Radio–Homeland Security–Computers & Radio–Family & Hobby Comms

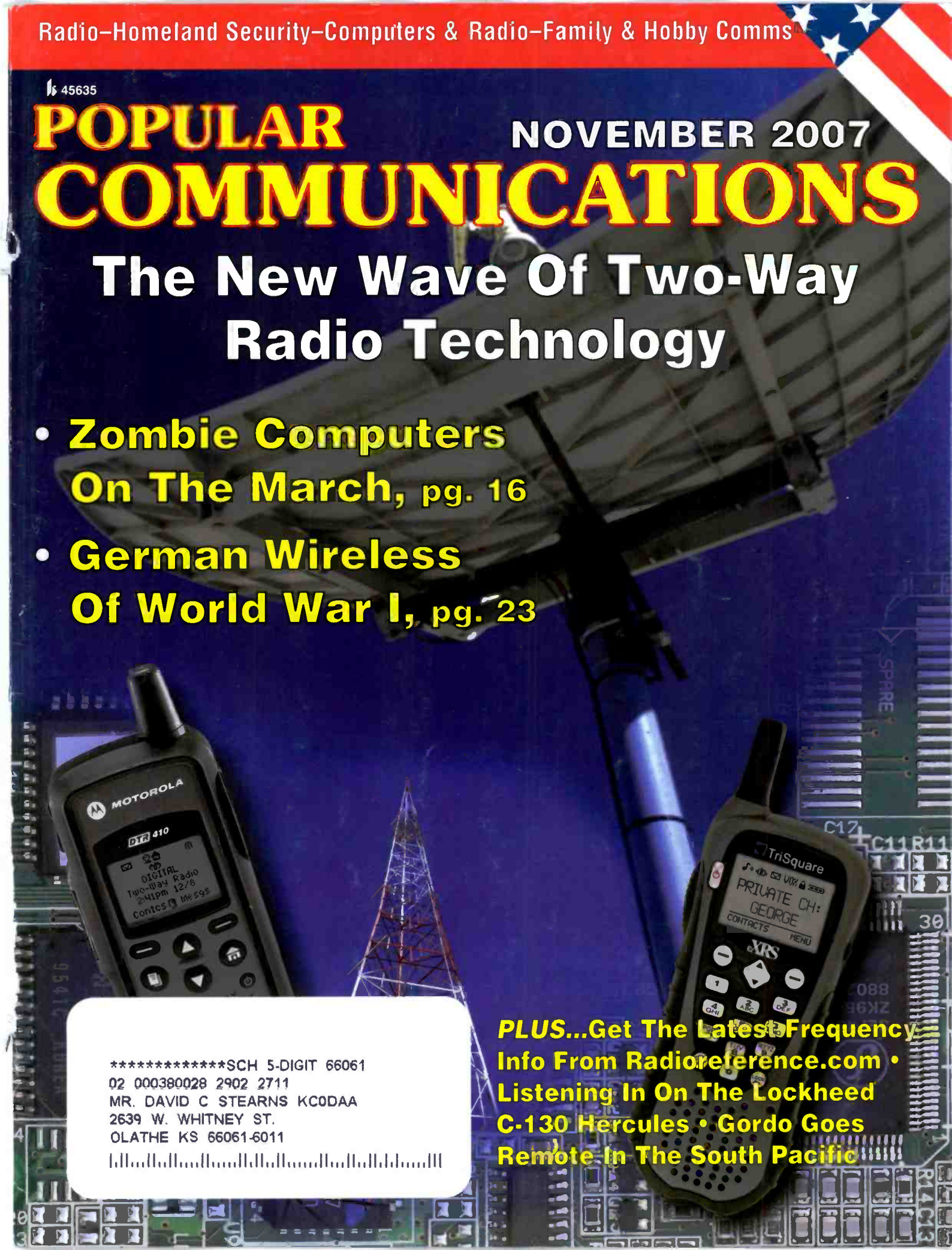
45635

POPULAR COMMUNICATIONS

NOVEMBER 2007

The New Wave Of Two-Way Radio Technology

- **Zombie Computers On The March,** pg. 16
- **German Wireless Of World War I,** pg. 23



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THE PROFESSIONAL STANDARD

The compact desk-top VR-5000 is Yaesu's most versatile Communications Receiver ever! With ultra-wide frequency coverage and a host of operating features, you'll be on top of the monitoring action with the VR-5000!

