scientific approach he takes toward getting the most fun from the ham radio hobby by improving the antenna system. His antenna information is methodically presented with the idea that it only takes about a 2dB of signal improvement to dra-

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matically increase your enjoyment of on-air operating!

An idea Tom subscribes to is that "everything works." And it does. Just how "well" it works is open for debate. To prove his point, Tom took a 150-watt light bulb, mounted it on a 4-foot fence post, and using a Kenwood TS-850S at 120 watts output, literally proceeded to work the world using the light bulb as an antenna! This project made the pages of *QST* (July 2000) and garnered Tom the coveted "Cover Plaque Award" for that issue. Using this light bulb antenna project, Tom easily convinces the reader that "everything" does indeed "work"! He goes on from there to lay the ground work for installing meaningful antennas to increase your enjoyment of the ham radio hobby.

Two decibels (2 dB) is not a whole lot of power increase (or decrease). However, that is what Tom says will make a big difference, and I am rapidly becoming a believer! Tom's reference point is a half-wave dipole at a height greater than 35 feet. His systematic approach to proving his claim is well-documented in the book, and it's hard to refute his line of thinking and scientific methodology.

After 20-plus years of designing radically different high-performance antennas for Force 12, coupled with countless interviews with a wide selection of hams, along with first-hand experiences encountered working as a DX station with Team Vertical, Tom makes a forceful argument that an increase of as little as 2 dB will enhance your on-air operating experience.

One of the quotes that appears multiple times in the book is "Once you have been behind a big antenna, your perspective is never the same." Now this is something with which I have first-hand experience. For four years (1980–83) I was a guest operator at G4ANT (GB4ANT), the East Anglia Contest Club, located in an industrial park just outside of Norwich, England. In addition to being thrown in with an experienced group of DXers and contesters, I was able to get my share of operating time with some really impressive antennas.

Prior to the CQ DX WW DX SSB Contest in 1980, I had arrived at G4ANT a bit early. While the majority of the guest ops headed out to the local pub, I plugged my Ten-Tec Argonaut 509 into the stack of 20-meter Yagis and proceeded to complete Worked All Continents in about two hours! Needless to say, I was impressed! The bands were hopping, with many contesters "stretching their legs" and mak-

The Elecraft K3 is my latest QRP acquisition. For me, it is the first time I have ever owned a world-class HF transceiver!

Tony Baleno, N3ZN, does some exceptionally beautiful work as can be evidenced by the hand-crafted ZN-QRP paddle set. This CW machine is superbly crafted and is a joy to use. It is smooth, sleek, and a definite attraction to any shack.

ing quick Qs prior to the start of the contest. It was relatively easy to garner WAC, but it was the antennas that did the heavy lifting, that's for sure. I will never forget that experience. I only wish I could erect three 120-foot towers in my back yard!

If you want to really learn and understand the practical side of antennas, pick up a copy of *Array of Light* by Tom Schiller, N6BT (http://www.n6bt.com/n6bt-AAOL-3rd-1.htm). It is one antenna book that you will constantly refer to as you progress in the radio hobby.

The "Key" to CW

Now that Morse code (CW) is no longer a requirement for earning a ham radio license, it appears to be at least as popular as ever, with many newer hams deciding on their own to learn it and use it at their own pace. Most newcomers to CW start out with a hand key and then progress to more sophisticated keys, such as bugs and paddles for electronic keyers.

While I am really not a collector of keys, bugs, and paddles, it seems that every once in a while one will follow me home and find a place on the ops bench. Such was the case with Tony Baleno, N3ZN, (http://www.n3znkeys.com/) and his outstanding family of beautiful and functional paddles. Tony provided me with his ZN-QRP paddles, and I instantly fell in love with the well-designed and beautifully-crafted CW sending machine!

Having never really mastered the art of iambic paddle operations, I am partial to a single-lever paddle. My old, faithful Vibroplex single-lever paddles have served me well over the years. However, after using Tony's ZN-QRP paddle, I have to say that I am suitably impressed! Although I use this dual-lever paddle like I would a single-lever system, I found virtually no problems transitioning from the Vibroplex to the ZN-QRP paddles.

One really nice thing: Tony's keys are *heavy*. They stay put on the operatin bench and don't tend to move around if you get a little wild while banging out your dits and dahs. Since I am one of the "heavy-handed" CW ops, this is a great feature, especially since these paddles are so small and compact. Normally, I used a small piece of neoprene drawer-lining material cut to the size of the paddle/key base to keep the key/paddles from moving around. With Tony's paddles this is unnecessary.

If there is one downside to the ZN-QRP paddles, it is that they are so darned pretty I hate to take them out of the shack and use them while in the bush! I just can't bring myself to do that! (Sorry, Tony!) The overall brass metal finish on this diminutive paddle is outstanding. The ZN-QRP paddle measures 3/4" × 2 1/4" × 2" and weighs in at a whopping 1 pound 4 ounces (20 ounces). It features three ball bearings per lever arm, which makes sending really good CW effortless.

For more information on Tony's outstanding line of CW sending machines, hit his website for an up-close and personal look at some exceptional hand-crafted engineering.

Meeting WB6NOA

On December 3, 2011, Ham Radio Outlet of Atlanta held a little shindig for the local ham radio operators. Reps from Kenwood and Yaesu were in attendance, along with one of my personal ham radio heroes, Gordon West, WB6NOA.

I first met Gordo at the Virginia Beach Hamfest back in the mid 1990s. What a guy! On this occasion I had a brief one-on-one encounter with him, and I have to say that Gordo is the "real deal." He has two speeds when it comes to ham radio: "Warp Factor 10" and "Off"! Seriously, my brief time with WB6NOA left me rejuvenated, with my ham radio "batteries" fully recharged and ready to go. I have never seen someone so "on fire" for amateur radio. Gordo is in a class by himself, and when he said to me, "Thank you for all you've done for ham radio," I was floored!

Me? All I have ever done is to write a couple of books and a few articles. Gordo, on the other hand, is a world-class ambassador for the hobby! Suffice it to say I was very impressed with the man and I know, beyond a shadow of a doubt, that the radio hobby is in much better shape with people like Gordo in the mix.

That is it for this segment, gang. Upcoming this year we will continue to focus on antennas, the lifeblood of any ham radio station. We'll also showcase some other shack accessories, and I will have my "official" mini-reviews of the Elecraft K3, the Flex Radio Systems 1500 SDR, and the SDR Cube from George Heron, N2APB.

73, Rich, K7SZ

what's new

BY JOHN WOOD,* WV5J

Protecting Those Great Gifts

Were you among the lucky ones who received or bought yourself a laptop computer or tablet during the holidays? If so, then you're probably still having a great time with your new electronic toy, using it to solve so many of the problems you encounter in your daily life while keeping you entertained. But have you thought about protection and safety for your new device? Having an iPad 2 is great but does it have a cover to protect the screen from the real world?

Skooba Design has announced six new product additions to its ever-expanding line of tech-travel carrying cases and accessories (photo A). The company's new flagship V.3 Collection includes two laptop bags, an iPad/tablet messenger, and a new version of Skooba's popular Superbungee shoulder strap. Also just introduced are Skooba Skin Neos, neoprene skins for laptops and tablets, featuring Skooba's patented skin-to-tote convertible design.

The Skooba Satchel V.3 has the potential of being a great computer-enhanced ham radio "go" bag since it provides a dedicated laptop section, separated from the main compartment, for maximum protection and fast access. Skooba's Bumper Bars supplement the fully padded walls providing additional shock absorption and improved air circulation. They feature a total of 20 additional pockets and compartments to organize gadgets, accessories, cords, files, and office necessities. Other features include a hideaway water-bottle caddy, a gasket-sealed weatherproof zipper on the front-flap compartment, movable/ removable file divider, Skooba's patent-pending Superbungee shock-absorbing shoulder strap (also offered as a separate accessory), and more. Yet with all of its bells and whistles, the Satchel tickles the scales at a shoulder-friendly 43 ounces for the standard size (for all 15"-range laptops and most slim models such as the MacBook) and 46 ounces for the large (for full-size 16–17" machines).

The V.3 iPad/Tablet Messenger is a slim, compact, courier-style bag that holds any tablet, netbook, or e-reader in a dedicated padded compartment. Sixteen other pockets and compartments hold accessories and office/travel necessities. Some of the many other features include hideaway water-bottle caddy, quick-access top zipper, and a unique magnetic front-flap closure that locks shut on contact and opens with a quick twist. The Messenger weighs in at 25 ounces—no more than the iPad with Smart Cover weighs alone.

One of the notable details of the V.3 Collection is that all of the compartments in the main accessory organizer are fully padded. According to Skooba's Lorri Diggory, it used to be that accessory pockets were just for pens, business cards, and cords, and most bags are still made that way. However, now these products hold cameras, audio equipment, portable hard drives, and other expensive gear, thanks to Skooba.

All V.3 Collection bags are made of micro ballistic nylon, a material that the company says provides the optimal combination of strength and durability, water resistance, and light weight with the look, feel, and quality of fine luggage.

V.3 Collection prices (MSRP) range from $27 for the Superbungee strap to $179 for the large Satchel. Skooba Skin Neos list for $49.95 to $59.95. Full specs and dealer/ordering information can be found at <www.skoobadesign.com>.

A Parallel Universe?

For all the many hams who enjoy building an electronic kit that has amateur radio application, let me break this fact to you gently: There is a parallel universe of people who like to call themselves "Makers." These fine folks may or may not be licensed amateurs, but they do enjoy building things, just like you, and they leave their options open as to what type of project they want to build.

One of their favorite starting points is at Sparkfun Electronics and its web page at <www.sparkfun.com> (photo B). As a purveyor of parts and knowledge for electronics creation, SparkFun Electronics has gained a lot of momentum with its new education program which was established earlier last year.

Lindsay Levkoff, education director at SparkFun Electronics, says: "We want to revive the wonderment of science lost to the paradigm of memo-

Photo – Skooba offers such a variety of cases that they should have one to fit and protect your valuable electronics.

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Photo B– Sparkfun Electronics provides parts, electronic and otherwise, and information that can serve as a starting point for both hams and makers.

rization and regurgitation. Our initiative is to create exciting, accessible, and affordable open-source education materials with an emphasis on creativity, constructivism and differentiated instruction."

The open-source model allows educators to bring relevant and engaging technology into the classroom, despite budget restrictions, because it eliminates intellectual property costs. Open-source educational materials also allow educators to revise materials to the level of the class or individual student. SparkFun's hope is that this will increase interest in STEM (Science, Technology, Engineerinmg, & Math) fields in all classrooms, especially in under-served areas.

SparkFun has taken these open-source education materials and hardware into schools, after-school programs, education events, and teacher workshops and has enjoyed success from the efforts.

Looking at the Spark Fun web page, I found that Spark Fun sells books, breakout boards, cables, cellular and GPS accessories, components development tools, LCDs, and a number of kits.

The kits include an Arduino audio amplifier that sells for $29.95, a bulb/dial clock kit for $84.95, and a DIY capacitance meter for $13.95. Other kits that may have more ham radio appeal include a digital oscilloscope for $59.95 and a frequency counter for $29.95.

Be aware that Sparkfun Electronics and its kits are available and can provide yet another source for parts and projects to appeal to that "Maker" in you. Once again, that website is <www.sparkfun.com>.

An Unbreakable Transistor?

That's what NXP Semiconductors says is a possible way to describe its new BLF578XR LDMOS power transistor which is capable of 1200 watts of RF output power. NXP formally calls it a 1200-watt LDMOS power transistor for broadcast applications and industrial applications in the HF to 500-MHz band.

The NXP BLF578XR (that's "XR" for Extremely Rugged) features easy power control, integrated ESD protection, high efficiency, and excellent thermal stability, and it is designed for broadband operation with possible applications in industrial, medical, and scientific fields, and as a broadcast transmitter. Its is compliant with Directive 2002/95/EC regarding restriction of hazardous substances.

That part about applications as a "broadcast transmitter" may pique the interest in this new product for hams, but what the NXP video that's available on You Tube and the <www.nxp.com> website show also makes it extremely impressive. In the video, the 1200-watt power transistor survives a series of abusive scenarios, including having its output power shorted to its shield, its output used in high VSWR conditions of 55:1 to 125:1, and its input voltage increased from its normal 50 volts to 55 volts and then used in an open-circuit situation. While many power transistors would have died under these adverse conditions, the NXP BLF578XR just keeps on percolating, and that's what makes this component potentially useful in any number of amateur applications.

For more information on the NXP Semiconductors BLF578XR, visit You Tube or go to <www.NXP.com>.

MFJ OCFD Antennas for 160/75 and 60/30 meters

Do you enjoy using wire antennas but would like to have some gain to help your signal? Now you can do both thanks to MFJ and its new off-center-fed dipoles for 160/75 and 60/30 meters, the MFJ-2013 and the MFJ-2016 (photo C).

MFJ tells us that these two antennas by K1BQT break traditional OCFD design barriers to deliver wider bandwidth, lower SWR, solid gain, and full-frequency agility without a tuner. You get the highest efficiency in a full-size radiator with MFJ's *Matchmaker*™ feed block, which tests over 98-percent efficient.

The NEC-modeled element delivers the same feed-point impedance on every band, and an innovative new transformer design yields the exact ratio needed for a great match. Both antennas come with a super balun, because OCFDs need good baluns to block feedline radiation. There is also a built-in bifilar-wound Guanella current choke which has over 30 dB of common-mode rejection on all bands. It also kills pattern irregularities, RFI and noise.

There's also the gain. MFJ says the pair delivers a ground-reinforced dipole pattern on the fundamental and a full-wave cloverleaf on the second harmonic for peak gain on higher bands. Each has great height compensation. Element feed points are compensated for typical mounting height, so you always get the lowest possible SWR on all bands.

MFJ says that the two OCFD anten-

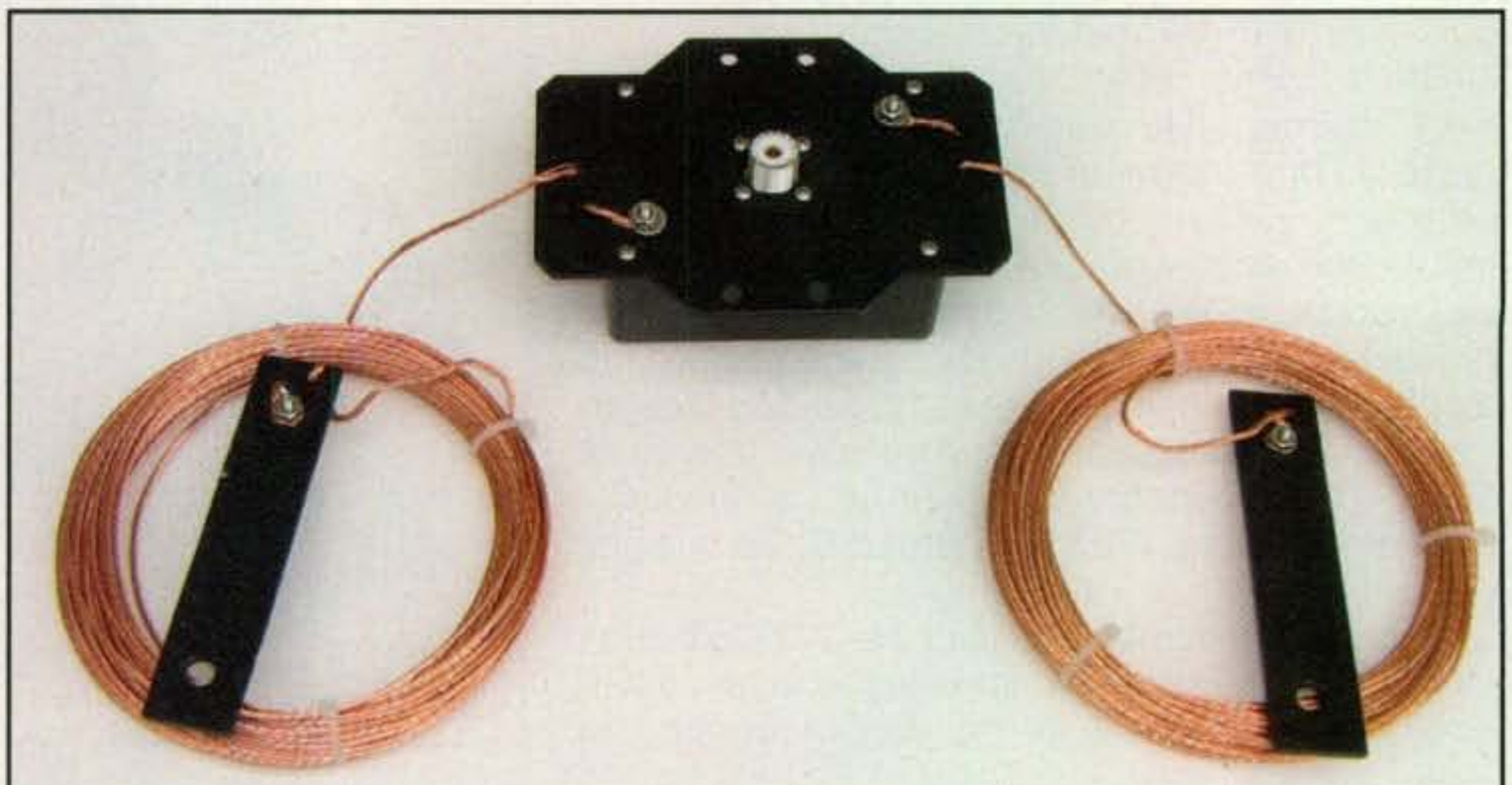

Photo C– MFJ's new OCFD wire antennas can handle higher power outputs while also providing gain for your signal, and they are easy to install.

nas also deliver great frequency compensation. Normally, an OCFD cut for 3.85 MHz resonates on 7.7 MHz, but MFJ's unique OCFD design resonates at the mid-band on both 75 and 40 meters. To give these antennas long life, MFJ uses UV-resistant marine-ABS feed blocks, stainless-steel hardware, and Teflon® SO-239 connectors that ensure maximum protection from the environment.

Both of the OCFD antennas install easily in a flat-top or inverted-V setup, because the feed block has attachment points for tower or tree support. Suggested height for these OCFDs is 35–70 feet. Priced at $79.95 for the Ultra-lite™ MFJ-2013, or $129.95 for the Power-Lite™ MFJ-2016, these designs reportedly outperform multi-band vertical antennas by a wide margin for a fraction of the cost.

The Power-Lite™ handles the maximum legal limit of 1500 watts CW/SSB, uses heavy-duty components and rugged construction, covers the low end of 160 meters, plus delivers gain in the 75-meter SSB DX window. The Ultra-Lite™ for 60/30 meters handles 300 watts PEP SSB, measures 86 feet long, and is a half-wave dipole ERP on 60 meters that delivers consistent gain on 30 meters.

The MFJ OCFDs are protected by MFJ's famous NoMatterWhat™ one-year limited warranty: MFJ will repair or replace (at its option) your MFJ product no matter what for one complete year.

To order, receive a free catalog, or to locate your nearest dealer, call 1-800-647-1800, fax t1-662-323-6551, write to MFJ, 300 Industrial Park Road, Starkville, MS 39759, or go online to <http://www.mfjenterprises.com>.

An Inflatable Antenna Tower for Amateur Radio

Yes, we said inflatable! Now you have available a 33-foot tower designed and priced for amateur radio operators and clubs. The inflatable HAM33 Antenna Tower (photo D) is built by airship manufacturer LTA Projects and designed primarily for amateur radio operators and clubs that need a fast and safe way to deploy their antenna systems without the risks and expenses of traditional steel towers. The portable HAM33 Tower system sets up in under 10 minutes and has a range of uses from ham festivals to emergency communications.

"We receive a lot of interest in our inflatable antenna towers from amateur radio operators," said designer Steve Garner, LTA Projects' founder and CEO. "Beyond being enthusiastic hobbyists, hams are a vital link for emergency and disaster relief agencies, so the HAM33 Tower is a natural addition to our line of inflatable tower systems."

Photo D– Yes, you are looking at an inflatable ham radio tower from LTA Projects that can support an antenna at a height of 33 feet.

The inflatable HAM33 Tower stakes into the ground and uses a continuous 5.5-amp blower to rapidly inflate to its full height of 33 feet (10 meters). The HAM33 has a 59-inch (1.5-meter) base diameter and is made of 10-oz. vinyl-coated 1000d polyester available in eight colors with callsign printing available. The HAM33 lifts up to a 10-lb. payload at the top with additional payload options along the sides.

For more information about the HAM Tower go to <http://ltaprojects.com/ham.html>.

LTA towers can be backpacked into remote areas or deployed from most any SUV or pickup truck without special modifications. The towers currently are in use by emergency management, law enforcement, and publicsafety agencies all over the U.S.

Array Solutions Surge Suppressors

Array Solutions says it is now producing the finest surge suppressors on the mar-

Photo E– Array Solutions is offering these two surge suppressors to help you protect your investment in communications.

ket—its eight-wire suppressor to support typical amateur rotator installations and a 16-wire suppressor when more connections are required (photo E).

Array Solutions also says the new suppressors are easy to install because they bolt to the tower with galvanized U-bolts. The outside terminals are made of stainless steel, the box is certified NEMA 4X to withstand a harsh chemical environment, and each component handles 6500 amps of surge current and fire at 65 volts.

For more information, visit <www.arraysolutions.com> or call Jay Terleski at 1-972-203-2008.

Book Corner

Just released is *Wi-Fi and the Bad Boys of of Radio*, a novel by Dr. Alex Hills, AL7K (photo F). With that title, it's guaranteed to interest a lot of amateurs and with the author, who is also a distinguished service professor at Carnegie Mellon University, there's the promise of a quality story.

According to the author, the book is a story about a young man fascinated with electronics in general and ham radio in particular. After being a teenage ham operator and bringing radio, TV, and telephone service to the Eskimos of northern Alaska, Dr. Hills leads a small band of innovators to overcome what he calls "the bad boys of radio"—the devilishly unpredictable behavior of radio waves—and build the network that would become the forerunner to today's Wi-Fi. Need we say any more?

For more information, visit <http://www.dralexhills.com>.

"ARRL Exam Review for Ham Radio" (photo G) is a CD that can help prepare you for the Technician, General, and Amateur Extra Class license by giving you review questions, answers, brief explanations, and randomly generated practice tests. By using this CD on your home PC to provide you with practice exams created from the actual examination question pools, you can make sure you are fully prepared when test day comes around. MSRP for the "ARRL Exam Review for Ham Radio" is $39.95 and it's available at <www.arrl.org> or by calling the ARRL at 1-860-594-0200. 73, John, WV5J

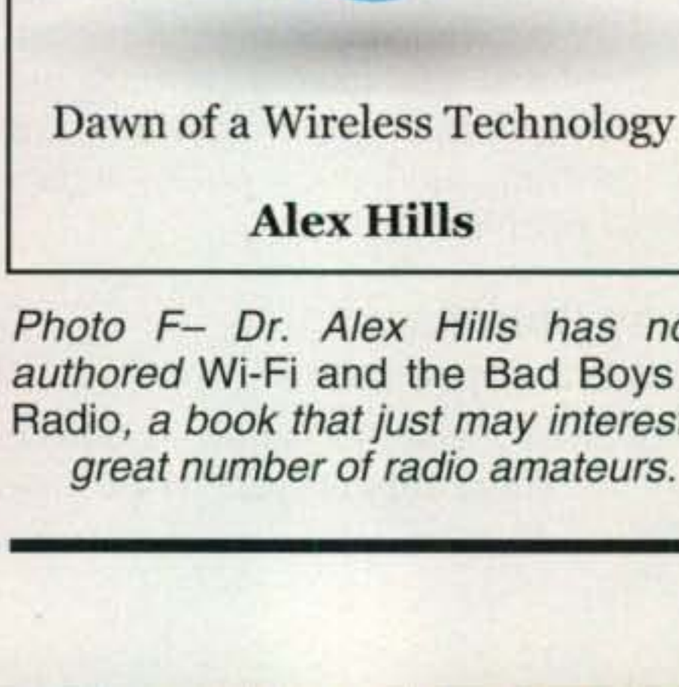

Photo F– Dr. Alex Hills has now authored Wi-Fi and the Bad Boys of Radio, *a book that just may interest a great number of radio amateurs.*

Photo G– The "ARRL Exam Review for Ham Radio" can help prepare you for the Technician, General or Amateur Extra Class license tests.

Note: *Listings in "What's New" are not product reviews and do not constitute a product endorsement by CQ or the column editor. Information in this column is primarily provided by manufacturers/vendors and has not necessarily been independently verified. The purpose of this column is to inform readers about new products in the marketplace. We encourage you to do additional research on products of interest to you.*

Data Error Detection & Correction

BY DON ROTOLO,* N2IRZ

Everybody makes mistakes, even Mother Nature. Digital data sometimes needs to be transferred without any errors, so man has developed ways to defeat nature and get perfect results. That comes at a cost, though.

This month, in response to a suggestion by Frank Reisch, KG5LA, we will take a closer look at the ways we can both detect and correct errors in data transmissions. Hams have at their disposal cutting-edge software for data communications, and based on what I'm seeing on the air, there are a lot of us making use of the spectrum. Which mode to use is often a matter of preference, but sometimes we need to decide which software might be best to overcome difficult band conditions. Here we'll look at a little theory that might help when those decisions arise.

Error-Free and Not

There are two basic communications types—error-free and not. "Not error-free" communications are those for which minor imperfections in the information are tolerable. For example, Morse code (CW) is not error-free, but almost always the human at the receiving end can compensate for interference, both natural (QRN) and man-made (QRM). PSK31 is also not error-free, but since it is used mostly for casual ragchews, we generally don't really care if a few scrambled characters slip in here and there. If we need to, we can always ask the other station to repeat the word.

Error-free communications are used when it's important to get each and every data bit correct. AX.25 packet is a good example of an error-free mode, since the message either gets delivered perfectly or not at all. These modes are used when sending computer data files, which are sensitive to errors, or important tactical information such as lists of names; in emergency communications we don't want Mrs. Bones inadvertently worrying about Mr. Jones's safety.

How do we manage to get error-free communications using an error-prone radio channel? The first step is detection: We need to know that there *is* an error.

Detection: Parity

One simple method of detecting errors uses a *parity bit*. You simply add up the number of ones in an eight-bit byte of data and set the parity bit to "1" if there is an even number of ones, or set it to zero if there is an odd number of ones. This is known as *even parity*. You can also count zeros, if you prefer, or use "1" to signal an odd number of ones (*odd parity*). This single bit is then tacked on to the eight-bit byte so the receiving end can check for errors.

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That brings up one of the downsides of this whole business: We now have to send nine bits for every eight-bit byte, effectively decreasing our communications channel's throughput by 12.5%. That's just part of the price we have to pay to try to defeat old error-prone Mother Nature.

Parity detects if there is a single error in a byte, or an odd number of errors (3, 5, or 7), but if two bits get flipped, the error is not detected. In a system where errors are extremely rare, such as in RS-232 communications carried out over a relatively short wire, parity is a fast and reliable way to ensure data integrity, easily implemented in hardware.

Checksum

If we expect our communications channel to allow errors where two bits in the same byte can get changed, we need to use something more powerful than a parity bit to identify errors. One such method is called a *checksum*. As the name implies, it is a mathematical operation performed on the data that is used to check for errors. The sending station calculates a checksum and sends it along with the data. The receiving station also calculates the checksum using the same method, and if the checksums are the same, the data was received without errors.

Checksums are more efficient than parity bits, because you can create a checksum for a much larger block of data. However, they are more computationally intense. Most checksums are impractical to implement in hardware, and so the designer needs to use CPU cycles to calculate it on both ends of the communications channel.

To help explain checksums, here is a simple example: Let's say we're sending a series of packets, each with 16 bytes of data. We add up the value of each byte (which can have a value of 0 to 255) in our data packet. Whatever that total value is, we divide it by 256, keeping only the remainder. Multiply the remainder by 256 and that is our checksum, which we send as a 17th byte. For example, assume a byte total of 1157. 1157/256 = 4.51953125. Subtract the whole number (4). Then 0.51953125 × 256 = 133, which is our checksum.

At the receiving end, the same process determines the packet's checksum and compares it to the one received. If they're different, there's an error (either in the data or in the checksum). While this example will identify many errors, there are some cases it can't detect—for example, multiple errors that exactly cancel out—so using addition for a checksum is not generally done.

CRC

Of course, you can develop more complex checksum algorithms to detect more complex errors. If we think along the lines of our example, but instead

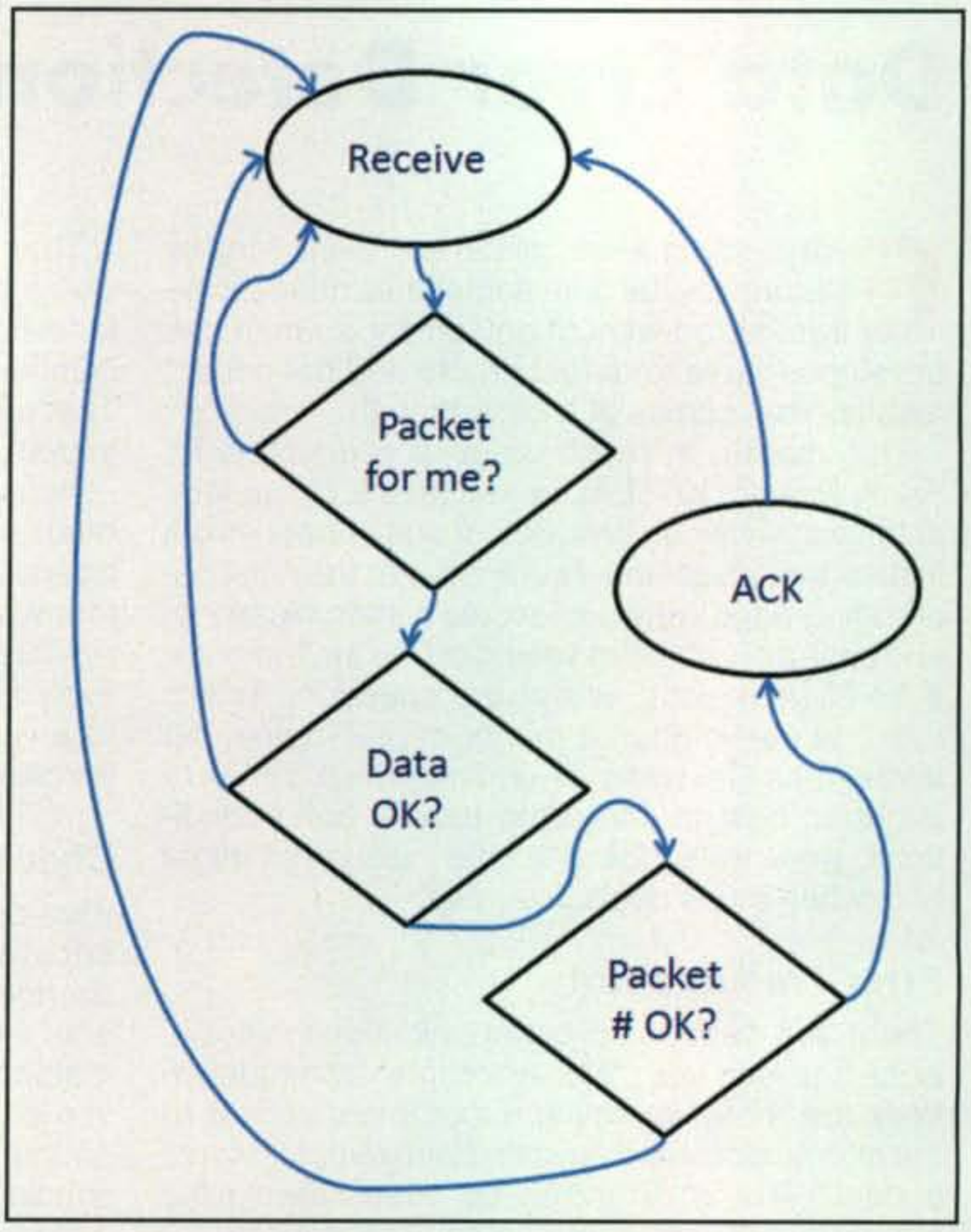

Fig. 1–A very simplified state diagram showing the ARQ performance of an AX.25 packet radio link from the receiver's point of view. Unless the packet is exactly correct—for that receiving station, no errors, and is the next expected packet in the series—it does not get ACKnowledged. When the transmitter doesn't get an ACK within a certain amount of time, it simply resends the packet, repeating until it gets an ACK or it has retried too many times.

divide the bytes by a fixed number and use the remainder as a checksum, we'll have a much stronger algorithm. However, doing all that division uses a lot of CPU cycles, so we just break it down into smaller chunks, just like third graders learn to do using long division. Since this kind of calculation is cyclic (or repeating), we call this a *Cyclic Redundancy Check*, or *CRC*.

As you might imagine, there is a *lot* more to it than that, but the idea is that we can detect errors in messages, using tricks to manage the computational workload and extra data that has to be delivered. Even simple choices, such as picking the fixed number by which to divide, have a profound effect upon how "good" the algorithm is.

OK, so far we have learned that if we are sufficiently clever, we (or rather our communications devices) can detect errors in data, the first step towards perfect error-free communications. But once we detect an error, then what? Detecting an error is not the same as repairing it.

Correction: ARQ

If we are able to communicate with the sender, we can ask for the data packet to be sent again until we get a good checksum. This is called *ARQ*, or *Automatic Repeat reQuest*. AX.25 packet uses CRC and ARQ to find and correct errors: The sending station keeps sending a packet until either it is acknowl-

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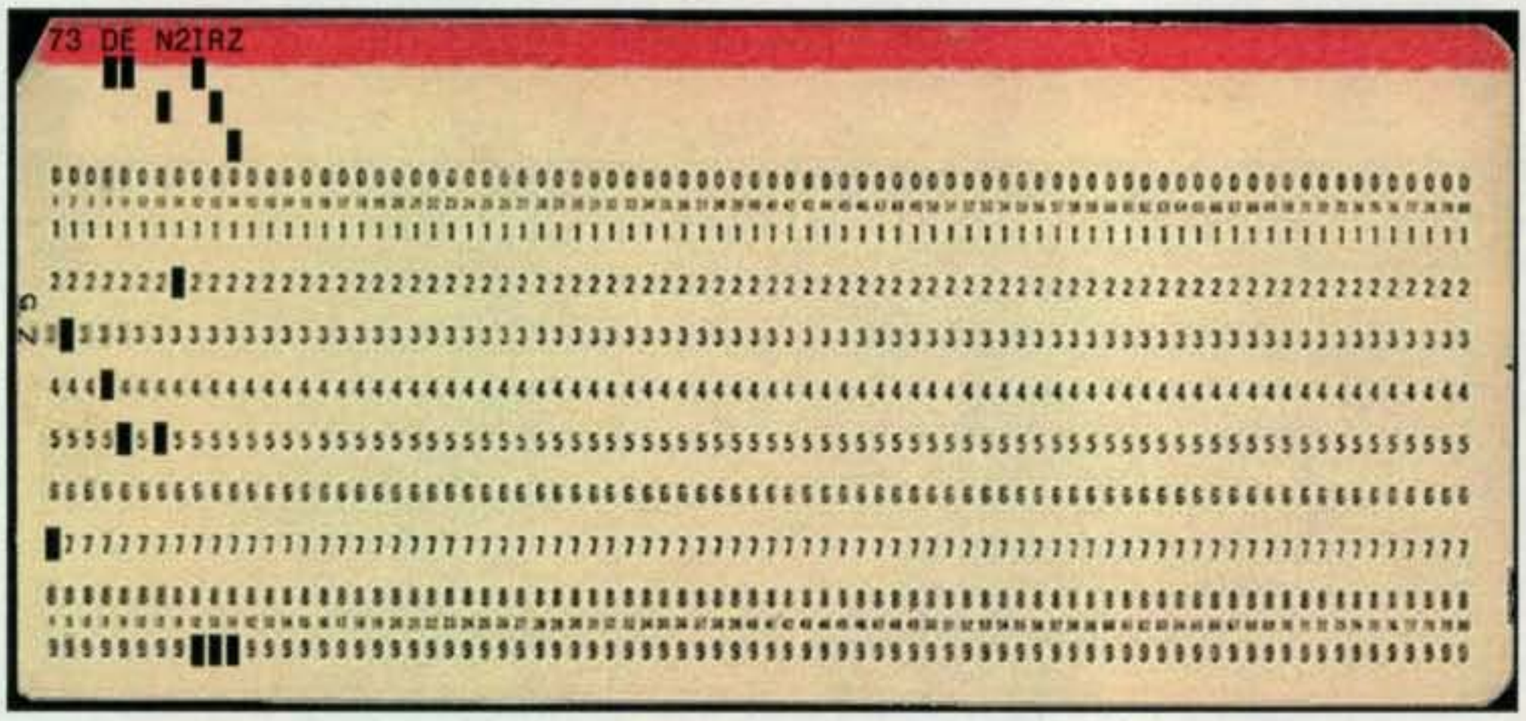

Fig. 2– A sample of a punch card from the early days of computing. Each card could encode up to 80 characters as a series of holes punched into the card, which is how you stored your program, but some early reading machines were prone to errors. Richard Hamming, frustrated with these errors, developed a way to correct them automatically, known as Forward Error Correction, or FEC.

edged as being received correctly, or we've re-tried too many times and the entire message is abandoned. See fig. 1 for a greatly simplified example.

ARQ makes a lot of sense to humans, since this is how we naturally communicate. If someone yells across the house for you to bring them a [garbled], you'll just shout back "bring you a what?" until you hear something you recognize. That's all well and good, but what do we do if we can't communicate back to the sender, for example when receiving data from a commercial broadcaster? We've detected the error, but how can we ask for a fill-in?

Forward Error Correction

In cases where there is no 'back-channel,' we must use some type of *Forward Error Correction* (*FEC*). Just as the name implies, we are sending with the data a means of not only detecting errors, but correcting them. FEC can be (and is) used together with ARQ: Most errors are corrected at the receiver (which saves transmitter time), but a repeat can be requested if necessary (adding robustness to the channel). Also, some data is tolerant of some errors—such as the Digital Radio Mondiale™ (DRM) broadcast scheme —but uses FEC to help minimize them.

As a simple example of FEC, we can send each data byte three times. If two of them match and one is different, we can guess that the most likely correct data is the two that match and go with that. Of course, such a simple scheme has several problems: What if all three are different? What if the error is really in the two that match? Can we live with a data channel with about one third of the normal capacity? To address these problems, we can add a CRC to the data, which will identify an uncorrupted byte, but we're still sending an awful lot of data.

Let's digress for a moment. A long time ago, before floppy disks and memory sticks, computers were programmed using paper punch cards. Each card could hold up to 80 characters stored as a series of rectangular holes punched into a stiff paper card (see fig. 2). These holes could be read by the computer at a rate of about a card a second. This is how the programmer would load a program and data into RAM so it could be run. Loading in the cards, telling the computer to run the program, dealing with any problems, and collecting the program's output (printed on paper) were all jobs for the computer operator.

The card readers, being electro-mechanical devices, had a small but noticeable error rate in reading those holes. If the computer choked on some error in a line of the program, the operator on duty would pull the specific punch card and read the typewritten characters printed on the card (put there to allow humans to read the card). He would then correct the error in the program and run it again.

Richard Hamming

Well, a guy named Richard Hamming (1915–1998), who worked on the Manhattan Project building the first atomic bomb back in the 1940s and then went to work for Bell Labs, was getting frustrated. He was working on some very lengthy and complex programs, and it got to the point where he couldn't load in his full deck of cards without at least one error. Back then not just anyone could (or would be allowed to) operate a computer, and on weekends the operators were not available. So Hamming (unfortunately not a ham, at least that I could discover) came up with a way of detecting and correcting data errors so he could run his punch-card decks on weekends without an operator available. Today the result is called a Hamming code.

A Hamming code (there are many versions) not only detects an error, but it tells us where the error is, allowing us to correct it. The theory is simple enough: Calculate a parity bit for certain data values in a packet and add up which parity bits show an error. This will give you the error's position. Bits divisible by 1 without a remainder—all of them—are in a group I'll call P1. Those divisible by 2 are in P2, divisible by 4 in P4, and by 8 in P8, as shown in fig. 3. If we have only 16 bits, we only need four parity bits. Thus, for example, if there is an error in parity shown by P1, P2, and P8, we can determine that the value the faulty byte is *supposed* to have is 11, since 1 + 2 + 8 = 11. This is a little complex, so if my explanation isn't clear, take a look at the "Hamming code" article on Wikipedia, as it is well-written (see: <http://en.wikipedia.org/wiki/Hamming_code>).

A Hamming code is one type of

	Numerical value of Byte															
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
P1		X		X		X		X		X		X		X		X
P2			X	X			X	X			X	X		X	X	
P4					X	X	X	X						X	X	X
P8									X	X	X	X	X	X	X	X

Fig. 3– An example of a Hamming code. If the parity bits for P1, P2, and P8 all are "bad," the erroneous byte had the value of 11. (See text for details.)

References

The following people are among the giants in communications information and FEC theory, each worth learning more about. For further reading, I recommend:

Claude Shannon (1916–2001) biography: <http://bit.ly/5IeMlf>
If you love complex math, here's Shannon's original paper: <http://bit.ly/R1IRL>

Richard Hamming (1915–1998) biography: <http://bit.ly/t3tVH5>
There's an inspiring talk he gave at Bellcore (formerly Bell Labs) in 1986. A similar talk is available on video; Google it: <http://bit.ly/48NS2>.

Andrew Viterbi (b. 1935) biography: <http://bit.ly/udg0t1>
An explanation of a Viterbi Algorithm: <http://bit.ly/sVTIvv>

Marcel J. E. Golay (1902–1989) biography: <http://bit.ly/u1RcAm>
A good explanation of how Golay Codes detect and correct errors: <http://bit.ly/vw0dvS>

How Reed-Solomon Codes work (Irving S Reed [b. 1923] and Gustave Solomon [1930–1996]): <http://bit.ly/sFphai>

Forward Error Correction. Since Hamming did his work, many others have created additional efficient and robust FEC methods. Some of the most popular have names such as Viterbi, Golay, and Reed-Solomon. Rather than get into the gory details of these methods (some of the math is kind of scary), I'll let interested readers research them on their own. Whole books exist on each of these, and I'd never do any of them justice here. (*See "References" above for suggested starting points.—ed.*)

Two things we can conclude from our little discussion of FEC: First, there are efficient methods for not only detecting but correcting data errors. Even really damaged data can be recovered if you make your algorithm strong enough, but you pay the price in additional data and computational complexity. Second, these guys must have been really, really smart to have come up with this stuff. I mean students of electrical engineering struggle to learn how the Viterbi algorithm works, and that's with a knowledgeable professor guiding them. Andrew Viterbi had no such guidance.