- CONTINUOUS FREQUENCY COVERAGE: 100 kHz ~ 2.6 GHz / LSB, USB, CW, AM-Narrow, AM, Wide AM, FM-Narrow, and Wide FM (cellular frequencies are blocked)
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- DUAL RECEIVE
- DIGITAL SIGNAL PROCESSING / BANDPASS FILTER, NOISE REDUCTION, NOTCH FILTER, NARROW CW PEAK FILTER (Optional DSP-1 requires)
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- WORLD CLOCK WITH UTC/LOCAL SETTINGS
- PRESET SHORTWAVE BROADCAST STATION MEMORY BANK
- EXTENSIVE SCANNING CAPABILITY/SMART SEARCH™

- AND MUCH, MUCH MORE. . .

● "RF Tune" Front-end Preselector (1.89-1000 MHz) ● 20 dB Attenuator for strong signal environments ● IF Noise Blanker ● DVS-2 Digital Voice Recorder (option) with two memories of up to 8 seconds each ● 10.7 MHz IF Output Jack ● Field Strength Meter ● Audio Tone Control ● All-Mode Squelch Control for silent monitoring ● Password-protected Panel and Dial "Lock" feature ● Display Dimmer/Contrast Control ● Clone Capability for copying memory information from one VR-5000 to another ● Personal Computer Interface Port ● Two Antenna Ports ● Audio Wave Meter provides display of Incoming signal's wave characteristics

COMMUNICATIONS RECEIVER

VR-5000

0.1~2599.99998MHz*
LSB/USB/CW/AM-N/AM/WAM/FM-N/WFM
*Cellular blocked

Enjoy the wide world of communications monitoring with the action-packed VR-5000, available from your Yaesu Dealer today!

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- Versatile 640-channel memory system

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VR-500

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- Front-end 20 dB Attenuator

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etón E1 XM

OPTION

The **etón E1 XM** is the world's first radio that combines AM, FM, shortwave and XM Satellite radio into one ultra high-performance unit. The E1 is an elegant confluence of performance, features and capabilities. The look, feel and finish of this radio is superb. The digitally synthesized, dual conversion shortwave tuner covers all shortwave frequencies. Adjacent frequency interference can be minimized or eliminated with a choice of three bandwidths [7.0, 4.0, 2.5 kHz]. The sideband selectable Synchronous AM Detector further minimizes adjacent frequency interference and reduces fading distortion of AM signals. IF Passband Tuning is yet another advanced feature that functions in AM and SSB modes to reject interference. AGC is selectable at fast or slow. High dynamic range permits the detection of weak signals in the presence of strong signals. All this coupled with great sensitivity will bring in stations from every part of the globe. Organizing your stations is facilitated by 500 user programmable presets with alpha labeling, plus 1200 user definable country memories, for a total of 1700 presets. You can tune this radio many ways such as: direct shortwave band entry, direct frequency entry, up-down tuning and scanning. Plus you can tune the bands with the good *old fashioned* tuning knob (that has *new fashioned* variable-rate tuning). There is also a dual-event programmable timer. Whether you are listening to AM, shortwave, FM or XM, you will experience superior audio quality via a bridged type audio amplifier, large built in speaker and continuous bass and treble tone controls. Stereo line-level output is provided for recording or routing the audio into another device such as a home stereo. The absolutely stunning LCD has 4 levels of backlighting and instantly shows you the status of your radio.

Many receiver parameters such as AM step, FM coverage, beep, kHz/MHz entry etc., can be set to your personal taste via the preference menu. The E1 has a built in telescopic antenna for AM, shortwave and FM reception. Additionally there is a switchable antenna jack [KOK] for an external antenna. Universal also sells a PL259 to KOK antenna jack adapter (*#1052* $14.95) as well as a sturdy angled Lucite radio stand (*#3873* $16.95).

The E1 comes with an AC adapter or may be operated from four D cells (not included). 13.1"W x 7.1"H x 2.3"D Weight: 4 lbs. 3 oz. We are shipping latest production. Get a **Free YB-300PE** with your E1 for a limited time.

E1 XM *Order #0101* **$499.95**

AUDIOVOX CNP2000

The Eton E1 is XM ready, so you may purchase the Audiovox CNP2000DUO XM antenna module at any time. It has a 25 foot cable. (An optional XM-EXT50 50 foot extension cable is also available *#4905* $39.95.)

CNP2000DUO *Order #0072* **$58.95**

Note: The CNP2000 DUO antenna module and XM subscription are sold separately. Activation and monthly subscription fee required for XM.

GRUNDIG YB-300PE

FREE

Receive a FREE Grundig YB-300PE with your Eton E1 purchase!

The **Grundig YB-300PE** *Professional Edition* covers: AM, FM stereo and shortwave from 2.3-7.8 and 9.1-26.1 MHz. Tune via Direct keypad entry, 24 memories, Band button, scanning plus Up and Down tuning. The YB-300 PE features a large LCD display with display lamp for momentary illumination. Other refinements include: 24 Hour Clock, DX-Local Switch, sleep timer, Scan and Lock. The side of the radio features the DC input jack, the external antenna input jack and earphone output jack. Includes an AC adapter, vinyl carrying case, carrying strap, plug in external wire antenna, Manual and stereo earphones. Operates from three AA cells. Titanium colored case 5.9 x 3.5 x 1.25 inches 13 oz. Originally introduced at $99.00.

YB-300PE *Order #0300* **$49.95**

➤ **Purchase your Eton E1 from Universal Radio before 12/31/07 and receive a FREE Grundig YB-300PE with your order!**

etón E5

FREE

Receive a FREE Grundig FR-200 with your Eton E5!

The **etón E5** is a world class portable radio covering long wave, AM, FM and shortwave. It offers SSB-Single Side Band, 700 memories, keypad entry, scanning and a 24 hour clock timer. You also get: Line Output, Local/DX Switch, Wide-Narrow selectivity and external SW antenna jack. Operates from four AA cells (not supplied) or the included AC wall adapter. Comes with a manual, wrist strap, protective case, wire antenna and ear buds. 6.675 x 4.125 x 1.125" 12.2 oz. One year limited warranty.

List $169.95 *Order #0055* **$149.95**

➤ **Purchase your Eton E5 from Universal before 12/31/07 and receive a FREE Grundig FR-200 AM/FM/SW wind-up emergency radio with your order!**

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- Special offers are subject to change.
- Returns subject to a 15% restocking fee.
- Prices shown do not include shipping.

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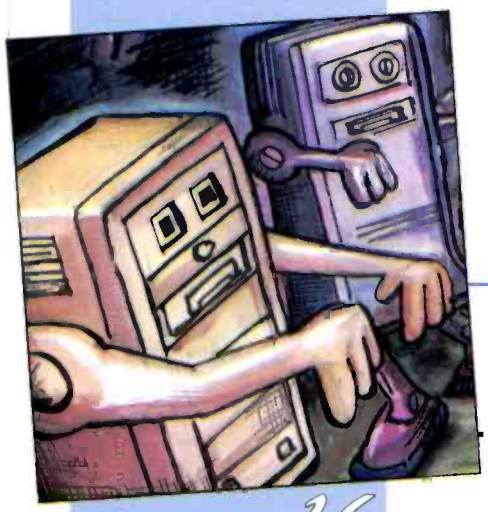

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On The Cover

Advances in communications technology don't occur at the speed of sound—it just seems like it. This month *Pop'Comm* examines where we've been and where we're going, with a spotlight on developments in digital frequency-hopping spread-spectrum (FHSS). See "Digital Two-Way Radio Technology Reaches Consumer Market," starting on page 10, for a glimpse into the future. (Cover by Larry Mulvehill, WB2ZPI)

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Tap into secret Shortwave Signals

Turn mysterious signals into exciting text messages with the MFJ MultiReader™!

MFJ-462B **$189.95**

Plug this self-contained MFJ *MultiReader*™ into your shortwave receiver's earphone jack.

Then *watch* mysterious chirps, whistles and buzzing sounds of RTTY, ASCII, CW and AMTOR (FEC) turn into exciting text messages as they scroll across an easy-to-read LCD display.

You'll *read* interesting commercial, military, diplomatic, weather, aeronautical, maritime and amateur traffic . . .

Eavesdrop on the World

Eavesdrop on the world's press agencies transmitting *unedited* late breaking news in English -- China News in Taiwan, Tanjug Press in Serbia, Iraqui News in Iraq -- all on RTTY.

Copy RTTY weather stations from Antarctica, Mali, Congo and many others. Listen to military RTTY passing traffic from Panama, Cyprus, Peru, Capetown, London and others. Listen to hams, diplomatic, research, commercial and maritime RTTY.

Listen to maritime users, diplomats and amateurs send and receive *error-free* messages using various forms of TOR (Telex-Over-Radio).

Monitor Morse code from hams, military, commercial, aeronautical, diplomatic, maritime -- all over the world -- Australia, Russia, Japan, etc.

Monitor any station 24 hours a day by printing transmissions. Printer cable, **MFJ-5412, $11.95.**

Save several pages of text in memory for later reading or review.

High Performance Modem

MFJ's high performance *PhaseLockLoop*™ modem consistently gives you solid copy -- even with weak signals buried in noise. New threshold control minimizes noise interference -- greatly improves copy on CW and other modes.

Easy to use, tune and read

It's easy to use -- just push a button to select modes and features from a menu.

It's easy to tune -- a precision tuning indicator makes tuning your receiver easy for best copy.

It's easy to read -- front-mounted 2 line 16 character LCD display has contrast adjustment.