PSK-61F

Now that we know about error detection and Forward Error Correction, I want to briefly discuss the *PSK* (*phase-shift keying*) modes. As mentioned before, PSK-31 is not an error-free mode, and neither is its faster sibling, PSK-63. However, with just a few changes by Nino Porcino, IZ8BLY, we have PSK-63F, and guess what the "F" stands for.

Although the data rate is the same, PSK-63F sends data somewhat more slowly than PSK-63 due entirely to the overhead of the Forward Error Correction. Also, the two modes are not compatible with each other since the data structure is different. Your best bet is to download a sound-card communications package that supports PSK-63F (several are freeware for hams) and play with it, assuming you don't already have it. PSK-63F is available as a mode in IZ8BLY STREAM, and MULTIPSK by F6CTE, for example.

Like almost any software, downloading and installing are trivial if you already have used a sound-card mode. If you're new to sound-card digital modes, my recommendation is to download DigiPan (which doesn't support PSK-63F, by the way) and follow those instructions, which I have found easiest to use. After that everything else will seem familiar and easier. Give it a try and let me know how you made out.

Well, that's all for this month. I hope this bit (no pun intended) of digital theory will help you enjoy the hobby more and aid in your decisions as to which modes to use for a given situation.

It's really cold here in the Northeast, perfect weather for climbing the tower. Snuggle up to the warmth of those transmitting tubes in the shack, toss another log on the fire, and try something new this month.

73, Don, N2IRZ

mobiling

BY JEFF REINHARDT,* AA6JR

Climb Every Mountain . . .

Fortunately for you, this is a magazine, so you would not be able to hear me break into song. "Break" would be the correct term, too, as my lack of singing talent would not be pleasing to your ears.

Instead of a concert, this time we're taking a look at one of the sub-disciplines of mobile operations—hilltopping. For the newcomer, hilltopping combines several elements into a challenging pursuit that is not only enjoyable for the mobile operator, but also provides a valued service for those who operate 6 meters, VHF and above, and enjoy collecting contacts from grid squares that overlay this planet. Not only is it a challenge in terms of listening at the right time and place, but there's a lot of skill and an element of luck that goes along with it.

One does not necessarily need to make a major investment to engage in effective hilltopping, but like so many other ham radio endeavors, it can escalate. Much of the success in hilltopping comes from having good radio equipment, and that's more than just the transceiver; it includes good antennas, high-quality coax, and maybe even some amplifiers.

As frequencies escalate through UHF and higher, those supposed "line of sight" signals can do some interesting things. Add a heaping portion of directional antenna gain, a dash of favorable conditions such as a high-pressure ridge inducing tropospheric skip, and perhaps some reflection off an immovable object or two and presto! You have a recipe for a confirmed contact.

How far can you go? I live adjacent to the Santa Monica Mountains, a coastal range near Malibu in California. The peaks are relatively small, around 2000 feet. However, on a nice summer day when a high-pressure ridge sets up over the Pacific Ocean, it's a fairly easy drive up those mountains which also takes your radio and antenna into the ducting zone. In those conditions, it's not uncommon to be able to work 2-meter repeaters or direct contacts with hams in Hawaii, nearly 2000 miles away! Don't take just my word for it either. Gordon West, WB6NOA, has logged many a contact with our 50th state using this easy method (see a myriad of articles by WB6NOA in *CQ*'s quarterly sister publication *CQ VHF*). Also, material from *CQ VHF* magazine Editor and *CQ*'s "VHF Plus" colum-

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N6MI's mobile rig is "loaded for bear" at a remote location. Directional antennas add to the fun of hilltopping. (All photos courtesy of Scott, N6MI)

A well-organized operating station inside the N6MI mobile rig. Everything important to the operator is within reach, and a lack of clutter makes the experience more enjoyable.

nist Joe Lynch, N6CL, can provide many insights on the fun of making long-haul contacts on the upper bands.

Getting Out There

For the beginner, think of hilltopping the same way you'd approach a new hobby such as mountain climbing or scuba diving. You need to know some basics, and it's good to team up with an experienced operator to learn the ropes. In some areas, it may be relatively easy to drive up a mountain, park on a paved turnout, and begin logging contacts. As one progresses into this pursuit, you also learn that putting certain "rare" grid squares on the air is a bit more of a challenge, requiring sturdy vehicles that can safely travel on unpaved roads. Off-roading is a pursuit with its own set of issues, and there are entire magazines devoted to that topic. Suffice to say, the more remote the location, the more time one needs to spend preparing for the trip and accounting for unexpected "surprises."

As to actually "doing it," I received a *nice note from* J. Scott Bovitz, N6MI, who has experienced the thrill of operating at two of the best DX locations in California—the contest stations on Castro Peak in Los Angeles County and on N6NB's mountaintop in Kern County. However, his real love is portable operation from remote locations under less than ideal conditions.

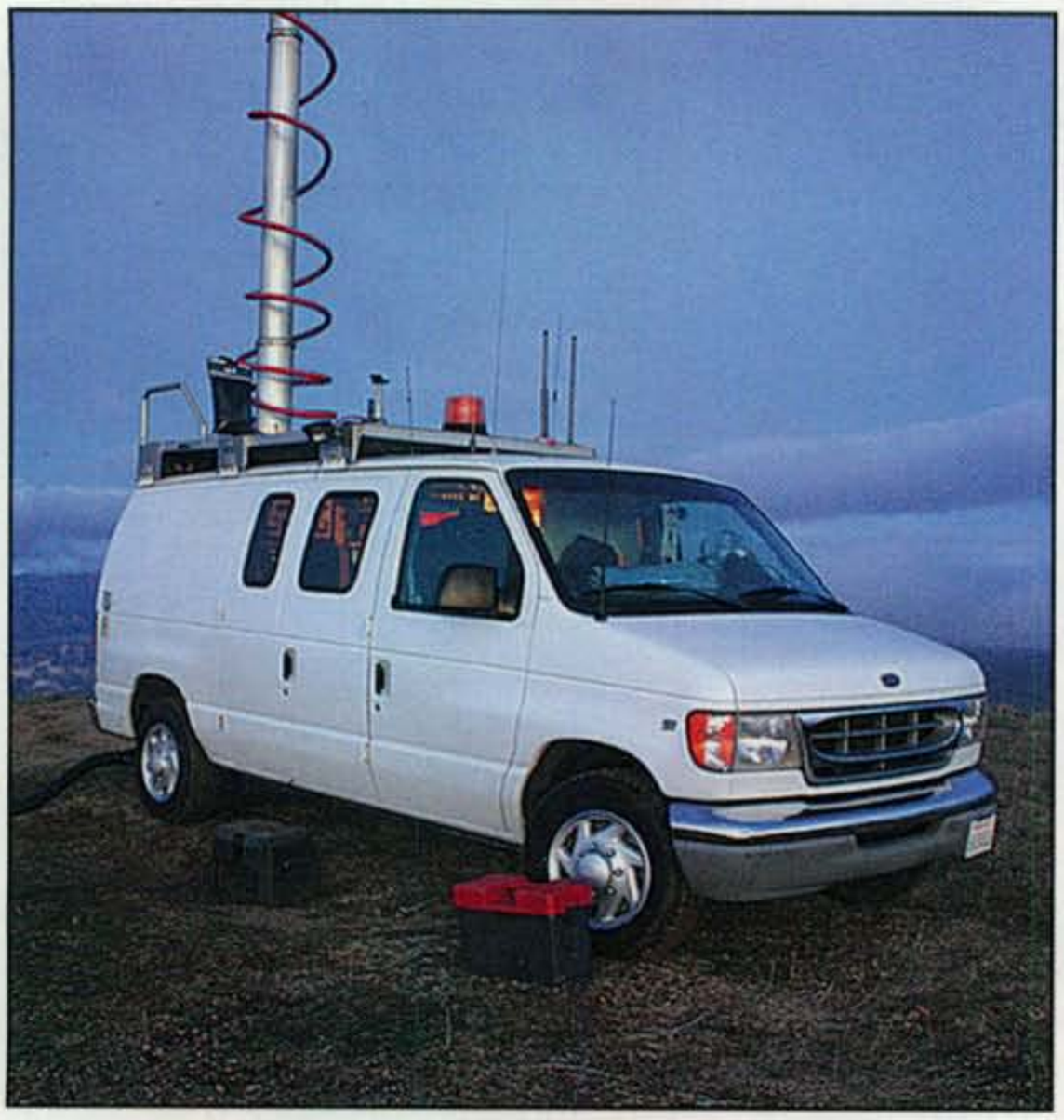
When his work schedule permits, N6MI operates major contests (Field Day style) from various grid squares in Los Angeles, San Bernardino, Riverside, Imperial, San Diego, and Monterey Counties. Bovitz has built his fourth "remote contest station." Currently, he runs an Elecraft K-Line (K3, P3, and KPA500) in a Ford van, a former electronic news gathering/cellular on wheels (COW) vehicle. His friend Tom Sneden, K6VCR, spotted the van on e-Bay.

The mobile rig can put out 500 watts on the low bands and 6 meters and more than 100 watts on the higher bands. The N6MI van has a 56-foot 2-inch pneumatic mast, a 5-kilowatt generator under the hood, and eight large deep-cycle batteries. Check out n6mi.com for more photos and videos.

Bovitz also uses the van as the remote headquarters for the all weekend transmitter hunts in southern California. On most hunts multiple transmitters are common. However, on one famous hunt, there were only four transmitters (one each in California, Arizona, Nevada, and Utah). See <http://www.thunter.org>.

Safety First

To be sure, there are many precautions to take in hilltopping. Scott's website has a useful slide show that demonstrates some of the measures that make for safe operations, including a hose that takes exhaust away from the vehicle, clean and neat wiring, and many spare parts. One other big concern is keeping an eye on the weather. Being caught on a hilltop with a 50-foot mast



A great-looking unit well above the average terrain. Note the exhaust hose to take fumes a safe distance away from the van.

in the air is not where I'd want to be if a sudden thunderstorm appeared. Also, prior to erecting any antenna or pneumatic mast, making sure you're clear of power lines is a must, including a safe zone in case the antenna and supporting rig were to topple over.

Mountains and Molehills

Scott's purchase of a used news van demonstrates another aspect of hilltopping. While a mountain may provide a lot of natural elevation, a used news vehicle with a telescoping mast can provide a lot of added range for the prairie-dweller as well. Those wide-open spaces are an invitation for signals to travel horizon to horizon, with many logged contacts as a result. As many a high-frequency operator will tell you, it's not about the power. To be sure an amplifier is nice, but remember the wise old ham's adage: "A dime spent on antenna is worth a dollar spent on transmitter."

I Need Your Help

My stock of photos and stories from reader experiences is pretty well depleted. Please drop me a note describing your mobile installation and include a few photos. Your "how I did it" story may prove to be very helpful to another ham who's taking on the challenge of installing a rig in a new car or truck. Send your material to the e-mail address shown at the beginning of this column. Who knows? You could become famous!

73 & travel safe! Jeff, AA6JR

An SUV is another approach to hilltopping and T-hunting. Traveling with a companion adds greatly to the experience plus a margin of safety.

The Weather Balloon That Could

BY JOE LYNCH,* N6CL

A bit of history was made in mid-December last year. The amateur radio world watched in amazement as a weather balloon launched in the San Jose, California area kept going and going and going. Its ultimate destination was well beyond anyone's estimation or expectation: The Mediterranean Sea, off the coast of Algeria, more than 6200 miles away.

The story of the balloon, known by its callsign K6RPT-11, did not start on December 12, 2011, however. Rather, it started in mid-2008. Ron Meadows, the owner of the callsign attached to the balloon, is the owner of a pool service company in northern California.

After being inspired by a PBS television special on weather balloons and learning much from the guys at the Great Plains Super Launch (which has been covered in various issues of *CQ VHF* magazine), along with many different balloon launches across the country, Ron decided that he also could launch a weather balloon. Recruiting his son Lee, along with Ron's father, Frank, KA6TVU, John Glass, NU6P, and Don Irving, N6DRB, who is a part-time storm chaser in Oklahoma, together they planned and eventually launched Ron's first balloon on September 12, 2009.

It seemed that Ron had what some would call "beginner's luck" with a near-perfect launch. The only hitch was recovering the payload that landed inside property protected by a locked gate. A few days after being contacted, the owner of the property located the payload and returned it to Ron.

e-mail: <n6cl@sbcglobal.net>

VHF Plus Calendar

February 7	Full Moon
February 11	Moon perigee.
February 14	Last quarter Moon
February 21	New Moon
February 272	Moon apogee.

—EME conditions courtesy W5LUU

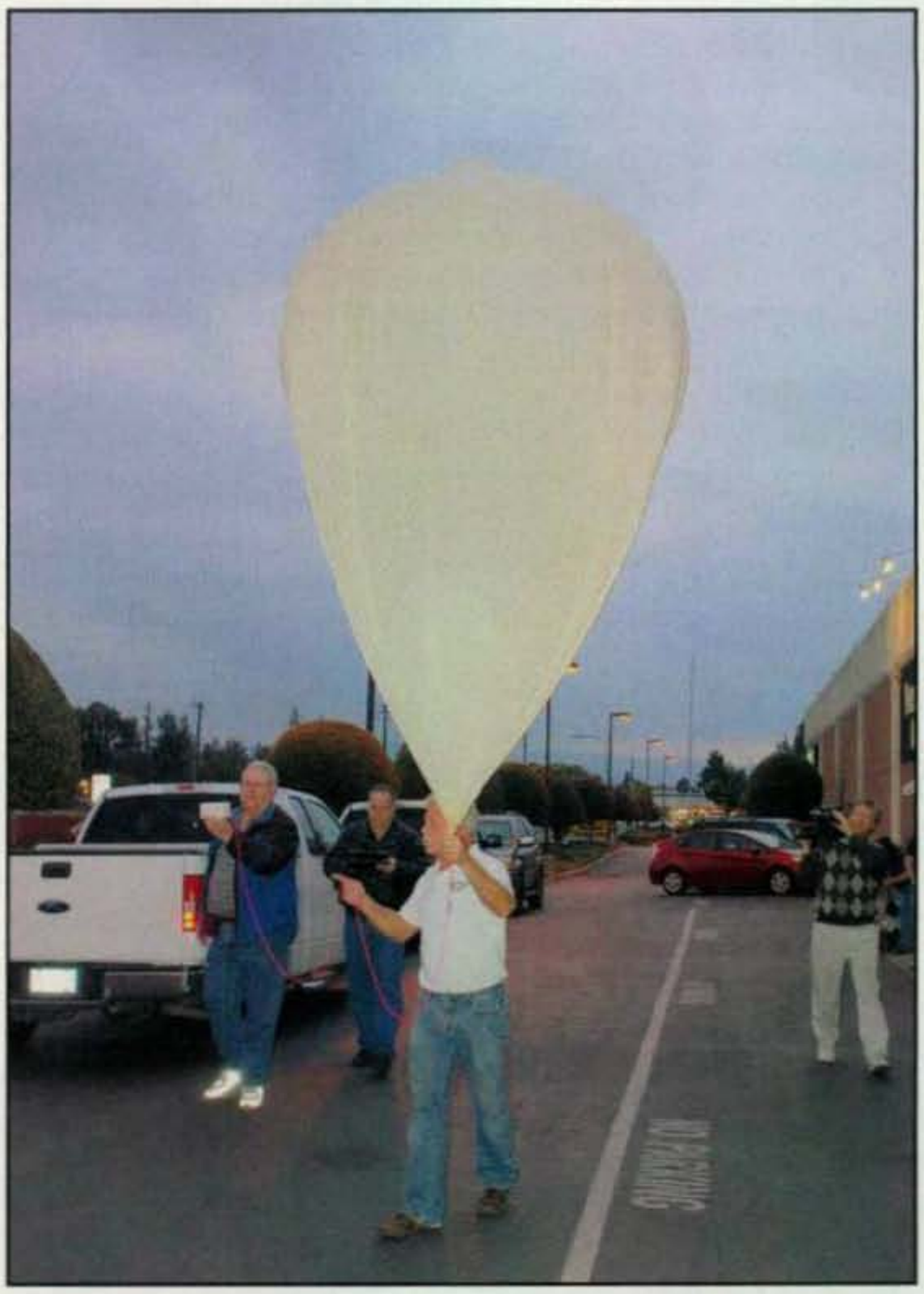
What began with an initial investment of around $2500, and countless hours of time, has turned into an ongoing project that has accounted for the launch of 14 balloons to date. Taking himself seriously, before Ron's first launch he coined the name California Near Space Project (CNSP) and set up a website: <http://californianearspaceproject.com>. On that website you can read highlights about each of his launches.

Commenting on the eve of his second launch, Ron told the *San Jose Mercury News*, "I love the idea of sending up something so high, getting as close to space as you can get. And it's also using the radio equipment, the science, the tracking, the photography, the recovery and all aspects of the flight. It's all my favorite interests in one" (March 27, 2010).

Early in Ron's efforts of launching balloons he set sight on breaking records. During his third launch he reached 122,649 feet, which at that time

Ron Meadows, K6RPT (left) and his son, Lee, filling the K6RPT-11 balloon. (Photo courtesy of KD6IRE)

This picture of K6RPT-12 payload is similar to K6RPT-11. (Photo courtesy of KD6IRE)



While Ron is walking with the balloon, Don Ferguson, KD6IRE, is carrying the payload on the left, Johnathan Corgan, AE6HO, is in the background left, and Videographer Michael Wright K6MFW is in background right. (Photo courtesy of KG6TBY)

put him in fifth place on the list of high-altitude records. During his fourth launch his balloon floated across three states, landing in Utah. Commenting on that launch, Ron stated that they had learned how to build a very-high-altitude floater, a balloon that would float along for some distance without reaching burst altitude.

On each successive launch Ron learned something else that would factor into his knowledge of balloon launching. During the fifth launch he learned how a defective balloon that develops a slow leak descends at a much lower rate than a balloon that totally had burst. During the sixth launch he learned about the problems associated with the avionics, having diagnosed a probable defective antenna as the cause of the loss of APRS packets.

During Ron's seventh launch he inched his way up the altitude record list, achieving an altitude of 128,047 feet. Unfortunately, launches in the successive months would relegate that latest achievement to twelfth place—but not for long. His next launch this past August achieved an altitude of 129,622 feet, thereby besting his previous launch and putting him into ninth place. Again, however, not for long. After having a rather nondescript launch for number nine, number ten put him on top of the altitude list, when he achieved an altitude of 136,545 feet according to Amateur Radio High Altitude Ballooning (ARHAB, <http://www.arhab.org>).

Switching to hydrogen and a larger balloon for that launch, Ron also incorporated other learning experiences. Commenting on these learning experiences, CNSP spokesperson Don Ferguson, KD6IRE, wrote:

Ron and Lee made several attempts with different sized balloons, both helium and hydrogen, and each of these flights provided additional information on the effect of neck lift (the lift needed to carry the payload) to payload weight. Also, they were able to keep track of the effectiveness of different balloon manufacturers and sizes from 1500 to 3000 grams.

Other lessons learned are related to the fill process and how to eliminate the effect of the hose weight from the lift measurement. Ron constructed a balanced fill fixture that allows very accurate lift measurements while filling the balloon.

On some early flights radio performance was an issue due to traffic collisions and antenna effectiveness. The antenna was redesigned to a half-wave center-fed dipole and the TNC was reprogrammed to transmit every 31 seconds. The antenna design significantly increased the gain and signal strength, and the RF field was measured before each flight. The TNC timing gives much better altitude resolution and eliminates recurring collisions with APRS stations transmitting at regular minute intervals. There is no receiver onboard to see if the frequency is clear before transmitting, so this timing causes each packet to occur at a one-second time differential within the minute.