Copies most standard shifts and speeds. Has MFJ *AutoTrak*™ Morse code speed tracking.

Use 12 VDC or use 110 VAC with MFJ-1312D AC adapter, $15.95. 5¼Wx2½Hx5¼D inches.

WiFi Yagi Antenna -- 15 dBi 16-elements extends range

MFJ-1800 **$29.95**

16-element, 15 dBi WiFi Yagi antenna greatly extends range of 802.11b/g, 2.4 GHz WiFi signals. 32 times stronger than isotopic radiator. Turns slow/no connection WiFi into fast, solid connection. Highly directional -- minimizes interference.

N-female connector. Tripod screw-mount. Wall and desk/shelf mounts. Use vertically/horizontally. 18Wx2¾Hx1¼D inches. 2.9 ounces.

MFJ-5606SR, $24.95. Cable connects MFJ-1800/WiFi antennas to computer. Reverse-SMA male to N-male, 6 ft. RG-174.

MFJ-5606TR, $24.95. Same as MFJ-5606SR but Reverse-TNC male to N-male.

Super Active Antenna

"World Radio TV Handbook" says MFJ-1024 is a *"first-rate easy-to-operate active antenna ...quiet... excellent dynamic range... good gain... low noise... broad frequency coverage."* Mount it outdoors away from elec- trical noise for maximum signal, minimum noise. Covers 50 KHz-30 MHz.

Receives strong, clear signals from all over the world. 20 dB attenuator, gain control, ON LED. Switch two receivers and auxilary or active antenna. 6x3x5 in. Remote has 54" whip, 50 feet coax. 3x2x4 inches. 12 VDC or 110 VAC with MFJ-1312, $15.95.

MFJ-1024 **$149.95**

Indoor Active Antenna

Rival outside long wires with this *tuned* indoor active antenna. *"World Radio TV Handbook"* says MFJ-1020C is a *"fine value... fair price... best offering to date... performs very well indeed."*

MFJ-1020C **$89.95**

Tuned circuitry minimizes intermod, improves selectivity, reduces noise outside tuned band. Use as a preselector with external antenna. Covers 0.3-30 MHz. Tune, Band, Gain, On/Off/Bypass Controls. Detachable telescoping whip. 5x2x6 in. Use 9 volt battery, 9-18 VDC or 110 VAC with MFJ-1312, $15.95.

Compact Active Antenna

Plug this *compact* MFJ all band active antenna into your receiver and you'll hear strong, clear signals from all over the world, 300 KHz to 200 MHz including low, medium, shortwave and VHF bands. Detachable 20" telescoping antenna. 9V battery or 110 VAC MFJ-1312B, $15.95. 3⅛x1¼x4 in.

MFJ-1022 **$59.95**

Eliminate power line noise!

MFJ-1026 **$189.95**

Completely eliminate power line noise, lightning crashes and interference *before they get into your receiver!* Works on all modes -- SSB, AM, CW, FM, data -- and on all shortwave bands. Plugs between main external antenna and receiver. Built-in active antenna picks up power line noise and cancels undesirable noise from main antenna. Also makes excellent active antenna.

MFJ Antenna Matcher

Matches your antenna to your receiver so you get maximum signal and minimum loss.

MFJ-959C **$109.95**

Preamp with gain control boosts weak stations 10 times. 20 dB attenuator prevents overload. Select 2 antennas and 2 receivers. 1.6-30 MHz. 9x2x6 in. Use 9-18 VDC or 110 VAC with MFJ-1312, $15.95.

High-Gain Preselector

High-gain, high-Q receiver preselector covers 1.8-54 MHz. Boost weak signals 10 times with low noise dual gate MOSFET. Reject out-of-band signals and images with high-Q tuned circuits. Push buttons let you select 2 antennas and 2 receivers. Dual coax and phono connectors. Use 9-18 VDC or 110 VAC with MFJ-1312, $15.95.

MFJ-1045C **$79.95**

Dual Tunable Audio Filter

Two separately tunable filters let you peak desired signals and notch out interference at the same time. You can peak, notch, low or high pass signals to eliminate heterodynes and interference. Plugs between radio and speaker or phones. 10x2x6 inches.

MFJ-752C **$109.95**

MFJ Shortwave Headphones

MFJ-392B **$24.95**

Perfect for shortwave radio listening for all modes -- SSB, FM, AM, data and CW. Superb padded headband and *ear cushioned* design makes listening extremely comfortable as you listen to stations all over the world! High-performance driver unit reproduces enhanced communication sound. Weighs 8 ounces, 9 ft. cord. Handles 450 mW. Frequency response is 100-24,000 Hz.

High-Q Passive Preselector

High-Q passive LC preselector boosts your favorite stations while rejecting images, intermod and phantom signals. 1.5-30 MHz. Preselector bypass and receiver grounded positions. Tiny 2x3x4 in.

MFJ-956 **$59.95**

Super Passive Preselector

Improves any receiver! Suppresses strong out-of-band signals that cause intermod, blocking, cross modulation and phantom signals. Unique Hi-Q series tuned circuit adds super sharp front-end selectivity with excellent stopband attenuation and very low passband attenuation and very low passband loss. Air variable capacitor with vernier. 1.6-33 MHz.

MFJ-1046 **$109.95**

MFJ Shortwave Speaker

This MFJ *ClearTone*™ restores the broadcast quality sound of shortwave listening. Makes copying easier, enhances speech, improves intelligibility, reduces noise, static, hum. 3 in. speaker handles 8 Watts. 8 Ohm impedance. 6 foot cord.

MFJ-281 **$12.95**

MFJ All Band Doublet

102 ft. all band doublet covers .5 to 60 MHz. Super strong custom fiberglass center insulator provides stress relief for ladder line (100 ft.). Authentic *glazed ceramic* end insulators and heavy duty 14 gauge 7-strand copper wire.

MFJ-1777 **$49.95** Ship Code A

MFJ Antenna Switches

MFJ-1704 **$69.95**

MFJ-1702C **$29.95**

MFJ-1704 heavy duty antenna switch lets you select 4 antennas or ground them for static and lightning protection. Unused antennas automatically grounded. Replaceable lightning surge protection. Good to 500 MHz. 60 dB isolation at 30 MHz. **MFJ-1702C** for 2 antennas.

Morse Code Reader

Place this pocket-sized MFJ Morse Code Reader near your receiver's speaker. Then watch CW turn into solid text messages on LCD. Eavesdrop on Morse Code QSOs from hams all over the world!

MFJ-461 **$89.95**

MFJ 24/12 Hour Station Clock

MFJ-108B, $21.95. Dual 24/12 hour clock. Read UTC/local time *at-a-glance*. High-contrast 5/8" LCD, brushed aluminum frame. Batteries included. 4½Wx1Dx2H inches.

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by Edith Lennon, N2ZRW, Editor

We're Not Talkin' Doritos

"Our ideals, laws and customs should be based on the proposition that each generation in turn becomes the custodian rather than the absolute owner of our resources—and each generation has the obligation to pass this inheritance on to the future."

—Charles A. Lindbergh, aviator

"We remain committed to the principle that wireless consumers and American taxpayers are best served when such a valuable commodity is auctioned in a fair and competitive manner with no strings attached,...

—Steve Largent, president and CEO, the Wireless Association

Obviously, Charles Lindbergh, quoted in a 1971 *New York Times Magazine* article, was not speaking about the upcoming FCC auction of the 700-MHz spectrum. Steve Largent was. Both, however, were referring to natural resources that are finite and precious.

The FCC is set to auction off segments of the 700-MHz band this January. Lying just below the 800-MHz cellular spectrum, this range is extremely valuable and has been compared to "beachfront property." It's ideal for long-range radiotelephone and broadband services, as signals can travel up to four times farther and penetrate obstructions much better than those on PCS frequencies of 1900 MHz and higher.

This segment of the band is currently used by U.S. analog broadcast television licensees on Channels 52 to 69, but with the Congressional mandate that TV stations transition to digital broadcasting by February 2009, the spectrum is up for grabs.

You can certainly see why mouths are watering all around the table, and it's believed that the sale may raise over *$10 billion* for the government.

And that's got to be good for the taxpayers, right? Well, that's debatable.

Ten billion sure sounds real big, but in the grand scheme of things, it's really chump change for the government and more useful as a public relations ploy than as a means to balance the budget. Just don't expect any trickle down tax cuts from it to help you buy your next scanner.

But it will still be fun to watch the continuing struggle between the likely big bidders, such as powerhouse telecoms, and consumer groups and certain other players like Google. The latter had asked that conditions be placed on the sale and petitioned the FCC to require the winning bidder to allow "open access" to their spectrum on a wholesale basis. This would have meant that a nearly unlimited number of competitors could have resold these wireless broadband services with value-added features. Such conditions, it was argued, represented the only chance for innovative new broadband services to emerge in competition with large telecom providers, and that without those conditions the largest carriers could buy and hoard the spectrum, and consumers would pay a heavy price—literally.

Not surprisingly, opposing conditions were companies like Verizon, which argued that auction conditions would lead to fewer bids and discourage innovation.

Guess what happened...the FCC denied Google's pro-consumer request.