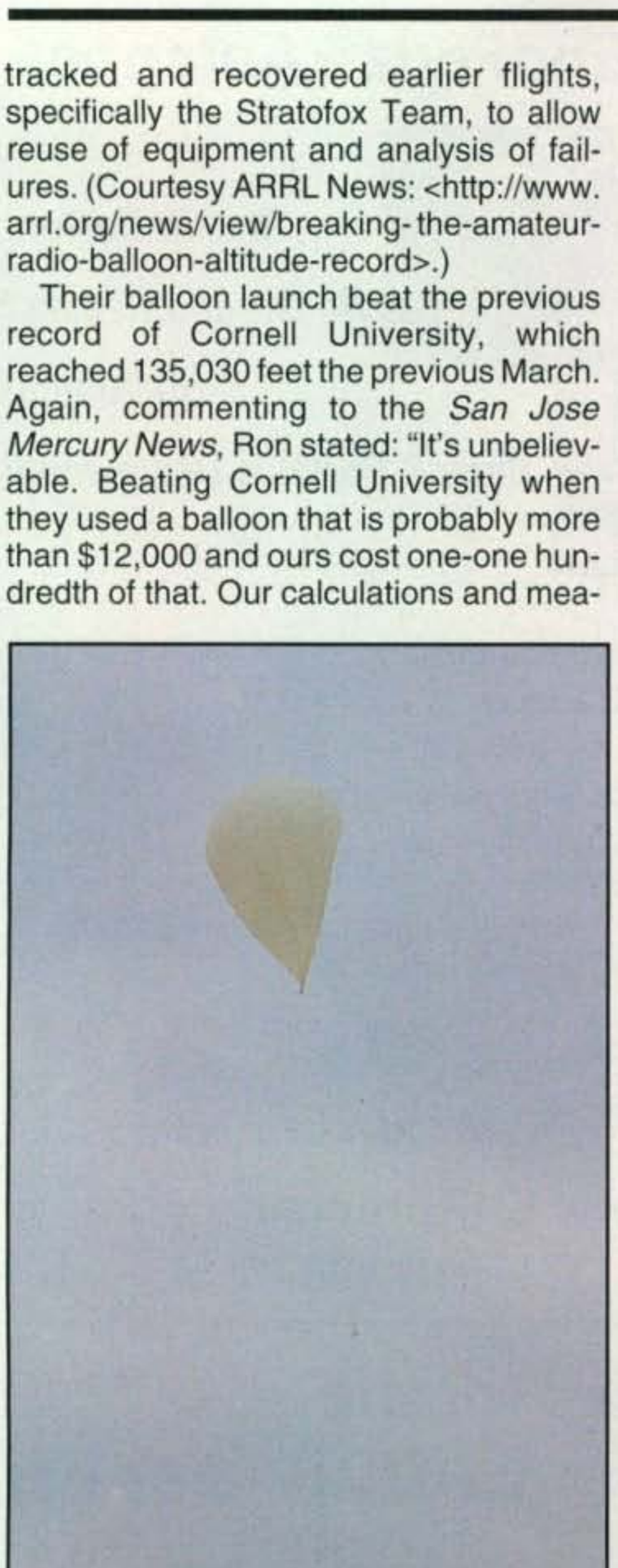
Other considerations include the size and number of batteries and the cold voltage performance of the battery. Ron measures the battery at subzero temperatures to ensure it will last longer than the expected flight and recovery.

Probably the most significant part of the prelaunch process is the calculation of initial fill/lift to successfully carry the payload to maximum altitude before bursting and without stalling at some altitude before bursting. For the October 23, 2011 record-breaking flight, Lee made all the decisions related to fill and led the team during the launch process. Ron and the team supported all his decisions and deserve significant credit for the success and the world record. CNSP-10 reached 136,545 feet, or 25.86 miles, AGL.

I know everyone on the team understands this accomplishment is a total team effort and all of the people involved in past flights have contributed to the team's success in achieving the ARHAB World Record. This includes all of the people who

tracked and recovered earlier flights, specifically the Stratofox Team, to allow reuse of equipment and analysis of failures. (Courtesy ARRL News: <http://www.arrl.org/news/view/breaking-the-amateur-radio-balloon-altitude-record>.)

Their balloon launch beat the previous record of Cornell University, which reached 135,030 feet the previous March. Again, commenting to the *San Jose Mercury News*, Ron stated: "It's unbelievable. Beating Cornell University when they used a balloon that is probably more than $12,000 and ours cost one-one hundredth of that. Our calculations and measurements were right on the money." (October 24, 2011).



Ron watches as the K6RPT-11 balloon begins its ultra-long journey. (Photo courtesy of KG6TBY)

The story of the recovery by the Stratofox team can be read here: <http://www.stratofox.org/events/cnsp10/>. It is a fascinating story of persistence paid off in locating the payload that, ironically, almost fell into a backyard swimming pool. Talk about an odd way to get business for the Meadow family pool service company!

These ten launches led to CNSP's most dramatic effort to date: the launch of four balloons. Again, these launches were to be learning opportunities. Ron's plan was to launch two floaters and two altitude balloons. According to Ron, the reason for these two flights was to see what effect UV had in reaching high altitude, day vs. night. The reasons for CNSP-11 and -12 (callsigns K6RPT-11 and K6RPT-12, respectively) floater flights were to see if they could float two completely different-size envelopes and what effect UV would have on Totex vs. Hwoyee. The floaters were predicted to land somewhere in Colorado.

The first of the four balloon launches took place on Sunday, December 11, 2011 at 4:43 PM PST (Monday, December 12, 2011 at 0043 UTC). The other three balloons were launched during the next few hours.

This is a photo of CT2JTR's Kenwood D72 handheld showing the copy of the K6RPT-11 packet. Other photos can be seen at this URL: <http://tinyurl.com/cczwwnf>. (Photo courtesy of CT2JTR)

The second balloon, K6RPT-12, traveled as far as southern Indiana. Howard Brooks, KC9QBN, of the Balloon Assisted Stratospheric Experiments (BASE) project out of DePauw University in Greencastle, Indiana, volunteered to locate the balloon, which he did from a tree top on December 13, 2011.

The third and fourth balloons, callsigns K6RPT-13, and K6RPT-14, respectively, came down in short order, both landing in Nevada. CNSP-13 and -14 altitude flights both experienced GPS failure around 125k, so going to Nevada for recovery was not that appealing.

The first balloon, K6RPT-11, was another story. Again, from CNSP spokesperson, Don Ferguson, KD6IRE:

The balloon reached a cruise altitude between 105,000 feet and 115,000 feet, where it continued its travel across the United States, the Atlantic Ocean, Spain, and finally into the Mediterranean Sea, about 70 miles north of Algeria.

The balloon traveled through California, Nevada, Utah, Colorado, Kansas, Missouri, Illinois, Indiana, Ohio, Pennsylvania, Maryland, Delaware, and New Jersey. When it left the New Jersey shore behind. it's signals were received by coastal stations as far away as Nova Scotia (VE1YAR), and when it exceeded the range of these stations, we lost track and feared that it would not be heard from again.

The footprint was about 450 miles in diameter. Once past the western edge of the footprint, there were no receiving stations.

In hopes of possibly picking up the balloon if it survived the trip across the Atlantic, e-mail blasts were sent out via several sources, alerting European operators to the possibility that this "weather balloon that could" might make it across the ocean.

On factor that had to be taken into consideration was that the balloon was transmitting on 144.390 MHz and the European frequency is 144.800 MHz for APRS tracking. Clearly, this factor did not become an issue, as European operators switched frequencies to hear the balloon's packet bursts.

It is impossible to thank, or even identify, all who assisted in these efforts, which worked beyond belief.

In the morning we were greeted by news that K6RPT-11's signal had been received by amateur radio station CU2ARA in the Azores and was alive and well at 111,503 feet and traveling 162 mph and continuing on its flight east at 92 degrees. Here is a video of one of his receptions: <http://www.youtube.com/?watch?v=G0GzeMTEZM4&feature?=youtu.be>. The rest of the day on Tuesday was exciting, as more stations around the

world took note of the little balloon from Silicon Valley heading for the European mainland.

After CU2ARA lost the signal, using CT1END, CT2JTR in Lisbon, Portugal, acquired the signal. Using his Kenwood D72 handheld, he maintained efforts to copy the balloon overnight, remarking at one point that he had to be real quiet so as to not awaken his wife.

The balloon's first packet sent from above Chipiona, Spain was at 0540 UTC, December 14, 2011, at an altitude of 109,708 feet and traveling 153 mph. It continued traveling across southern Spain, exiting the coast near Garrucha. That packet was received by EA7FQB. A few more bursts were picked up by EA7FQB and one by CT2JTR before EA6WQ heard the signal at 0738 UTC. At 0812 UTC EA4RKU received a packet. Then at 0818 EB6AOK received a packet. It would be this station that would copy the packets until the end of their transmissions.

At 0916 UTC EB6AOK received a packet indicating that the altitude was 116,326 feet and the speed was 173 mph. Between the packet sent at 0920 UTC and 0922 UTC the balloon dropped 10,000 feet in altitude and slowed to 104 mph. The next packet indicated an altitude of 91,537 feet and a speed of 83 mph. Clearly, the balloon was in descent mode.

The last packet that EB6AOK received at 0946 UTC indicated an altitude of 14,558 feet and a speed of 35 mph. The position was 37°45.69'N 4°21.09'E.

The Amateur Radio APRS system of digital radio repeaters maintained reception of the data traffic from the balloon transmitter, which transmitted its location from the onboard GPS. This network is established on 144.39 MHz in the United States but is on a different frequency in Europe. Ham radio operators across the world were able to quickly adjust the European receivers to the balloon's frequency and provide continued tracking worldwide.

This is yet another example of the response and flexibility of ham radio operators to meet a sudden challenge and provide communications when needed.

The balloon traveled at about 150 mph most of the trip and eventually covered 6,236 great-circle miles in just 57 hours 2 minutes for new amateur radio balloon flight distance and duration world records. The first radio packet after launch was received at 12/12/2011 00:44:30 UTC. The last packet was received on 12/14/2011 at 09:46:30 UTC.

The actual flight path can be viewed at this link: <http://aprs.fi/?call=K6RPT-11&mt=roadmap&z=6&timerange=259200&_s=ss_call>.

Bill Brown, WB8ELK, will have an extensive feature article in the Winter 2012 issue of *CQ VHF* magazine.

And Finally . . .

Ron set out to learn how he could set a record of endurance on some future flight. Instead, he accomplished a record that will stand for some time to come, with amazing austerity and effectiveness. Indeed, this was the weather balloon that could and did succeed beyond anyone's wildest imagination.

If you have a story that you want to tell that is beyond anyone's wildest imagination, or a story that pertains to the VHF Plus spectrum in any way, please contact me at <n6cl@sbcglobal.net> so that I can share it here, in this, your column, or in *CQ VHF* magazine. Until next month . . .

73 de Joe, N6CL

dx

BY CARL SMITH,* N4AA

DX News, plus "DXers Share"

It really seems strange that I'm writing something for the second month of next year, as it is early December right now. Such is life in the publishing world. All of this material must flow through a myriad of people and processes before being finalized in the format that you will see a couple of months from now, be it the print format or the digital version of *CQ* magazine. That's not at all like our beloved ham radio, where we turn on the radio and within minutes we can be talking to people all over the world. Isn't ham radio great? It sure it is, and we love it!

The operating location of the 9N7MD DXpedition. Those Hexbeams worked pretty well. (Photo courtesy of Sam, KØYAK/9N7AK)

Patience, Please!

The ARRL's Logbook of The World is a great service (in my opinion). Is it absolutely trouble free? No, but is anything totally trouble free? I doubt it. A serious backlog developed after the CQ WW DX SSB Contest the end of October. Hundreds of logs were sent to LoTW and it hiccupped!

Days after someone sent in a log, it was finally "accepted." However, by that time people got nervous and started sending their logs again, and again, and yet again. I was told there was one log that was sent over *twenty* times. Now really, was that necessary? Of course not, and it just points out the problem. A lot of folks have become so accustomed to having everything happen *now* that when something does not happen *now*, they go berserk. Please folks, have patience!

DX Around the World

The year 2011 ended with some really good propagation and some really good DXpedition operating by some really great folks. Look at **9N7MD from Nepal**, for example. The latest information on the website shows that in the ten days of operation the team logged 28,301 QSOs with 11,838 unique callsigns in 158 countries and all 40 of the CQ zones. Considering where Nepal is, it is not surprising that the bulk of the QSOs were with Europe and Asia. Still, they show 20%, or 5600, with the "Americas." Another plus is the 17%, or nearly 4900, digital QSOs. All in all, I would consider this DXpedition quite successful.

T2T from Tuvalu is another operation I would consider to have been quite successful. In *The DX Magazine*'s Most Wanted Survey for 2010, worldwide T21 was ranked at #75, and for 2011 it had moved up to #62. That survey was before the T2T operation. The team was on the island from November 10 to December 4. It consisted of VK4AN, VK4FW, VK4NEF, NL8F, K4ZLE, and W5SL, and they had to make do with less than the planned array of equipment and antennas due to transportation snafus beyond their control. It seems there was a water shortage on Tuvalu and transportation was being devoted to getting water to the island. The irony of all that was on the day the team arrived it started to rain and continued for three days, relieving the shortage of water. On top of that, several of the team members came down with a stomach bug for a time, making the manning of radios more difficult.

In the end, they managed 42,060 QSOs with 16,215 unique callsigns. The majority of the contacts were on CW (69%), but they did put forth a good effort on digital, with 3587 Qs. Somewhat surprising to me was the breakdown by area. North America made up 47%, while Europe and Asia shared almost the same number with 23–25%, respectively. With the improved propagation, they spent a lot of time on 10, 12, and 15 meters, with 15 being their top QSO band, 20 running a close second, and 10 just behind those two bands.

What a difference a few years make. In the recent past we would not have seen those kinds of numbers on the higher frequency bands … and wasn't it great to hear those signals? You bet it was!

I'm looking forward to the **CYØ Sable Island** operation the end of December. Murray, WA4DAN, along with Ron, AA4VK, and Jeff, N1SNB, "hopefully" will not suffer the delays of the last group that went to Sable.

The "major" operation as **HKØNA** from most wanted **Malpelo Island** probably still will be going on when you read this. This one is *major* by almost any standard. The group is to arrive in two stages with four members taking all equipment, radios, antennas, and infrastructure to Malpelo in early January. Two weeks later the rest of the team will arrive and set up two operating sites. They will spend about 30 days on this island. Don't miss this one, as it has been years since the last operation, and who knows how long before another could take place. This group will be working all bands and modes, so make the most of it.

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e-mail: <n4aa@cq-amateur-radio.com>

The WAZ Program

6 Meters

107 .....EA6SX (26 zones)

10 Meters CW

201 .....WD5DBV

20 Meters CW

608 .....A65CA

80 Meters CW

89.....G4IRN

All Band WAZ

Mixed

8841 .....JP1PZE
8842 .....JA6PCH
8843 .....UT6IG
8844 .....SP3EPG
8845 .....AD7KG
8846 .....NA8M
8847.....RT3M
8848 .....KF4VTT

SSB

5189 .....IK2PZC
5190.....N8EHW
5191 .....NU1B

CW

653 .....IK2PZC

RTTY

218 .....KG1V
219 .....IK2PZC
220.....K2FF
221.....JAØNZR

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Award Manager, Floyd Gerald, N5FG, P.O. Box 449, Wiggins, MS 39577-0449. The processing fee for all *CQ* awards is $6.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $12.00 for nonsubscribers. Please make all checks payable to Floyd Gerald. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. N5FG may also be reached via e-mail: <n5fg@cq-amateur-radio.com>.

CQ DX Awards Program

CW

1127.....BV1EK
1128 .....NN4J

RTTY

56.....UT2AB

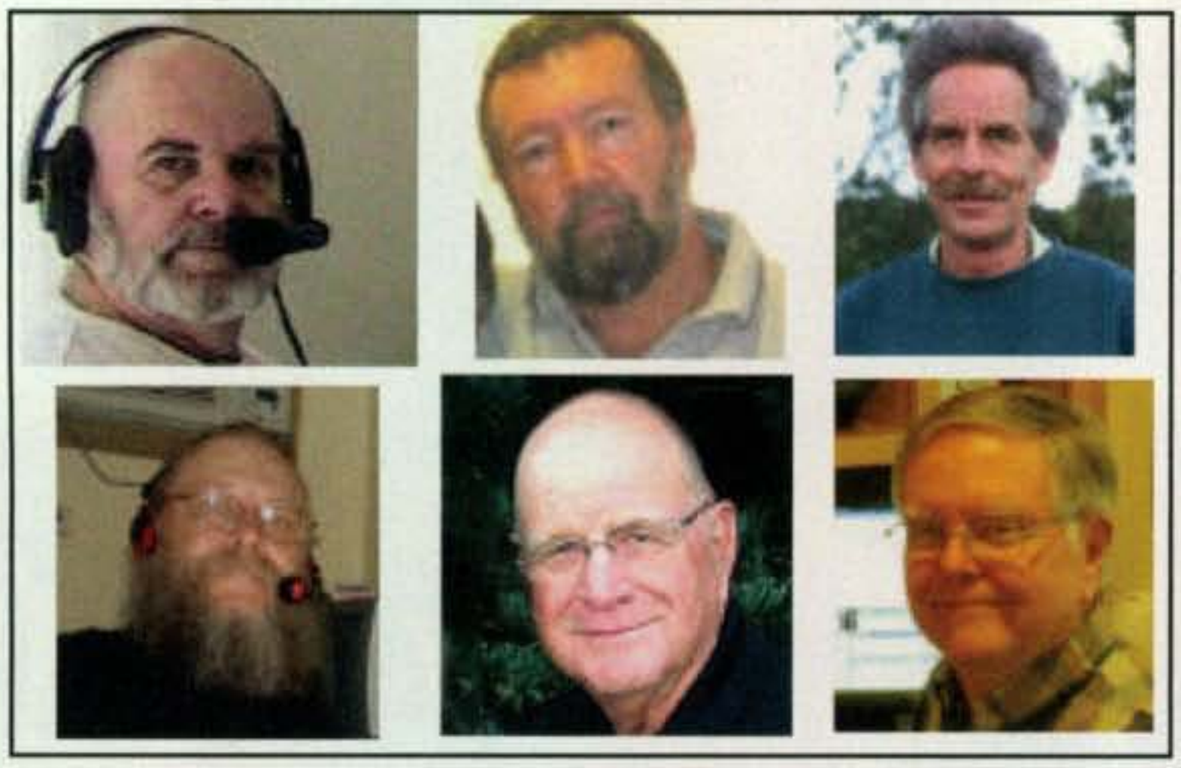
SSB Endorsements

255 .....WA6JJB

CW Endorsements

145 .....WA6JJB

The basic award fee for subscribers to *CQ* is $6. For non-subscribers, it is $12. In order to qualify for the reduced subscriber rate, please enclose your latest *CQ* mailing label with your application. Endorsement stickers are $1.00 each plus SASE. Updates not involving the issuance of a sticker are free. All updates and correspondence must include an SASE. Rules and application forms for the CQ DX Awards may be found on the <www.cq-amateur-radio.com> website, or may be obtained by sending a business-size, self-addressed, stamped envelope to CQ DX Awards Manager, Please make checks payable to the Award Manager, Keith Gilbertson. Mail all updates to Keith Gilbertson, KØKG, 21688 Sandy Beach Lane, Rochert, MN 56578-9604. We recognize 342 active countries. Please make all checks payable to the award manager. Photocopies of documentation issued by recognized national Amateur Radio associations that sponsor international awards may be acceptable for CQ DX award credit in lieu of having QSL cards checked. Documentation must list (itemize) countries that have been credited to an applicant. Screen printouts from eQSL.cc that list countries confirmed through their system are also acceptable. Screen printouts listing countries credited to an applicant through an electronic logging system offered by a national Amateur Radio organization also may be acceptable. Contact the CQ DX Award Manager for specific details.



The T2T Team. Top row (left to right): Eddie, VK4AN; Bill, VK4FW; Eric, VK4NEF. Bottom row (left to right): Tim, NL8F; Jay, K4ZLE; Jay, W5SL. (Photo from T2T website)

"Aussie and Yank in Cambodia." The Aussie is Mal, VK6LC/XU7AEO, and the Yank is John, KFØRQ/XU7ACQ, in Phnom Penh, Cambodia November 19, 2011. Photo courtesy of Mal, VK6LC)

Bill, N7OU, spends a lot of time on islands in the Pacific. In November and December he was on both South and North Cook Islands. **North Cook** is not the easiest place to get to, and Bill had some difficulty getting there. His transportation was delayed a week or so, but he did finally get there and did a good job of making North Cook a bit less needed as **E51MAN** (MAN for Manihiki).

The announcement by Bob, KK6EK, and John, N7CQQ, of plans to go to **Clipperton Island** in March had me looking at *The DX Magazine* Most Wanted Survey again. Clipperton had gone from #62 for 2010 to #45 for 2011. Perhaps it is time for another operation from there. No dates were given for their plans, so I'll have to wait for more until next month.

A52SV is a new call in **Bhutan**. It belongs to Shinya, JA2PSV, who says he will be working there until September of 2013.

Another one in that part of the world is Sam, **9N7AK**. Sam is working at the Carter Center in **Kathmandu** and will be there until the end of July 2012. He is a doctor and his home call in Minnesota is KØYAK. In November Sam reported that for the first time in ten years the government was now issuing licenses and there were about 40 Nepal citizens who were ready to take the exams. I'll follow this and let you know how it works out. He did say that there is a serious shortage of equipment for

The WPX Program

CW

3271 .....W6PN

SSB

3110 .....PY5PDC

Mixed

2173.....RT3M
2174.....W6PN
2175.....W8NGA

CW: 650 W6PN. 800 UA1TGQ. 1500 WM4R. 6050 WA2HZR.
SSB: 800 W6PN.
Mixed: 850 RT3M.