We've heard the industry line before; but we've *seen* what happens when a finite resource is in the hands of a limited number of entities—skyrocketing access costs. To be sure, some wallets will get fatter after January, but they probably won't belong to you. One way or another, that 10 billion is coming out of our pockets.

When it comes to radio spectrum, unlike Doritos, you can't just "make more." While these frequencies still belong to us, and we still have the opportunity, let's use—and sell—them wisely.

An Update On "Plane Sense"

For you commercial aviation followers out there, we apologize for neglecting your cravings for frequencies, et al, the past few months. Work and other life commitments have meant that Bill Hoefer can no longer provide the "Plane Sense" column. Not to worry, though, the search is on for another columnist.

Edith Lennon

Popular Communications invites your comments, questions, criticisms, compliments, article submissions—in a word, your thoughts. Write to me at editor@popular-communications.com.

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This is the table-top stereo that the market has been waiting for. This visually stunning piano black wooden cabinet isn't just redefining the table-top category it is paving a new path.

Its features start with the ability to play MP3's and Windows Media Audio (WMA) formats from a slot load CD but takes it further by offering SD/MMC and USB flash connections that provide the flexibility no other table-top offers. For those of you who still listen to radio, it provides the AM & FM reception and sensitivity that Sangean is famous for, 20 memory presets, and the RDS text services that displays artist, song title, and other text information provided by your favorite FM stations.

Add to all this the stunning Hi-fi sound produced by the 3W + 3W amplifier that pushes 2 3" Polypropylene speakers and dual front facing bass ports. Featuring the Sangean AcoustiCase™ technology and a 3D audio projection technology, the speakers produce an unmatched level surround performance and bass response and clarity in a table-radio. For the custom sound that many listeners covet you have the ability to adjust bass and treble controls providing 14 full steps and is sure to have a range that will provide for optimal listening enjoyment whether for music or talk radio.

WR-3

WR-3 Digital AM/FM/CD/SD/MMC/USB Wooden Cabinet Table-Top Radio With MP3 Playback

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- SD/MMC card / USB MP3 playback.
- FM/AM bands.
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- Alarm & Sleep timer.
- Search & Manual tuning.
- Full Menu Display.
- Record out socket.
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- Aux-in
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by D. Prabakaran

News, Trends, And Short Takes

Radio Regenbogen Launches First HD Radio Test In Germany

Radio Regenbogen, one of Germany's private radio stations, and network operator Media and Broadcast of T-Systems, have announced the start of an HD Radio technology field test at the end of August. Listeners in the Rhine-Neckar area will be able to receive the Radio Regenbogen program as well as two multicast formats: Regenbogen Gold and Regenbogen Comedy.

The testing is also supported by Ibiquity Digital, Audioexport Georg Neumann, Orban/CRL Systems, Broadcast Electronics, and Ruoss, a company that has assisted with HD Radio tests in Switzerland. The first test results are to be presented at an event of the Regional Office for Communication that will be held in Stuttgart on September 27, 2007.

German Public Broadcasters Launch "Sparse Image Audio Service" Trial

A "sparse image audio service" trial has been launched by German public broadcasters WDR in Cologne and MDR in Leipzig. In the area of greater Cologne, the proposed broadcasting location is the "Kölnturm" (Cologne tower) in Mediapark with an aerial height of 160 meters. The DMB multiplex is on channel 11D, and the radiated power of 10 kilowatts is aimed at in-house coverage for Cologne city center. Trial broadcasts consist of existing TV programs as well as visually enhanced radio programs; for example, displaying the CD cover of a track being played or a road map with traffic news.

The DAB/DMB technology employed was developed in cooperation with the Fraunhofer Institute for Telecommunications, Heinrich Hertz Institute (HHI) in Berlin. Instead of the usual DAB format, however, a High-Efficiency Advanced Audio Coding HE-AAC radio format is being used, reducing the bandwidth from 192 kilobits per second to 48 kilobits per second.

Minivan Radio To End Shortwave Broadcasts

Minivan Radio, the Maldivian opposition station, will end its current series of shortwave transmissions on August 31. The shortwave broadcasts, at 1600 to 1700 UTC on 11965 kHz, were resumed on August 1 after four months during which they had been available only via the Internet. The station had stopped the broadcasts in anticipation of winning an FM license, but has so far been unable to procure one. It's likely that further shortwave transmissions will be made to cover significant events.

Radio Six International Returns To Shortwave And Mediumwave

Scotland's only independent international broadcaster, Radio Six International, returned to shortwave with a resumption of its Saturday morning broadcast on 9290 kHz beamed to Europe, the Far East, and Pacific regions. The program, transmitted every Saturday between 0700 and 0800 UTC, will be relayed from the 100-kW facility at Ulbroka, Latvia, as well as from the 2.7-kW mediumwave transmitter on 945 kHz in Riga, Latvia.

The station has recently expressed reservations about the effectiveness of shortwave transmissions and is available 24 hours a day on the Internet at www.radiosix.com as well as via satellite and FM in various parts of the world at certain times of day. The shortwave and mediumwave transmissions will continue until the end of September, when the situation will be reviewed.

VOA Delano To Close At End Of Summer

Another international broadcasting shortwave site is to close at the end of the current shortwave broadcast season. The American Federation of Government Employees, Local 1812, says that the Broadcasting Board of Governors has announced the closure of the Delano, California, transmitting station. The closure is scheduled for October 30, 2007. Employees will remain on the payroll until January 5, 2008. This site is currently used for Radio Martí, VOA Spanish and Creole, and Special English to Latin America.

UK Regulator Allows License-Exempt Use Of UWB Technology

UK communications regulator Ofcom announced a change to the law to enable the use of a new technology that wirelessly connects digital devices in the home. As of August 13, 2007, Ofcom removed the requirement to hold a license to operate equipment using approved Ultra-Wideband (UWB) technology. UWB allows the transfer of large amounts of data (up to 2 Gb/s) over relatively short distances (around 30 meters).

The technology could promote the convergence of communications devices and services by, for example, connecting personal computers, DVD players, portable music players, and digital cameras without the need for wires. In addition, research has shown that devices that transfer data using UWB equipment use low-power technologies that can enhance battery life compared with other wireless technologies.

UWB equipment is already exempt from the need to hold a license in the United States and Japan, and technology companies have started to develop and sell UWB products, such as UWB home hubs, for these markets.

Bhutan Broadcasting Service Inaugurates New Shortwave Transmitter

The Bhutan Broadcasting Service Corporation inaugurated a new 100-kW shortwave transmitter. BBS Radio today broadcasts 100 hours a week in four languages. The shortwave transmitter was installed with financial support from the Indian Government. The transmitter, on 6035 kHz, is on the air Monday through Friday at 0000 to 0600 and 0800 to 1500, Saturday/Sunday 0000 to 1500 UTC. English is scheduled daily at 0500 to 0600 and 1400 to 1500 UTC. ■

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The handheld BCD396T scanner was designed for National Security/Emergency Preparedness (NS/EP) and homeland security use with new features such as **Fire Tone Out Decoder.** This feature lets you set the BCD396T to alert if your selected two-tone sequential paging tones are received. Ideal for on-call firefighters, emergency response staff and for activating individual scanners used for incident management and population attack warning. **Close Call Radio Frequency Capture** – Bearcat exclusive technology locks onto nearby radio transmissions, even if you haven't programmed anything into your scanner. Useful for intelligence agencies for use at events where you don't have advance notice or knowledge of the radio communications systems and assets you need to intercept. The BCD396T scanner is designed to track Motorola Type I, Type II, Hybrid, SMARTNET, PRIVACY PLUS, LTR and EDACS® analog trunking systems on any band. Now, follow UHF High Band, UHF 800/900 MHz trunked public safety and public service systems just as if conventional two-way communications were used. **Dynamically Allocated Channel Memory** - The BCD396T scanner's memory is organized so that it more closely matches how radio systems actually work. Organize channels any way you want, using Uniden's exclusive dynamic memory management system. 3,000 channels are typical but **over 6,000 channels are possible** depending on the scanner features used. You can also easily determine how much memory you have used and how much memory you have left. **Preprogrammed Systems** - The BCD396T is preprogrammed with over 400 channels covering police, fire and ambulance operations in the 25 most populated counties in the United States, plus the most popular digital systems. **3 AA NiMH or Alkaline battery operation and Charger** – 3 AA battery operation - The BCD396T includes 3 premium 2,300 mAH Nickel Metal Hydride AA batteries to give you the most economical power option available. You may also operate the BCD396D using 3 AA alkaline batteries. Unique Data Skip - Allows your scanner to skip unwanted data transmissions and reduces unwanted birdies. Memory Backup - If the battery completely discharges or if power is disconnected, the frequencies programmed in the BCD396T scanner are retained in memory. Manual Channel Access - Go directly to any channel. LCD Back Light - A blue LCD light remains on when the back light key is pressed. Autolight - Automatically turns the blue LCD backlight on when your scanner stops on a transmission. Battery Save - In manual mode, the BCD396T automatically reduces its power requirements to extend the battery's charge. Attenuator - Reduces the signal strength to help prevent signal overload. The BCD396T also works as a conventional scanner to continuously monitor many radio conversations even though the message is switching frequencies. The BCD396T comes with AC adapter, 3 AA nickel metal hydride batteries, belt clip, flexible rubber antenna, wrist strap, SMA/BNC adapter, RS232C cable, Trunk Tracker frequency guide, owner's manual and one year limited Uniden warranty. Not compatible with AGEIS, ASTRO or ESAS systems. Order on-line at www.usascan.com or call 1-800-USA-SCAN.