160 Meters: UA1TGQ
40 Meters: UA1TGQ

Asia: UA1TGQ
Africa: UA1TGQ

Award of Excellence Holders: N4MM, W4CRW, K5UR, K2VV, VE3XN, DL1MDD, DJ7CX, DL3RK, WB4SIJ, DL7AA, ON4QX, 9A2AA, OK3EA, OK1MP, N4NO, ZL3GO, W4BQY, I0JX, WA1JMP, KØJN, W4VQ, KF2O, WB8CNL, W1JR, F9RM, W5UR, CT1FL, WA4QMQ, W8ILC, VE7DP, K9BG, W1CU, G4BUE, N3ED, LU3YL/W4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SMØDJZ, DK5AD, WD9IIC, W3ARK, LA7JO, VK4SS, I8YRK, SMØAJU, N5TV, W6OUL, WB8ZRL, WA8YTM, SM6DHU, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, DK4SY, UR2QD, AB9O, FM5WD, I2DMK, SM6CST, VE1NG, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, HA8UB, HA8XX, K7LJ, SM3EVR, K2SHZ, UP1BZZ, EA7OH, K2POA, N6JV, W2HG, ONL-4003, W5AWT, N3XX, HB9CSA, F6BVB, YU7SF, DF1SD, K7CU, I1POR, K9LJN, YBØTK, K9QFR, 9A2NA, W4UW, NXØI, WB4RUA, I6DQE, I1EEW, I8RFD, I3CRW, VE3MS, NE4F, KC8PG, F1HWB, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, KC7EM, YU1AB, IK2ILH, DEØDAQ, I1WXY, LU1DOW, N1IR, IK4GME, VE9RJ, NN1N, HB9AUT, KC6X, N6IBF, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, WØULU, K9XR, JAØSU, I5ZJK, I2EOW, IK2MRZ, KS4S, KA1CLV, WZ1R, CT4UW, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, OE1EMN, W9IL, I7PXV, S53EO, DF7GK, S57J, EA5BM, DL1EY, DJ1YH, KU0A, VE2UW, 9A9R, UAØFZ, DJ3JSW, OE6CLE, HB9BIN, N1KC, SM5DAC, RW9SG, WA3GNW, S51U, W4MS, I2EAY, RAØFU, CT4NH, EA7TV, W9IAL, LY3BA, K1NU, W1TE, UA3AP, EA5AT, OK1DWC, KX1A, IZ5BAM, K4LQ, KØKG, DL6ATM, VE9FX, DL2CHN, W2OO, AI6Z, RU3DX, WB9IHH, CT1EEN, G4PWA, OK1FED, EU1TT, S53MJ, DL2KQ, RA1AOB, KT2C, UA9CGL, AE5B, KØDEQ, DKØPM, SV1EOS, UAØFAI, N4GG, UA4RZ, 7K3QPL, EW1CQ., UA4LY, RZ3DX, UA3AIO, UA4RC, N8BJQ, UA3BS, UA9FGR, UT3UY, WA5VGI, UT9FJ, UT4EK, K9UQN, UR5FEO, LY2MM, N3RC, OH3MKH, RA3CQ, UT3IZ, S55SL, RU3ZX, YO9HP, RA3DNC, K8ZT, KE5K, JH8BOE, TF8GX, S58MU, UX1AA, AB1J, DM3FZN, AG4W, UA3QNS, RX3AGD.

160 Meter Endorsements: N4MM, W4CRW, K5UR, VE3XN, DL3RK, OK1MP, N4NO, W4BQY, W4VQ, KF2O, W8CNL, W1JR, W5UR, W8ILC, K9BG, W1CU, G4BUE, LU3YL/W4, NN4Q, VE7WJ, VE7IG, W9NUF, N4NX, SMØDJZ, DK5AD, W3ARK, LA7JO, SMØAJU, N5TV, W6OUL, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, UR2QD, AB9O, FM5WD, SM6CST, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, K7LJ, SM3EVR, UP1BZZ, K2POF, IT9TQH, N6JV, ONL-4003, W5AWT, N3XX, F6BVB, YU7SF, DF1SD, K7CU, I1POR, K9LJN, YBØTK, K9QFR, W4UW, NXØI, WB4RUA, I1EEW, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, YU1AB, IK4GME, NN1N, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, K9XR, JAØSU, I5ZJK, I2EOW, KS4S, KA1CLV, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, S53EO, S57J, DL1EY, DJ1YH, KU0A, VR2UW, UAØFZ, DJ3JSW, OE6CLD, HB9BIN, N1KC, SM5DAC, S51U, RAØFU, CT4NH, EA7TV, LY3BA, K1NU, W1TE, UA3AP, OK1DWC, KX1A, IZ5BAM, DL6ATM, W2OO, RU3DX, WB9IHH, G4PWA, OK1FED, EU1TT, S53MJ, DL2KQ, RA1AOB, UA9CGL, SM6DHU, KØDEQ, DKØPM, SV1EOS, N4GG, UA4RZ, 7K3QPL, EW1CQ, UA4LY, RZ3DX, UA3AIO, UA4RC, N8BJQ, UA3BS, UA9FGR, UT3UY, WA5VGI, UR5FEO, N3RC, UT3IZ RU3ZX, YO9HP, RA3DNC, K8ZT, KE5K, JH8BOE, S58MU, UX1AA, DM3FZN, AG4W, UA3QNS, RX3AGD.

Complete rules and application forms may be obtained by sending a business-size, self-addressed, stamped envelope (foreign stations send extra postage for airmail) to "CQ WPX Awards," P.O. Box 355, New Carlisle, OH 45344 USA. Note: WPX will now accept prefixes/calls which have been confirmed by eQSL.cc. Other electronic QSL confirmation means are not accepted.

*Please Note: The price of the 160, 30, 17, 12, 6, and Digital bars for the Award of Excellence are $6.50 each.

5 Band WAZ

As of December 1, 2011, 859 stations have attained the 200 zone level and 1751 stations have attained the 150 zone level.

New recipients of 5 Band WAZ with all 200 zones confirmed:

N4PN S59ZZ

The top contenders for 5 Band WAZ (zones needed, 80 or 40 meters):

N7US, 199 (18)
N4WW, 199 (26)
W4LI, 199 (26)
K7UR, 199 (34)
IK8BQE, 199 (31)
JA2IVK, 199 (34 on 40)
IK1AOD, 199 (1)
VO1FB, 199 (19)
KZ4V, 199 (26)
W6DN, 199 (17)
W3NO, 199 (26)
RU3FM, 199 (1)
N3UN, 199 (18)
W1FZ, 199 (26)
SM7BIP, 199 (31)
N4NX, 199 (26)
EA7GF, 199 (1)
JA5IU, 199 (2)
RU3DX, 199 (6)
N4XR, 199 (27)
HA5AGS, 199 (1)
N5AW, 199 (17)
JH7CFX, 199 (2)
K7LJ, 199 (37)
RA6AX, 199 (6 on 10)
RX4HZ, 199 (13)
S58Q, 199 (31)
G3NKC, 199 (31 on 10)
K8PT, 199 (26)
N8AA, 199 (23)
HB9ALO (1)
IZ1ANU, 199 (1)
IN3ZNR, 199 (1)
IK4CIE, 199 (1)
K2FF, 198 (18, 23)
EA5BCX, 198 (27, 39)
G3KDB, 198 (1, 12)
JA1DM, 198 (2, 40)
9A5I, 198 (1, 16)
G3KMQ, 198 (1, 27)
N2QT, 198 (23, 24)
OK1DWC, 198 (6, 31)
W4UM, 198 (18, 23)
US7MM,198 (2, 6)
K2TK, 198 (23, 24)
K3JGJ, 198 (24, 26)
W4DC, 198 (24, 26)
F5NBU, 198 (19, 31)
W9XY, 198 (22, 26)
KZ2I, 198 (24, 26)
W9RN, 198 (26, 19 on 40)
W5CWQ,198 (17, 18)
UA4LY, 198 (6&2 on 10)
JA7XBG, 198 (2 on 80&10)
JA3GN, 198 (2 on 80&40)

The following have qualified for the basic 5 Band WAZ Award:

WA9YYY (170 zones)

5 Band WAZ updates:

IK4CIE (199 zones)

***Please note: Cost of the 5 Band WAZ Plaque is $100 shipped within the U.S.; $120 all foreign (sent airmail).**

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Award Manager, Floyd Gerald, N5FG, P.O. Box 449, Wiggins, MS 39577-0449. The processing fee for the 5BWAZ award is $10.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $15.00 for nonsubscribers. An endorsement fee of $2.00 for subscribers and $5.00 for nonsubscribers is charged for each additional 10 zones confirmed. Please make all checks payable to Floyd Gerald. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. N5FG may also be reached via e-mail: <n5fg@cq-amateur-radio.com>.

CQ DX Honor Roll

The CQ DX Honor Roll recognizes those DXers who have submitted proof of confirmation with 275 or more ACTIVE countries. With few exceptions, the ARRL DXCC Countries List is used as the country standard. The CQ DX Award currently recognizes 341 countries. Honor Roll listing is automatic when an application is received and approved for 275 or more active countries. Deleted countries do not count and all totals are adjusted as deletions occur. To remain on the CQ DX Honor Roll, annual updates are required. All updates must be accompanied by an SASE if confirmation of total is required. The fee for endorsement stickers is $1.00 each plus SASE. (Stickers for the 340 level are available.) Please make checks payable to the Award Manager, Keith Gilbertson. Mail all updates to Keith Gilbertson, KØKG, 21688 Sandy Beach Lane, Rochret, MN 56578-99604.

CW

NØFW 341	EA2IA 341	K9BWQ 340	K3JGJ 339	W4MPY 334	JA7XBG 330	W9IL 319	WD9DZV 310	4Z5SG 277
K2TQC 341	N7FU 341	N4MM 339	F3TH 341	K5UO 334	K6YK 330	W6YQ 320	KT2C 307	WA2VQV 277
WB4UBD 341	K4IQJ 341	W7CNL 340	DL3DXX 341	N6AW 334	K8SIX 329	OZ5UR 323	HA5LQ 302	
K3UA 341	K4MQG 341	N5ZM 340	YU1AB 336	HB9DDZ 334	KE3A 327	CT1YH 318	N2LM 300	
N4JF 341	W8XD 341	N4AH 341	WØJLC 338	W7IIT 334	K6CU 327	EA3ALV 317	K4IE 296	
K2FL 341	N7RO 341	K9IW 340	PY2YP 335	G3KMQ 332	W1DF 327	RA1AOB 315	HB9DAX/QRPp	
WK3N 341	N5FG 341	K8LJG 339	K9OW 335	K6LEB 332	KA3S 326	KØKG 318	284	
N4NX 340	K4CN 341	W7OM 340	K1FK 335	N7WO 332	IKØADY 326	WA4DOU 314	K7CU 283	
K9MM 341	OK1MP 341	K7LAY 338	W6OUL 335	F6HMJ 331	EA5BY 326	YO9HP 314	N2VW 281	
W4OEL 341	K4JLD 340	KA7T 339	K2OWE 334	K5RT 330	WG5G/QRPp 326	ON4CAS 312	K4EQ 279	

SSB

XE1AE	342	EA2IA	342	VE3XN	341	W7FP	340	KZ2P	341	W3AZD	335	KE4SCY	328	IV3GOW	314	K7SAM	303
NØFW	342	IN3DEI	341	K5TVC	341	W4UNP	340	W8AXI	336	K1UO	335	K6GFJ	328	W6NW	312	I3ZSX	302
K6YRA	342	DU9RG	341	W6BCQ	341	K9IW	340	VK4LC	336	HB9DDZ	335	KD5ZD	328	KU4BP	312	AE9DX	300
IK1GPG	342	K4MQG	342	VE2GHZ	341	N7WR	340	WS9V	336	K8SIX	334	W9GD	327	N2LM	312	4X6DK	299
K2TQC	342	N4MM	341	K2FL	341	W2FKF	339	VE3MR	336	KE3A	334	W6OUL	327	KA1LMR	310	WD9DZV	299
K4MZU	342	K9MM	342	K9BWQ	341	W7BJN	339	VE3MRS	336	N2VW	334	SV3AQR	326	RA1AOB	310	K7ZM	298
K5OVC	341	K3JGJ	342	K7LAY	340	W2CC	339	AA4S	336	JA7XBG	334	VE7EDZ	326	G3KMQ	310	W9ACE	292
DJ9ZB	342	N5ZM	342	W6DPD	341	K3LC	338	PY2YP	336	N5YY	334	W1DF	324	XE1MEX	310	W6MAC	290
OZ5EV	341	N7RO	342	K8LJG	340	W4WX	337	K9OW	336	K5UO	333	WØROB	325	IØYKN	308	N3KV	290
K3UA	341	KE5K	341	YU3AA	340	IØZV	337	EA5BY	336	K5RT	332	W4MPY	323	XE1MW	307	K7CU	288
WB4UBD	342	K4IQJ	342	W7OM	341	OE2EGL	337	XE1J	336	WØYDB	332	TI8II	322	AA1VX	306	WD8EOL	282
N4JF	342	N5FG	342	AB4IQ	340	W4ABW	337	OE3WWB	335	WA4WTG	332	YO9HP	322	W5GT	306	VE6MBT	280
VE2PJ	341	K4CN	342	W8ILC	341	DL3DXX	342	N6AW	335	ZL1BOQ	332	KW3W	322	K4IE	306	N3RC	278
WK3N	342	OZ3SK	342	W9SS	341	VE1YX	337	IK8CNT	335	W9IL	332	XE1RBV	319	AD7J	306	WA2VQV	279
N4NX	341	OK1MP	342	K9HQM	341	EA3BMT	337	EA4DO	335	CT1AHU	330	VE7SMP	318	K4ZZR	306	IWØHOU	278
K4JLD	342	I8KCI	341	4Z4DX	340	IKØAZG	337	CT3BM	335	N1ALR	330	ON4CAS	317	HB9DQD	305	WA5UA	276
N7BK	342	N4CH	342	KØKG	341	YU1AB	337	K8LJG	335	K7HG	329	N8SHZ	314	4Z5FL/M	304		

RTTY

WB4UBD	340	NI4H	339	N5FG	338	N5ZM	336	K3UA	333	OK1MP	335	K4CN	326	WK3N	328	K8SIX	298

these new operators. The recent 9N7MD team left some antennas and accessory items, but no radios.

"DXers Share"

Since I'm on the topic of helping others, here is something that my good friend Uncle DX recently sent to me:

DXers Share

The title of this serves *only* as a reminder because we DXers already share in many ways, but at times we need that extra little "kick" instead of wondering what is in that box in the basement. We simply forget that many around the world and here at home need equipment to give us that signal to work. So let's get hopping and not only help others but clean out our own areas as well.

I needed to be reminded of this also. Recently a good friend, who is a DX-pedition leader and a super DXer, mentioned he was buying a rig for an elderly friend because the friend truly needed it to stay on the air. Wow, that was nice, and as my grandson would say, "awesome." This DXer already helps in many ways by being a good leader, but this was going way beyond. Thanks, friend.

Helping with antenna parties, putting coax connectors on for others at club meetings, leading a class, explaining to others the difference among the digital modes (yes, I need this!), or helping out as a VE (Volunteer Examiner) are things some of us already do, but to donate equipment to someone who might otherwise be off the air is something *mamy* of us could do.

I'd like to see DX clubs pass the hat and buy a roll of coax, an antenna, a digital interface, a subscription to a magazine, or even a rig for those who need it. Equipment doesn't need to be the K3, FT-5000, etc., but many of us have older rigs that are just gathering dust and are not being used at all. Be sure to check them out first, but please consider it on an individual basis, as a club, or with the monthly lunch bunch.

Books are also a good place to start. I recently saw the newest version (22) of the ARRL *Antenna Book*. It takes wheels to move it (hi!), but it's awesome. I love antenna books, have read them since my Elmer said I should, but this book is something else. Think about a book for a DX friend.

Uncle DX has some really good ideas, and this is one of them. There are any number of books on various topics available from the ARRL, CQ, and/or others. These are not necessarily "cheap," but just think of the benefit one or two might be to someone who might never have the opportunity to even see one?

Until next time, enjoy the chase and do Have Fun!

73, Carl, N4AA

QSL Information

GB2RAF via G4PSH
GB2RI via G3LUW
GB2SCA via GØOOO
GB2SJS via G4DFI
GB4BVD via M1DZT
GB4MDI via GWØANA
GB4SH via G4DFI
GB4VLX via G4DFI
GB4WINGS via MØXDF
GB5Ø via G4DFI
GB5ØATG via M5AEX
GB5ØBH via G4STH
GB5CQD via GØOKF
GB5FI via GWØANA
GB5KIL via GØSGB
GB5OBH via G4STH
GB5SIP via GWØANA
GB5SPD via MNØAKU
GB65FRW via M3DPQ
GB6CW via G4DFI
GB6GEO via G3VOF
GB6MW via G4DFI
GB75ØCC via GWØANA
GB75BF via G4DFI
GB8OSJ via G4DFI
GB8ST via G4DFI
GC4BRS via GWØANA
GC4BRS/LH via GWØANA
GDØF via MØCMK
GDØOUD via GØOUD
GDØVNK via DJ8NK
GD4FDM via GM4FDM
GD8K via GWØANA
GJ3RTE via G3SWH
GJ3SWH via G3SWH
GJ3ZAY/P via G7VJR
GJ4VXE via G3SWH
GJ5XW via G5XW
GJ6YB via G3SWH
GJ7TWC/P via G7TWC
GMØANA/P via GWØANA

(The table of QSL Managers is courtesy of John Shelton, K1XN, editor of "The Go List," 106 Dogwood Dr., Paris, TN 38242; phone 731-641-4354; e-mail: <golist@golist.net>.)

Looking Ahead in CQ

Here are some of the articles we're working on for upcoming issues of *CQ*:

- CW Results, 2011 CQ World-Wide WPX Contest
- The Extraordinary Solar Cycle 19
- The ON4WW Ultimate Beverage Switchbox
- Solid-State Mods to Heathkit VTVMs

Upcoming specials:

QRP (April)

Take it to the Field (June),

Emergency Communications (October)

Technology (November).

Do you have a ham radio story to tell? Something for one of our specials? See our writers' guidelines on the CQ website at <http://www.cq-amateur-radio.com/ guide.html>.

SUCH A HAM

Correct me if I'm wrong, Stan, but if no one can hear you all you're doing is sitting here talking to yourself.

GEORGE TRANOS,* N2GA

Passing the Torch

Calendar of Events

All year	**CQ DX Marathon**	**(http://bit.ly/vEKMWD)**
Jan. 27–29	**CQ WW 160M CW Contest**	**(http://bit.ly/uB0wFb)**
Jan. 28–29	REF CW Contest	(http://concours.ref-union.org/contest/?page_id=2)
Jan. 28–29	UBA SSB DX Contest	(http://www.uba.be/hf/contest-rules/uba-dx-contest-rules)
Feb. 4	Minnesota QSO Party	(http://bit.ly/w4dcDM)
Feb. 4–5	Vermont QSO Party	(http://www.ranv.org/vtqso.html)
Feb. 4–5	Delaware QSO Party	(http://www.fsarc.org/qsoparty/qsohome.htm)
Feb. 4–5	Mexico RTTY Int'l Contest	(http://www.fmre.org.mx/)
Feb. 4–5	10-10 Int'l Winter Contest	(http://bit.ly/cWgCpa)
Feb. 5	North American CW Sprint	(http://www.ncjweb.com/sprintrules.php)
Feb. 11	Asia-Pacific Spring Sprint (CW)	(http://jsfc.org/apsprint/)
Feb. 11	FISTS Winter Sprint	(http://www.fists.org/sprints.html)
Feb. 11–12	**CQ WW RTTY WPX Contest**	**(http://bit.ly/uYC0gp)**
Feb. 11–12	Dutch PACC Contest	(http://pacc.veron.nl/)
Feb. 12	North American SSB Sprint	(http://www.ncjweb.com/sprintrules.php)
Feb. 13–17	ARRL School Club Roundup	(http://www.arrl.org/school-club-roundup)
Feb. 18–19	ARRL CW DX Contest	(http://www.arrl.org/arrl-dx)
Feb. 24–26	**CQ WW 160m SSB Contest**	**(http://bit.ly/uB0wFb)**
Feb. 25–26	REF SSB Contest	(http://concours.ref-union.org/contest/?page_id=2)
Feb. 25-26	UBA CW DX Contest	(http://www.uba.be/hf/contest-rules/uba-dx-contest-rules)
Feb. 25–26	North American RTTY QSO Party	(http://www.ncjweb.com/naqprules.php)
Mar. 3–4	ARRL SSB DX Contest	(http://www.arrl.org/arrl-dx)
Mar. 24–25	**CQ WW WPX SSB Contest**	**(http://bit.ly/hKqJjG)**

One-hundred years of amateur radio and we're still going strong. Recent trends indicate that the number of ham radio operators is still growing. Contesting is also seeing increased participation. Most of the major contests are experiencing record numbers of log submissions. To continue this trend and grow the hobby, contesters must pass the torch to the next generation by mentoring and encouraging newcomers.

"How did you get started in contesting?" is a great question to ask anyone who has been doing it for a while with some success. Ask any of today's current crop of big guns and chances are you will hear similar refrains. Someone was there at the beginning to answer questions, encourage, and take them under his or her wing. This personal connection to the past is what helps create an up-and-coming group of new contesters.

Amateur radio operators should strive to be good communicators. Contesters take this to the extreme. They need to be excellent listeners and should have a keen sense of what is going on. To be successful, contesters must extend this to their interpersonal relationships. The true measure of success is the impact one has on others. If you look at those who have come before us, the most remembered are those who exert a positive influence on those around them and inspire people.

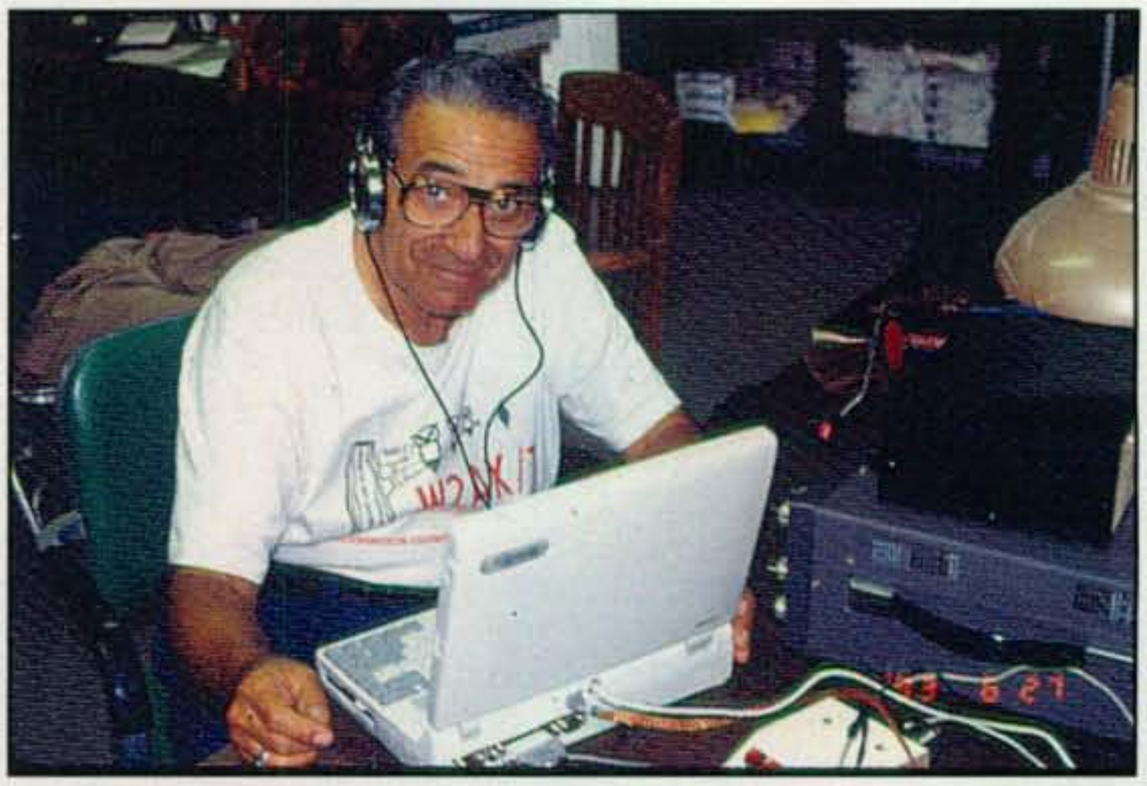
Shane Mattson, K1ZR, of Sandown, New Hampshire, had Dean Straw, N6BV, as a mentor. They met in Windham, New Hampshire in 1996 through local contacts. Mattson said, "Dean sat down with me after each major DX contest to go over my log and offer suggestions for improvement. He introduced me to the Yankee Clipper Contest Club." His biggest influence was "strategy and skill development." K1ZR adds, "If every newcomer to contesting had access to a mentor like Dean, the contesting community as a whole would benefit significantly."

Jay Corriveau, W1UJ, (ex-N1GKI), of Webster, Massachusetts, had Dick Pechie, KB1H, as his contesting mentor. Corriveau said, "I met Dick at a Field Day in 1989 or 1990 in Killingly, Connecticut when I was 15 years old and was running a station at the Eastern Connecticut Amateur Radio Association operation. Dick asked me to stop by to check out his station someday. Dick was my biggest contesting mentor, since he provided me the exposure to

The Barnstormer KB1H team: Kim, KB1DFB (now N1WK); Jay, N1GKI (Now W1UJ), and Dick, KB1H. Dick is presenting the 'K1GX Award' for the most help around the barn. (Photo courtesy of W1UJ)

*P.O. Box 657, Copiague, NY 11726
e-mail: <n2ga@cq-amateur-radio.com>

Shane Mattson, K1ZR, Sandown, New Hampshire, at his station. (Photo courtesy of K1ZR)



Larry Amodeo, W2AX, operating during the ARRL Field Day contest. (Photo courtesy of Andy Bodony, K2LE)

HF contesting at a competitive, multi-operator station. My original mentor was my grandmother, WA1WPX, but for contesting it was KB1H. WA1WPX used to drive me to KB1H for contest operations 25 miles south of our central Massachusetts home and pick me up afterwards. After completing high school, military service, and (establishing) my family … I had a few years' hiatus from radio and came back into things in 2005. I upgraded to Extra and applied for a new vanity callsign. Dick welcomed me back as a necessary member of the KB1H team." W1UJ adds that "Dick continues to help me with exposure to the KB1H superstation, multi-op team building, experimentation, and general radio stuff. We finish in the top 5 or 10 in the M/2 class of the major contests and continue to build antennas and the team."

Randy Thompson, K5ZD, of Uxbridge, Massachusetts, had two very important mentors in contesting—Tom Morrison, K5TM, and Tom Taormina, K5RC. Thompson said, "I met K5TM around 1976 on traffic nets in Texas. Tom gave me a ride from Austin, Texas, up to the ARRL National Convention in Denver, Colorado, that year. I moved away and then we got together again in 1977 when I attended the University of Texas at Austin. Tom taught me how to do tower work and gave me the chance to operate from a station with real antennas. In addition to ham radio, he helped me find a student job and with learning some about life. It was Tom who helped me with my first year as publisher of *NCJ (the National Contest Journal—ed.)*. He provided the typewriter and found a printer."

Thompson continues about his other mentor, Tom Taormina: "I first met K5RC around 1976 when I was living in Houston. I later spent a lot of time at his place during summers doing antenna work and using his big station. Again, it was a great place to learn about radio and contesting. Many other people have contributed to my contesting success. Two that come to mind include Gordon Fogg, N5AU, and John Kanzius, K3TUP. Both of these guys allowed me to operate from their great stations."

Frank Fallon, N2FF, of East Williston, New York, mentioned Larry Amodeo, W2AX, of Manhasset, New York, as his contest mentor. Fallon says, "It was not until the late 1980s that I had a contest mentor. Up to that point I was still a lone wolf as far as contesting went. It was not until a few local contesters happened to notice that I turned in some respectable scores on RTTY and SSB, that I was asked to join the Order of Boiled Owls *(a New York-based contest club—ed.)*. That's when I met W2AX, who lived perhaps two miles from me, the closest Owl to my QTH. He lived in a condo in Manhasset and had no HF station there. However, he had a superstation in Vermont across the road from his former business partner, Andy Bodony, K2LE. They tied together the two stations in a network and worked a lot of stations in contests as a multi-multi.

'Larry had one of the first remote stations using telephone lines and he could turn on his station in Vermont, rotate his beams, and control his linear from New York. He had a 110-foot tower with a 2-element 80-meter beam on the side of a ski slope at 1800 feet. He could put two stations on the air simultaneously, with linear amplifiers, without interference.

"This was utterly new to me and amazing, and I got invited to operate there a few times a year. Larry was friendly, helpful, and generous. He had bought one of the original Advanced Radio Devices 230A automatic linears which he could control from Long Island. It sat on the floor in another room in Vermont and a control box in the operating room connected to it by a long RS-232 cable sent it commands. It would automatically change bands and tune itself up on frequency in a matter of seconds. This was pre-autotune amps.

"Larry also had a second tower with a stack of three 10-meter monobanders with the top 10-meter antenna at 90 feet, and a 40-meter three-element beam at 110 feet. It looked small up at full height until you cranked down the tower.

"A few years after we met, Larry gave me the keys and security codes to the house and let me operate the ARRL 10 Meter contest as HP SSB. I felt sure I was going to win for VT in SSB. Saturday afternoon Larry arrived and it was blowing a gale. When I closed down that night about 8 PM local, I offered to go out and push the buttons and dress the cable as the tower came down. There was more than a foot of snow

Larry Amodeo, W2AX, at the controls of his contest super-station in Readsboro, Vermont. (Photo courtesy of K2LE)

out there and the top 15-foot mast section was already bent about 10 degrees. Larry said leave it; you will never get it back up in the morning and the cable will be frozen in place.

"Well, the next morning after a pretty sleepless night from listening to real howling winds, the cable was not frozen in place, but the top mast section was bent another 20 degrees. ... It looked like we were about to get into HF moonbounce. Larry was annoyed but not with me. I think he did not want me to crank it down because he felt that would ruin the contest for me.

"I finished the contest with over 2000 QSOs in the log and felt I had indeed won for Vermont. When the results were printed months later, I was shocked to learn that I had been soundly beaten by a guy who had 500 more QSOs. Still, thanks to Larry, I had had a unique experience.

"Larry made things like this possible for me and other guys from NLI *(New York Long Island—ed.)* and two Canadians who were not as fortunate to have (a) house on a ski slope in southern Vermont. He made it possible for me to begin thinking about doing something similar on Long Island at a more limited scale. Seeing his setup and his attitude was my motivation.

"And so it was that for a few years I ran a small multi with two ARD 230s (a pair of 3CX800A7s) and a 3-element quad at 45 feet and a bunch of wire beams and dipoles. One year we managed to win first place multi-two for NLI and go to a LIMARC *(Long Island Mobile Amateur Radio Club—ed.)* hamfest to boot. We may have been the only NLI station in that category.

"The day after the recent 2011 CQ WW CW contest, Larry passed away. He had been in poor health for the last four years. He had Woody, W2UU, take down the station and the beams and towers and told no one, because he did not want to be talked out of it, and sold the Vermont house. It was sad to watch him go downhill that way. But we have photographs and great memories of times we had contesting in Vermont. He was a first-class CW contester who loved to send QTCs. *(transmitting information about previous contacts, a score-raising technique in the Worked All Europe contest—ed.)*"

Andy Bodony, K2LE, adds about Amodeo, "He bought his own place in Vermont in 1971 but began building his Vermont contest station in 1989. He went on to create a single-operator and then multi-operator station. At its zenith, the station had two towers with stacked 10-, 15- and 20-meter monobanders, a 2-element beam on 40 and, in 1996, a 2-element beam on 75/80 meters that never survived the winter. The multi-operator team operated as W2AX in SSB and K2LE in CW contests and always finished in the top 10 of the USA multi-multi category. Larry joined the Order of Boiled Owls in 1962, sponsored by Ron, W2SUC. Larry sponsored Andy, K2LE, in 1963. Larry was the organizer and mover in many contest DXpeditions. He was the Owls' activities manager from 1967 through 2003, organizing Field Days and many contest DXpeditions. Because of poor health, he sold his VT contest station in 2009. Larry became a Silent Key on November 28, 2011, the day after the 2011 CQ WW CW contest."

This column is dedicated to the memory of Larry Amodeo, W2AX. It is a tribute to him and to all of the other mentors. Ham radio would not be the same without them. As time goes on, things change and those of us who have been here for a while now must take on the responsibility to mentor those who will come after us. Those who have come before us have fulfilled their duty; it is now up to the rest of us to pass the torch to the next generation of contesters. 73, George, N2GA

awards

BY TED MELINOSKY,* K1BV

Commonwealth Jubilee Award

This time we start out with a short-term award for 2012 from England. We then move on to awards from Namibia, Brazil, and Corsica.

England's Commonwealth of Nations Jubilee Award 2012

Radio amateurs across the world are invited to work stations in the Commonwealth of Nations during the calendar year 2012. This award celebrates the Diamond Jubilee of Queen Elizabeth II and especially her position as head of the Commonwealth of Nations. Since the Jubilee takes place in 2012, the award will run for 12 months starting on January 1, 2012 and ending on December 31, 2012.

There are 139 qualifying Commonwealth call areas. A certificate will be awarded to every licensed radio amateur who makes contact with stations located in 60 and 100 different Commonwealth call areas during 2012. Any mode of transmission may be used. Contacts made via the internet do not count. A simple spreadsheet can be downloaded from the website listed below to facilitate record keeping. A league table will be on the same website showing the number of call areas contacted by participating stations. No QSL or other verification is required. Certificates will be available for download and printing by stations who claim the contacts required. Please note that CW QSOs made by non-Commonwealth stations during the Commonwealth Contest on March 10–12, 2012 should not be counted. If you wish to take the opportunity to apply for the main Commonwealth Century Club awards then you should follow the procedure on the web page.

Requirements:

1. Keep track of Commonwealth call areas you have worked using the score sheet.

Download the score sheet from the link below. Enter the callsign of the station worked and the date contact was made. Then every week e-mail your scores for the league table to: <g3pjt@btinternet.com>.

2. Claiming your certificate. When you have reached the goal of 60 or 100 different Commonwealth stations needed, then just e-mail your score sheet to G3PJT. Your certificate will be e-mailed to you for printing on your printer. There is no cost for the award.

The spreadsheet is available at: <http://www.rsgb-spectrumforum.org.uk/ccc.htm>. (Click on the "Score Sheet" link which will open an Excel spreadsheet.)

*12 Wells Woods Rd., Columbia, CT 06237
e-mail: <k1bv@cq-amateur-radio.com>

Work stations in the Commonwealth of Nations during the calendar year 2012 to earn England's Commonwealth of Nations Jubilee Award.

USA-CA Honor Roll

500

W2ZI.....3553
LY2W.....3554
LY5W.....3555

1000

W2ZI.....1820
LY5W.....1821
DJ5IH 1822

1500

W2ZI.....1531

2000

W2ZI.....1419

2500

W2ZI.....1335

3000

W2ZI.....1246

The total number of counties for credit for the United States of America Counties Award is 3077. The basic award fee for subscribers is $6.00. For nonsubscribers it is $12.00. To qualify for the special subscriber rate, please send a recent CQ mailing label with your application. Initial application may be submitted in the USA-CA Record Book, which may be obtained from CQ Magazine, 25 Newbridge Road, Hicksville, NY 11801 USA for $2.50, or by a PC-printed computer listing which is in alphabetical order by state and county within the state. To be eligible for the USA-CA Award, applicants must comply with the rules of the program as set forth in the revised USA-CA Rules and Program dated June 1, 2000. A complete copy of the rules may be obtained by sending an SASE to Ted Melinosky, K1BV, 12 Wells Woods Road, Columbia, CT 06237 USA. DX stations must include extra postage for airmail reply.

The Namibia Award

One of the countries needed for the Commonwealth Jubilee award mentioned above is Namibia in southwest Africa. Home of the Namib Desert along the Atlantic coast and the Kalahari Desert to the east, this arid and sparsely populated nation is principally known for its production of gem-quality diamonds and a number of valuable minerals including uranium. It is generally considered a fairly scarce country on the ham bands, though it does not appear on *The DX Magazine*'s top 100 Most Wanted Countries.

The Namibian Amateur Radio League offers two awards. The V5 Worked All Grid Squares is probably too much to consider in a "normal" lifetime. The Namibia Award is very hard, but a life of active DX chasing may pay off here.

The Namibia Award is issued for having made two-way radio contact on or after March 21, 1990. A minimum of five contacts with individual licensed radio amateurs permanently based in Namibia with a callsign with the prefix V51 or V5Ø is required.

The Namibia Award is issued to any radio amateur who can submit proof of having made two-way radio contact on or after March 21, 1990 on any amateur frequency using any mode. A minimum of five contacts with individual licensed radio amateurs permanently based in Namibia with a callsign with the prefix V51 or V5Ø is required. The award may be endorsed for all contacts on one band or mode.

1. Stations outside Namibia should send via e-mail proof of the five confirmed QSOs in the form of scanned QSL cards, or certified copies by mail. Fee: US$10.

2. Namibian stations should present proof of 10 confirmed QSOs (certified copies or personal presentation of QSL cards). Fee: N$10 NARL members; N$50 non-NARL members.

Apply to: Awards Committee, Namibian Amateur Radio League, P.O. Box 1100, Windhoek, Namibia. Applications must be accompanied by:

1. Originals (which will not be returned) or photo-copies of both sides of the relevant QSL cards confirming the contacts.

2. Cash or banker's draft for US$10.

3. The full name and postal address of the applicant.

Allow four to eight weeks for processing and mailing the certificate. Internet: <http://www.qsl.net/narl/index_files/awards.htm>.

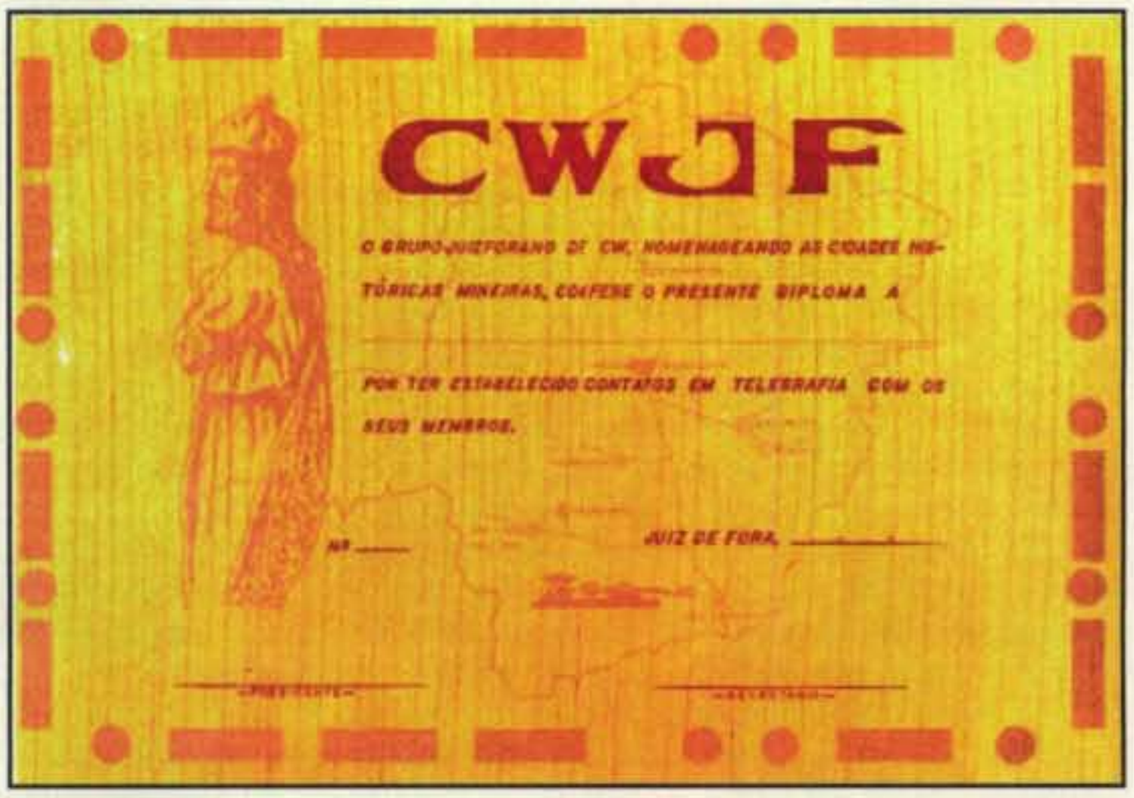
Brazil's CWJF Series

The following two awards are sponsored by the CWJF Group in Brazil. It is known for its sponsorship, along with Aracaria DX Group, of the Manchester Mineira Contest, held on the third weekend of April each year for participating stations in North, Central, and South America.

General Requirements: Contacts after January 1, 1985 count for the awards, but only using CW mode. SWL OK. Contacts made and confirmed for the Manchester Mineira Contest are valid for these awards. No need for GCR; just send the list of contacts and fee of $US7 or 5 IRCs to: CWJF, P.O. Box 410, Centro, Juiz de Fora MG 36001-970 Brazil. Internet: <http://www.powerline. com.br/cwjf/eng5.htm>.

CWJF Award. Contact five different CWJF members on any band.

City of Juiz de Fora Award. Form the phrase "Juiz de Fora – A Manchester Mineira" by using any letter of the suffixes of South American stations contacted using CW. *(Why the name "Manchester" in a South American city? The Bernado Mascarenhas Textile Factory built in the 1880s was inspired by the famous textile mills of Manchester, England. Today, it is a cultural center used for expositions, theatre, and art workshops.—ed.)* Three different members of the CWJF group must be included. The Juiz de Fora stations can be used as "wild cards" for any letter needed to form the phrase. Internet: <http://www.powerline.com.br/cwjf/eng5.htm>.



To earn the CWJF Award, contact five different CWJF Group members in Brazil on any band.

Diplome de Corse

Corsica is an island in the Mediterranean Sea west of Italy and southeast of France. Known as the birthplace of Napoleon Bonaparte, its culture reflects both French and Italian heritage. Corsican stations are not exactly common on the bands, but

William Pedersen, KM1C
USA-CA All Counties #1219, October 1, 2011

I was first licensed in 1955 as a teenager in Rye, New York. Many a night was spent on 40 and 80 CW working stations behind the Iron Curtain with a mighty 35 watts from my home-brew 6AG7/6L6 xmitter, Hallicrafters S38D receiver, and a Windom wire in the trees. From there, a lot of moves were made to and through college, the military, a piloting career with Eastern Airlines, a second career in Electrical Engineering hardware services, a short stint driving 18-wheelers around the country, and ultimately, retirement. I have always had a station wherever I went and have never left this incredibly fun hobby.

Our family settled into southern New Hampshire in the early 1970s, and I discovered the Yankee Clipper Contest Club. I was helped enormously by Bill Myers, K1GQ, and John Dorr, K1AR, who taught me the art of building towers and operating contest stations. Contesting and DXing were my mainstay for 25 years. However, many QTH changes, with the associated tower and antenna work, eased me toward QRP and minimalist antennas. This was particularly fun as the new digital sound-card modes came into being. (Imagine CQing with 1 watt to a ground-mounted Hamstick on the MFSK16 mode and being called by ZD8DB for a long ragchew, with no one trying to break in!)

Meanwhile, the county hunting bug bit hard in March 2005 when I installed an HF mobile rig in my truck and discovered that hams wanted to work me on the county hunter (CH) net frequencies. A half a dozen county runs netting around 500 QSOs hooked me! It felt like being out on a mini-DXpedition, where I was the rare DX, if only for about an hour per run on the various bands and modes. It had everything I liked: fast QSOs, strong fixed-station signals, mobile-to-mobile contacts, plenty of weak-signal work, and a superb bunch of really good and friendly operators. The county hunters had caught my attention!

With my years of contesting, I "knew" I easily must have over 2500 counties confirmed, so what could be so tough about getting all 3077 into the log book and getting the cards for USA-CA? Well, a card check began, and the real total was something just shy of 700! Wow, what a shock. This county hunting thing might be tougher than it looks! And it was tough, but there are a wonderful bunch of operators in the CH community who will help fellow operators by running mobile counties, acting or assisting in net control, alerting you by e-mail or phone if a needed county is going to be run, etc. So many operators helped along the way that it would take a full page of callsigns to give credit. However, two operators are at the top of their game and deserve high credit and praise: Bob, N4CD, and Jim, K2JG/KZ2P.

Bob,N4CD, has the distinction of having operated from all 3077 counties and is close to completing that task for a second time! He is a rapid-fire operator with good ears who runs counties on both CW and SSB and will usually cover a county on all bands from 40 through 17 meters, with higher frequencies thrown in if conditions warrant. In my quest for USA-CA, I had over 1600 QSOs with Bob in 37 different different states! Without him, I am sure it would have taken at least several more years to complete the task of working and confirming all 3077 counties.

Bob is probably the most prolific of the mobile ops and is out there multiple times per month as a mobile. He also writes a great electronic newsletter pertaining to CHing and other interesting topics concerning radio and . . . oil! Bob is retired from the energy sector and has lots of good info pertaining to the state of oil production throughout the world. Google "N4CD CH News" and you should come up with a good link. Bob has many other useful URLs listed at the beginning of the newsletter that will get you to a wealth of information on the "how to's" of county hunting—i.e., the frequencies, procedures, how to send MRCs (Mobile Reply Coupons, to save on postage), CW techniques, etc. His newsletters are a great resource and an enlightening read.

Jim, K2JG/KZ2P, manages the 14336 CH SSB Net frequency five or more days per week, depending on mobile activity. He has the ability to be there for a dozen-plus hours coordinating the runs for multiple mobiles who are themselves running as many as 12 to 15 counties per day. (Some are OM/XYL teams who can run counties "on the fly" with one operating/driving, the other logging.) Jim maintains the list of who is up next, puts out the info on the W6RK spotting web-site, coordinates relays for weak-signal contacts, verifies that signal reports on relay contacts are correct (if not, the contact gets scratched), and keeps the net running smoothly and efficiently for hours at a stretch with hardly a break. Without Jim's well-run net, I would still be a long way from qualifying for USA-CA. Thank you Jim and crew! You have worked very hard on behalf of hundreds and hundreds of operators, and it is much appreciated.

Bill Pedersen, KM1C, USA-CA All Counties #1219.

A word of advice to newcomers: The 20-meter SSB net is formal. There are rules to follow, particularly with the high number of mobiles who often show up on frequency at nearly identical times. Without good management there would be chaos, and Jim is a great manager. Do some careful listening and figure out the customs of how CHers work each other under the net rules.

A good place to practice the "how to" of SSB county hunting would be on the 7188 SSB net. This is an informal group and often has some quiet time between mobile runs. If a mobile is not running, it is the place to ask questions. Operators such as N5UZW, N4AAT, W4SIG, and many others will make the time to help you. You might want to get comfortable on 7188 before trying 14336, where things can run fast and furious and overwhelm a new, unknowing, or confused operator! Don't "lid" yourself and break up the flow of the 336 net! (14336 is where "the trains run on time"; 7188 has more "give and take" as a social net where friends get together and the mobile often has to "break in" to run a county.)

For more information on CW county hunting, which is very popular, be sure to go to the N4CD electronic newsletter mentioned above. Bob has provided a lot of information on this topic. You will often find the CH CW frequencies run without a formal net control, but it often works well when the mobiles follow the procedures Bob recommends.

County hunting has provided me with an incredible amount of fun, not just working mobile and fixed operators in various counties, but often meeting those same operators in person. It has been the source of many new friendships. I have been able to run 631 counties to date from my 4×4 and really enjoy getting off of the interstates and into the back-country of many counties. I do not operate while driving. I prefer to find a radio-quiet location, park, shut down the engine, and operate under ideal conditions. I can work many more ops this way, rather than having the noise and distraction of going down the road and losing the weaker signals. (I have been known to go into 4-wheel drive low range on muddy federal land and climb a mountain to get to a county line! The reward can be 150-plus QSOs with good friends on multiple bands and modes. It can be all the adventure you want it to be!)

My focus now is on working all counties the second time around, all mobile to mobile, all CW, all SSB, etc. MARAC (Mobile Amateur Radio Awards Club) has a wonderful logging program called LOGGER that tracks your status on the dozens and dozens of awards that are available through the MARAC Club. No QSLs are required for these awards once you have gotten your "star" by completing USA-CA from *CQ* magazine for the first time around. (USA-CA All Counties is probably the single most difficult award to attain in ham radio and has certainly been well worth the effort. It is very well managed by Ted, K1BV, who has kept the integrity of the award at the highest possible level.)

My personal thanks to all those who helped along the way. I hope to "pay it forward" by running as many counties as I can for the newcomers to county hunting (I, too, hope to operate from all 3077), and, of course, reworking each and every one of the many county hunter friends who are chasing those elusive MARAC award combinations. See you on the bands!

—73 de Bill, KM1C
Oriental, NC (Pamlico County)

The City of Juiz de Fora Award is available for forming the phrase "Juiz de Fora – A Manchester Mineira" by using any letter of the suffixes of South America stations contacted using CW.

Contact at least five different resident stations of Corsica (TK or old FC prefex, which was used before 1983) for the Diplome de Corse award.

might be a little easier to find than the Namibian stations noted above. This award will be a lot easier for the DXer who has confirmed "tough ones" over the years.

Contact at least five different resident stations (TK or old FC prefix, which was used before 1983). Stations temporarily operating in Corsica (TK/xxx) are not accepted for the award. Contacts via repeaters are not allowed; those via satellite are OK. SWL OK. No date or mode restrictions. Send a photocopy of the QSLs; screen prints are accepted for digital mode applications. The award fee is 10 Euros or 16 IRCs. Apply to: Radio Club d'Ajaccio, TK5KP, Diplôme Manager, Chez M. Pellegrinetti Alexandre, Rés. les Golfes - Imm. le CALVI, F-20090 Ajaccio, France. Internet: <http://radioamateur.tk/index.php/diplome-de-corse>.

We're always on the lookout for new awards to feature in these pages. I invite your e-mails to the address shown on the first page of this column.

As the New Year begins, I wish you a healthy, good year and happy hunting! 73, Ted, K1BV

BY TOMAS HOOD,* NW7US

February Conditions

A Quick Look at Current Cycle 24 Conditions

(Data rounded to nearest whole number)

Sunspots
Observed Monthly, November 2011: 97
Twelve-month smoothed, May 2011: 48

10.7 cm Flux
Observed Monthly, November 2011: 153
Twelve-month smoothed, May 2011: 106

***Ap* Index**
Observed Monthly, November 2011: 4
Twelve-month smoothed, May 2011: 8

One Year Ago: A Quick Look at Solar Cycle Conditions

(Data rounded to nearest whole number)

Sunspots
Observed Monthly, November 2010: 22
Twelve-month smoothed, May 2010: 16

10.7 cm Flux
Observed Monthly, November 2010: 83
Twelve-month smoothed, May 2010: 79

***Ap* Index**
Observed Monthly, November 2010: 5
Twelve-month smoothed, May 2010 :6

We are starting to approach the end of the winter season. The period of darkness is growing shorter, seasonally causing the average daily maximum usable frequency (MUF) to rise a slight bit. Noise levels are still low, at the same time, making for more reliable DX. The solar activity is moderate and holds enough energy to keep the mid-HF spectrum alive with signals. General conditions are expected to be good to excellent for HF propagation throughout February. From the middle of February through early April, typical equinoctial propagation conditions can be expected on the HF frequencies. Specifically, this means a noticeable improvement in conditions between the Northern and Southern Hemispheres on north/south paths.

Twenty meters through 15 meters will open shortly after sunrise, and will remain open until possibly late evening. Morning and evening DX openings between some areas in the Northern Hemisphere on these bands are very short, however, because the band in question closes on one end of the path before it opens on the opposite end.

The 40- and 30-meter bands remain in a seasonal peak much like in January, but with longer openings. Continue to look for great openings between North America and Europe in the morning and between North America and Asia during the late afternoon hours. Daytime conditions will

CQ WW CW Contest Conditions

As you may remember, I predicted fair to good conditions for the 2011 CQ WW CW Contest starting at 0000 UTC, Saturday, November 26, and running through 2359 UTC Sunday, November 27. The weekend was, at least by the reports I've received, much better than expected, and well within the prediction. The planetary *Ap* on the first day was a mere 2 on the first day, rising slightly to a very quiet 4 by the second day of the contest.

With such quiet geomagnetic conditions, the lower HF bands were great players during the night; weaker signals were more easily heard on those bands where openings provided signals weak yet present. During the day the higher bands played nicely, as well.

The 10.7-cm radio flux was 133 on Saturday and 135 on Sunday (compared to a year ago, when they were 77 and 80, respectively), and the observed sunspot count on the first day was 133, while on the second day it was 123. There were seven minor C-class x-ray flares, none of which caused much degradation during the contest. These conditions resulted in reasonable propagation on many of the contest bands. These conditions fit pretty well with the forecast.

How did you fare in 2011, compared to 2010? I am interested in hearing from you regarding the differences and how you did overall in the contest this time.

*e-mail: <nw7us@nw7us.us>

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for February 2012

	Expected Signal Quality			
Propagation Index.....	(4)	(3)	(2)	(1)
Above Normal: 1-2, 7-10, 25-29	A	A	B	C
High Normal: 4-6, 11, 13-18, 22-24	A	B	C	C-D
Low Normal: 3, 12, 19-21, 23	B	C-B	C-D	D-E
Below Normal: N/A	C	C-D	D-E	E
Disturbed: N/A	C-D	D	E	E

Where expected signal quality is:

A—Excellent opening, exceptionally strong, steady signals greater than S9.
B—Good opening, moderately strong signals varying between S6 and S9, with little fading or noise.
C—Fair opening, signals between moderately strong and weak, varying between S3 and S6, with some fading and noise.
D—Poor opening, with weak signals varying between S1 and S3, with considerable fading and noise.
E—No opening expected.

HOW TO USE THIS FORECAST

1. Find the *propagation index* associated with the particular path opening from the Propagation Charts appearing in *The New Shortwave Propagation Handbook* by George Jacobs, W3ASK; Theodore J. Cohen, N4XX; and Robert B. Rose, K6GKU.

2. With the *propagation index*, use the above table to find the expected signal quality associated with the path opening for any given day of the month. For example, an opening shown in the Propagation Charts with a *propagation index* of 2 will be good (B) on Feb. 1–2, poor (D) to fair (C) on the 3rd, fair (C) on the 4–6, etc.

3. As an alternative, the Last-Minute Forecast may be used as a general guide to space weather and geomagnetic conditions through the month. When conditions are Above Normal, for example, the geomagnetic field should be quiet and space weather should be mild. On the other hand, days marked as Disturbed will be riddled with geomagnetic storms. Propagation of radio signals in the HF spectrum will be affected by these conditions. In general, when conditions are High Normal to Above Normal, signals will be more reliable on a given path, when the path is ionospherically supported.

resemble those of 20 meters, but skip and signal strength may decrease during midday on days with high solar flux values. Nighttime will be good between some regions (remember, using a good propagation modeling tool such as ACE-HF Pro <http://hfradio.org/ace-hf> aids in discovering when the paths are open between your station and the distant DX that you are hunting).

Eighty meters is still a good DX band during February, although it slowly will become more challenging as seasonal noise increases and the hours of darkness decrease. Generally, the usable distance for propagation on 30 meters is expected to be somewhat greater than on 40 and 80. DX activity tends to increase later in the evening toward midnight. Look for Africa and South Pacific (Australia, Papua New Guinea, and so on) on both bands throughout the night. On 80 and 40 meters, long-path DX is possible along the gray line.

The 160-meter band continues to remain stable, with very low noise levels, but like 80, it slowly will degrade with the change in season. Throughout the winter season, high noise may occur during regional snowstorms, but overall, conditions typically will remain quiet. The band opens just before sunset and lasts until the sun comes up on the path of interest. Except for daytime short-skip signal strengths, high solar activity has little impact. Continue to look for Europe and Africa around sunset until the middle of the night, and then Asia, the Pacific, and the South Pacific as morning approaches.

VHF and Above

There are no major meteor showers during February that could provide any VHF meteor-scatter propagation. However, other modes may be possible. Check for 6-meter short-skip openings

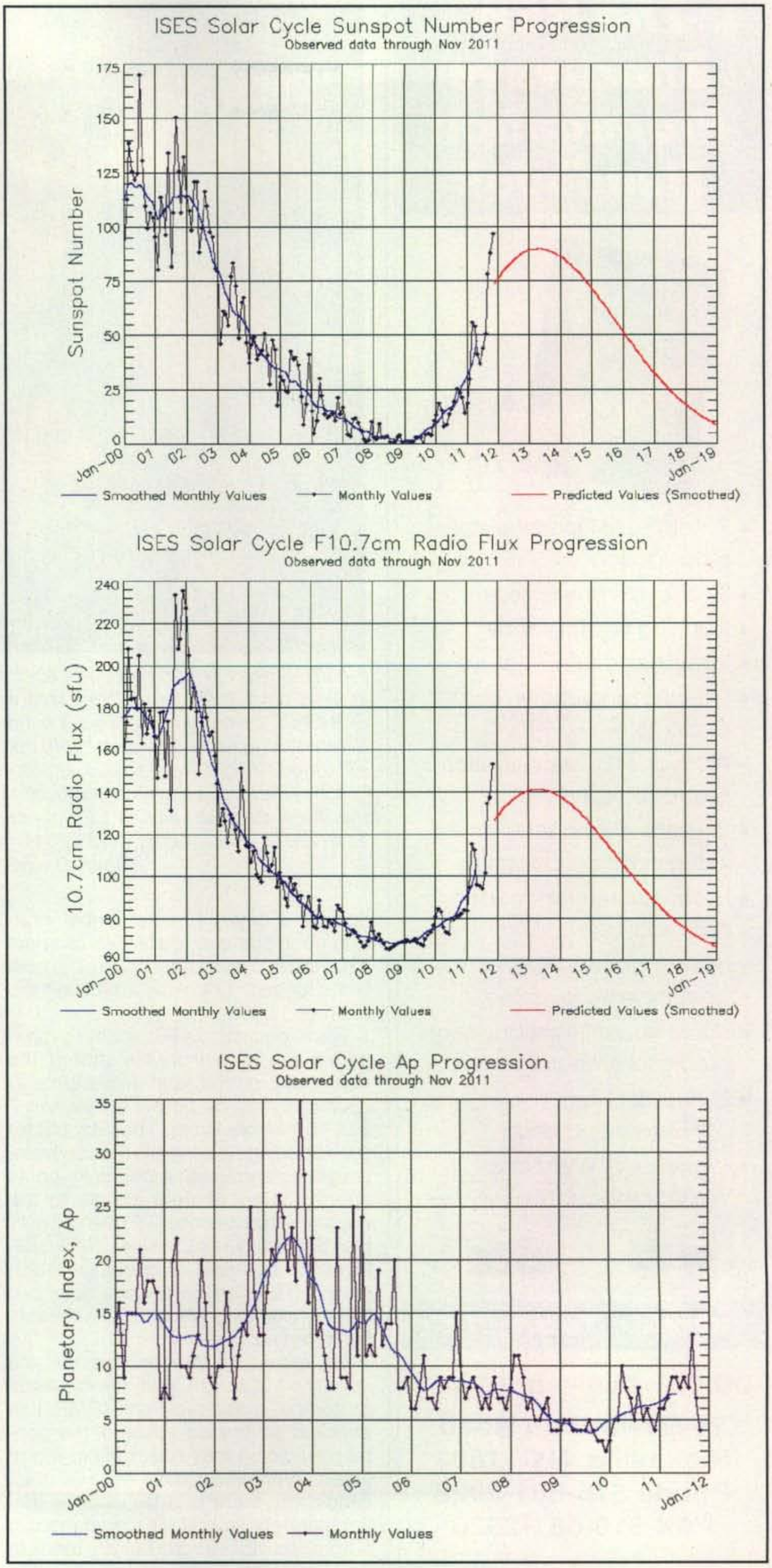


Fig. 1– Sunspot Cycle 24 progression charts showing the huge, sharp rise in during the last months of 2011. We will continue to see variable monthly numbers, but overall it is clear that this sunspot cycle is on a quick rise. As can be seen by the geomagnetic progression chart (Ap), conditions were very favorable for stable HF propagation, as the geomagnetic field was very quiet. This results in some very stable, reliable communications when a DX opening is present on a given ionospheric path. (Source: Space Weather Prediction Center [SWPC]/The National Oceanic and Atmospheric Administration [NOAA])

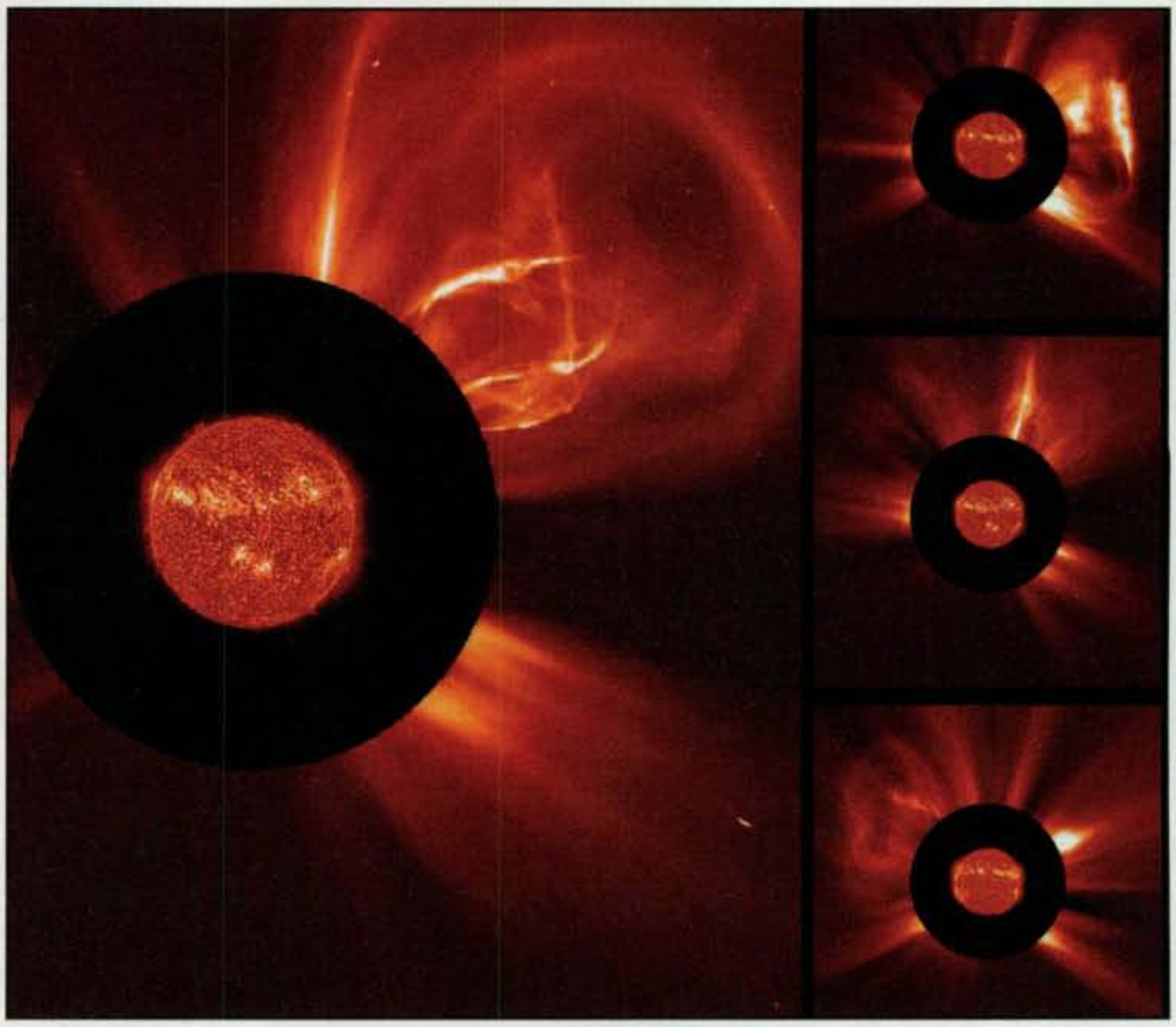


Fig. 2– Since the Sun produced about a dozen coronal mass ejections (CMEs) in eight days, it did seem like it was working overtime (Nov. 22–28, 2011). The SOHO C2 coronagraph shows the storms (both large and small) blasting out in different directions. The Sun itself, taken by the Solar Dynamics Observatory in extreme UV light, was scaled appropriately and superimposed on the coronagraph. This image shows a composite of some of the larger CMEs. The times of the three stacked LASCO C2 images featured in the still are (top to bottom): 11/26/2011 at 07:48:06; 11/23/2011 at 10:48:06; and 11/29/2011 at 08:00:05. (Source: NASA/SOHO/SDO)

during the daylight hours. Some short-skip openings over distances of about 1200 to 2300 miles may occur. The best times for such openings are during the afternoon hours.

Trans-equatorial (TE) scatter propagation tends to increase during the equinoctial period, and some 6-meter openings may be possible between 7 and 10 PM local time. The best bet for such openings is between the southern-tier states and South America for paths approximately at right angles to the equator. An occasional TE opening may also be possible on 2 meters. Unlike *F2*-layer or sporadic-*E* openings on 6 meters, TE openings are characterized by very weak signals with considerable flutter fading.

Do expect moderate coronal-hole activity on occasion. With the influence of coronal mass ejections (CMEs) or elevated solar wind streams, the geomagnetic field may reach minor storm levels. While most days will see quiet conditions, there is a fair chance that geomagnetic storms will trigger modest auroral activity. Auroral activity tends to occur more frequently during the equinoctial period. Look for days when the planetary *A*-index (*Ap*) is climbing, when the planetary *K*-index (*Kp*) reaches 5 or higher. These are the days on which VHF auroral-type openings are most likely to occur.

Check out *CQ VHF* magazine's "VHF Propagation" column for an in-depth look at propagation on VHF and above.

Current Solar Cycle Progress

The Royal Observatory of Belgium reports that the monthly mean observed sunspot number for November 2011 is 96.7, up from 88.0, and the highest yet in solar Cycle 24. The lowest daily sunspot value of 68 was recorded for November 28. The highest daily sunspot count was 123 on November 9. The 12-month running smoothed sunspot number centered on May 2011 is 47.6, up from April's 41.8. A smoothed sunspot count of 80, give or take about 9 points is expected for February 2012.

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada,

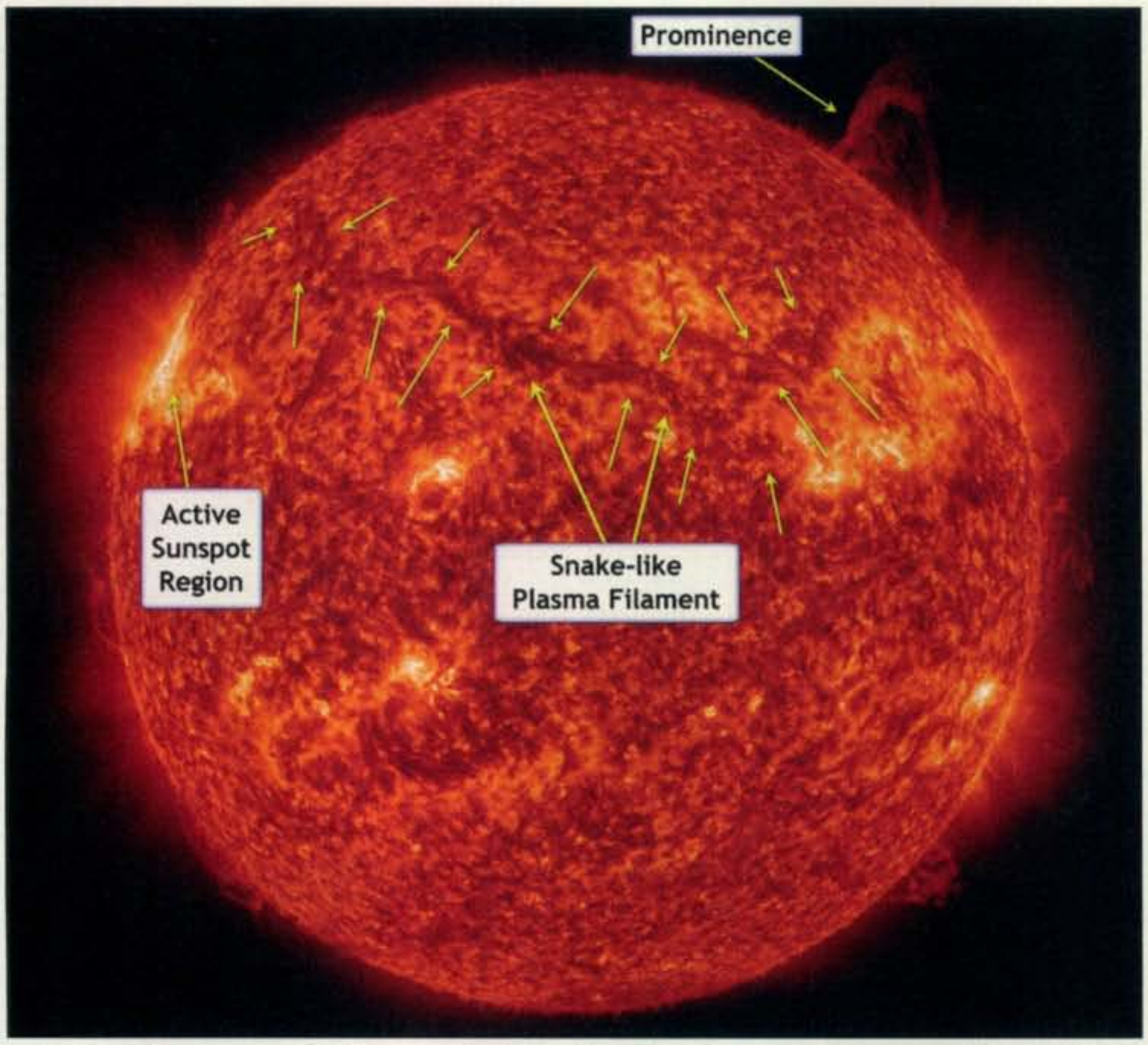


Fig. 3– A huge plasma filament (marked by the many yellow arrows) is suspended on the Sun in this image taken on December 12, 2011. This long, snake-like cloud is held in place by magnetic fields. These filaments are dense, cool gas (cooler than the surrounding gases), and they often are held suspended like this for days, until the magnetic fields change, and the plasma "cloud" breaks away off into interplanetary space, riding the solar wind. While the filament is cooler than the surrounding area in which it is suspended, if we were to see it while it were off to the side from our vantage point (off to the side of the solar disc, or limb), it would be bright, and we'd call it a prominence. Such a prominence is occuring in this photograph, as seen on the upper right of the solar disc. (Source: SDO/AIA)

reports a 10.7-cm observed monthly mean solar flux of 153.1 for November 2011, up from 137.2 for October 2011. The 12-month smoothed 10.7-cm flux centered on May 2011 is 105.6, up from April's 100.4. The predicted smoothed 10.7-cm solar flux for February 2012 is 133, give or take about 9 points.

The observed monthly mean planetary *A*-index (*Ap*) for November 2011 is 4, a very sharp decrease from October's 7, though both indicate rather quiet conditions overall. The 12-month smoothed *Ap* index centered on May 2011 is the same as for April: 7.5. Expect the overall geomagnetic activity to vary greatly between quiet to stormy during February; refer to the Last-Minute Forecast for the outlook on conditions during this month.

I welcome your thoughts, questions, and experiences regarding this fascinating science of propagation. You may e-mail me, write me a letter, or catch me on the HF amateur bands. Please come and participate in my online propagation discussion forum at <http:// forums.hfradio.org/>. If you are on Facebook, check out<http://www.facebook.com/spacewx.hfradio> and <http://www.facebook.com/NW7US>. Speaking of Facebook, check out the CQ Amateur Radio Magazine fan page at <http:// www.facebook.com/CQMag>. Also, be sure to follow this author's Twitter account, from which I "tweet" educational space weather and propagation information and a good amount of other informative information, plus welcome interaction with you. Additionally, you can "follow" @hfradiospacewx for hourly "tweets" of space weather and radio propagation data such as the 10.7-cm radio flux, and so on.

With all the new solar cycle activity, I'll be keeping my ears to the radio, hoping to hear you on the air. Happy DX!

73, Tomas, NW7US

Answers to the Amateur Radio Quiz: "Washington Readout" p. 64

1. Answer D. Since amateur radio is an international pursuit and to cut down on interference to other radio services, the various countries of the world must agree on which frequencies are allocated to the many radio services, including ham radio.

2. Answer B. Automatic control is the use of devices and procedures for controlling a transmitting ham station without the control operator being present at a control point. Control operators still must monitor all communications and be responsible for the transmissions but do not have to be at the transmitter site.

3. Answer A. The FCC issues station callsigns under three different programs: Sequential, Vanity, and Special Event. Under its Sequential Call Sign System, the FCC assigns callsigns in strict order from alphabetized blocks that correspond to the geographic area of an applicant's mailing address and operator class. A sequential callsign is the first callsign issued to a new radio amateur. Ham operators may change this callsign to the next one on the list at any time without charge.

4. Answer C. Bandwidth is usually defined as the frequencies that contain majority of a transmitted signal.

5. Answer D. The five purposes of the Amateur Radio Service are to (1) recognize ham radio as a voluntary noncommercial communication service, especially for providing emergency assistance; (2) advance the radio art; (3) improve one's communications and technical skills; (4) expand the number of trained operators and technicians; and (5) enhance international goodwill.

6. Answer A. Divided into six subparts, the Part 97 Rules and Regulations contain the administrative, operating, technical, examination, and emergency communications standards of amateur radio. They have the force of U.S. law.

7. Answer C. A Federal Registration Number (FRN) is a publicly available 10-digit unique identifying number that is assigned to people and organizations doing business with the Commission. It basically takes the place of a Social Security Number (SSN), or if a business or organization, the Employer Identification Number (EIN), neither of which is disclosed to the public.

8. Answer B. The Commission's Registration System, also known as "CORES," registers all applicants doing any type of business with the FCC. CORES issues applicants an identification number (FRN) and a password so that registrants can make changes to their FCC account, file applications ,and make payments to the FCC.

9. Answer D. Every amateur radio operator has an online FCC account, a part of the Universal Licensing System (ULS). You access this account by entering your FRN number and CORES password into the License Manager.

10. Answer D. You provide the FCC with your correct mailing address, phone number, and other personal data, apply and pay for a vanity callsign, and obtain a duplicate license by accessing your online ULS account.

11. Answer B. Any valid amateur license authorizing operation in the U.S., including one of the four types of reciprocal operating authority: (1) a CEPT license; (2) an IARP; (3) a reciprocal permit from a country that does not participate in either of these two multilateral agreements; and (4) a Canadian amateur radio license. (An automatic reciprocal agreement exists between the U.S. and Canada.) Additionally, all maritime mobile operation must be approved by the master of the ship.

12. Answer A. Section 97.121(a) specifically says that if your station interferes with the reception of a well-engineered receiver, you must stay off the air during prime local time and Sunday mornings. It is a controversial rule, since receivers can be designed to reduce or eliminate RF interference. If you don't comply, the FCC can order these "Quiet Hours."

13. Answer D. Only the FCC's Amateur Service database shows when a callsign has been canceled. Section 97.19(c)(3) states that a station callsign becomes available for reassignment two years following (meaning one day after) cancellation or expiration, whichever is sooner. Use the FCC's ULS License Search function to check for unassigned callsigns.

14. Answer B. Section 97.113(a)(3)(iii) allows classroom teachers to accept compensation for amateur radio instructional communications conducted as an incident of their teaching position.

15. Answer C. The purpose of the Radio Amateur Civil Emergency Service is to provide volunteer communications during emergencies to protect civilian life and property. Certification by a civil defense organization and an amateur radio license are required. [See Section: 97.407(a)].

16. Answer B. Section 97.523 requires that VECs cooperate in maintaining one question pool for each of the three written examination elements.

17. Answer C. Antenna structures over 200 feet above ground must be registered with the Federal Aviation Administration and Federal Communications Commission. Further limitations apply to antenna structures located near public airports. [See Section 97.15(a)]

18. Answer A. Section 97.313(a) specifically limits power levels to the least amount needed to carry out amateur radio communications.

19. Answer A. There is no requirement that an amateur hold any specific license class to obtain the temporary use of one of the 750 one-by-one special event callsigns. (K1A is an example of a 1×1 special event callsign.)

20. Answer B. Section 97.113(a)(2) prohibits being compensated for providing communications over the ham bands.

21. Answer B. The rules permit amateurs to use "any means of radiocommunication at its disposal to provide essential communication needs in connection with the immediate safety of human life and immediate protection of property when normal communication systems are not available." (Section 97.403.)

22. Answer C. Section 97.303 states "A station in a secondary service must not cause harmful interference to, and must accept interference from, stations in a primary service."

23. Answer A. The law precludes the FCC from providing "benefits" (such as a vanity callsign) when the person has a delinquent debt with the U.S. The RLD system is a database of entities who have non-tax unpaid debts and have not made payment arrangements.

24. Answer D. "Line A" is a dividing line above the 41st parallel where 420–430 MHz (70 cm) amateur operations is not permitted. Certain U.S. land mobile operations and Canadian radio services operate in this band along the border. (See Section 97.303(m).

25. Answer D. Congress enacted the Debt Collection Improvement Act of 1996 to strengthen Federal debt collection procedures. The DCIA requires that federal agencies collect Taxpayer Identification Numbers (TINs), which for ham operators, is their Social Security Number (SSN).

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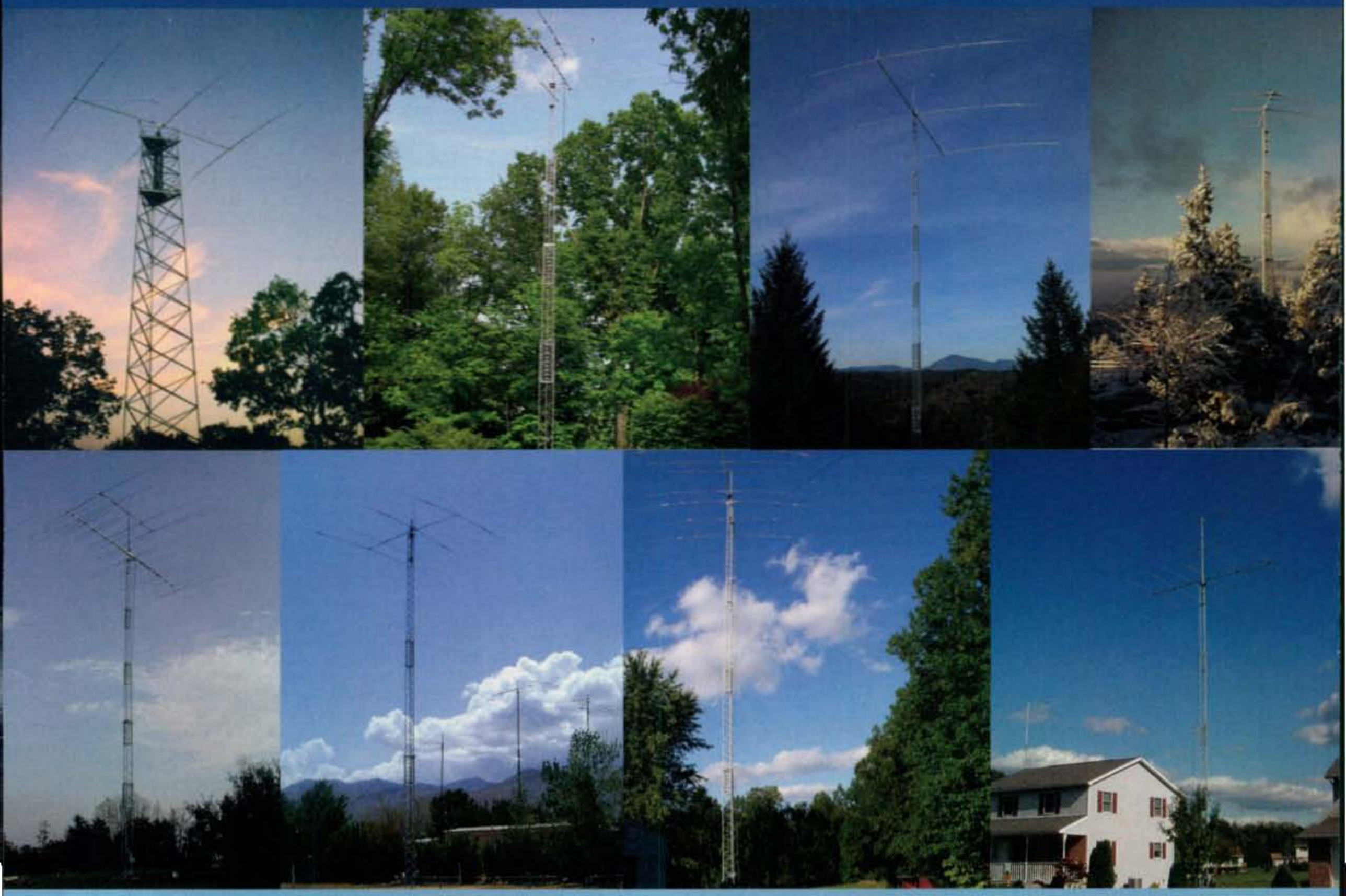

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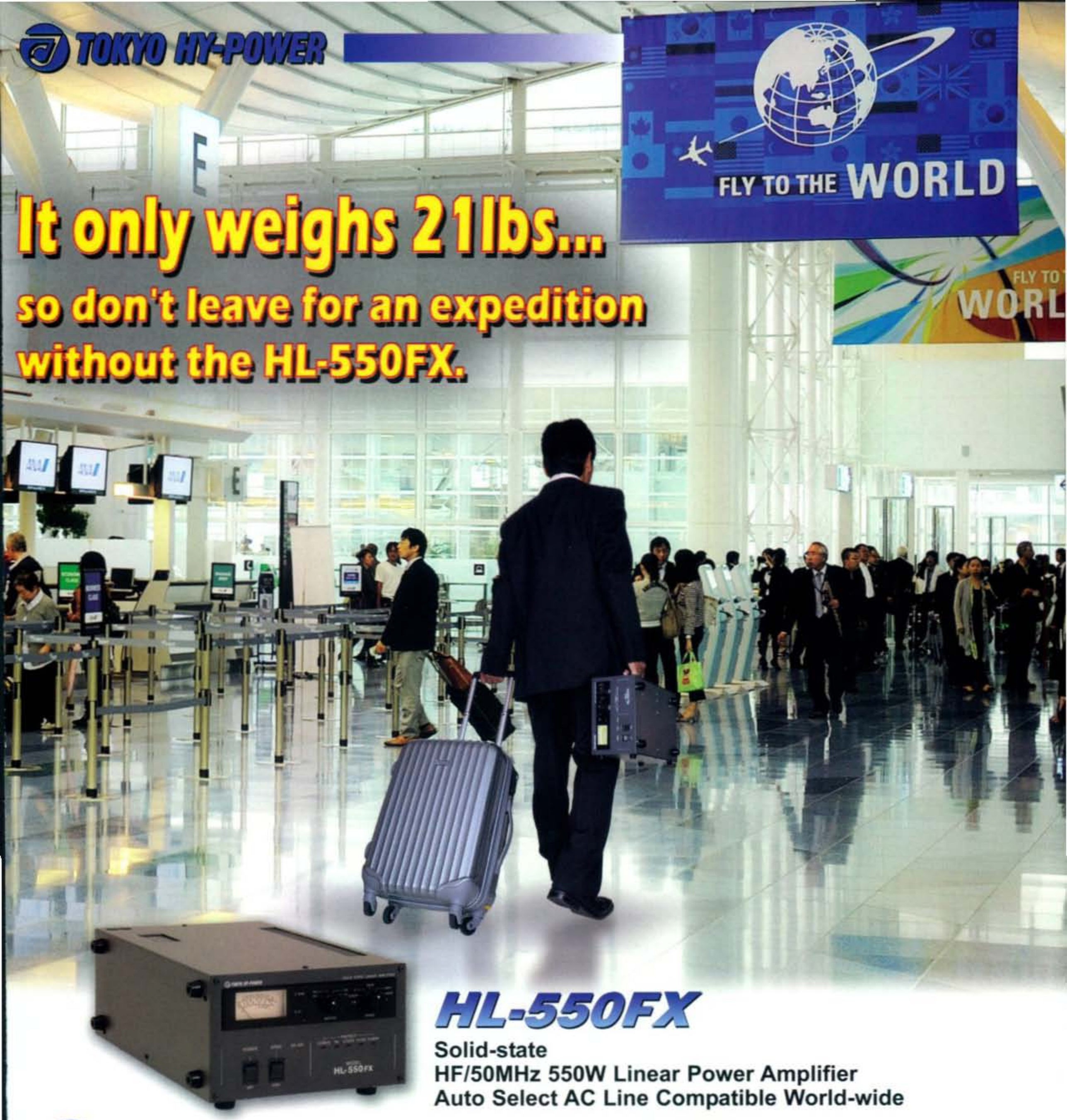

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