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Frequency Coverage:

25.0000-54.0000 MHz., 108.0000-174.0000 MHz., 216.0000-224.9800 MHz., 400.0000-512.0000 MHz., 806.0000-823.9875 MHz., 849.0125-868.9875 MHz., 894.0125-956.000 MHz., 1240.0000 MHz.-1300.0000 MHz.

The handheld BC246T TrunkTracker scanner has so many features, we recommend you visit our web site at www.usascan.com and download the free owner's manual. Popular features include **Close Call Radio Frequency Capture** – Bearcat exclusive technology locks onto nearby radio transmissions, even if you haven't programmed anything into your scanner. **Dynamically Allocated Channel Memory** - Organize channels any way you want, using Uniden's exclusive dynamic memory management system. 1,600 channels are typical but **over 2,500 channels are possible** depending on the scanner features used. You can also easily determine how much memory is used. **Preprogrammed Service Search (10)** - Makes it easy to find interesting frequencies used by public safety, news media TV broadcast audio, Amateur (ham) radio, CB radio, Family Radio Service, special low power, railroad, aircraft, marine, racing and weather frequencies. **Quick Keys** - allow you to select systems and groups by pressing a single key. **Text Tagging** - Name each system, group, channel, talk group ID, custom search range, and S.A.M.E. group using 16 characters per name. **Memory Backup** - When power is lost or disconnected, your BC246T retains the frequencies that were programmed in memory. **Unique Data Skip** - Allows the BC246T to skip over unwanted data transmissions and birdies. **Attenuator** - You can set the BC246T attenuator to reduce the input strength of strong signals by about 18 dB. **Duplicate Frequency Alert** - Alerts you if you try to enter a duplicate name or frequency already stored in the scanner. **22 Bands** - with aircraft and 800 MHz. The BC246T comes with AC adapter, 2 AA 1,800 mAH nickel metal hydride batteries, belt clip, flexible rubber antenna, wrist strap, RS232C cable, Trunk Tracker frequency guide, owner's manual and one year limited Uniden warranty. For more fun, order our optional deluxe racing headset part **#HF24RS** for $29.95. Order now at www.usascan.com or call 1-800-USA-SCAN.

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by Richard Fisher, KI6SN

Capitol Hill And FCC Actions Affecting Communications

FCC Praises BPL In House Testimony, Radio Amateurs Respond

FCC Commissioner Jonathan S. Adelstein testified at a House Subcommittee on Telecommunications and the Internet hearing that "three of the many urgent priorities we face" include the need for "a national broadband strategy to ensure the ubiquitous deployment of affordable, high-speed broadband infrastructure to this country."

In reaction, David Sumner, K1ZZ, chief executive officer of the American Radio Relay League (ARRL), reiterated the organization's position with regard to Broadband over Power Line (BPL) technology and "its propensity to interfere with radio communication, a flaw that is not shared by other broadband delivery platforms," according to an on-line news release. "As long as interference is avoided, it is of no concern to us whether private investment is devoted to BPL. However, we must object to your identification of BPL as a technology that is particularly deserving of favorable public policy treatment," Sumner said.

FCC Chairman Kevin Martin and Commissioners Deborah Tate, Robert McDowell, and Michael Copps also testified at the "Oversight of the Federal Communications Commission" hearing.

Sumner said that according to the Commission's latest figures, "of 64,600,000 'high-speed' lines, only about 5,000 are BPL. This is a share of 0.008 percent, a share that actually declined in the six-month period between reports—and if an 'anemic' definition were not used, none of the 5,000-or-so BPL lines would qualify."

The ARRL's concern, Sumner said, regarding the "prospect of an even greater encouragement of BPL, as your testimony suggests, is that—even at the very low level of deployment that exists to date—the FCC's enforcement efforts have proved to be woefully inadequate to address ongoing cases of harmful interference from BPL systems."

Sumner concluded by saying: "We respectfully submit that BPL has not earned a place in the much-needed national broadband strategy to benefit all Americans. Resources are better devoted elsewhere, to more promising technologies that do not pose a threat to the Commission's radio service licensees."

Convicted Felon Withdraws Application For Amateur License

An amateur radio license application from a Florida man has been denied by the FCC on grounds that his felony conviction "for at least one sexual-related offense involving children raises material and substantial questions as to whether he possesses the requisite character qualifications to be a Commission licensee."

The Commission issued its Order of Dismissal and Termination against Jack R. Sharples, who its records described as "a convicted felon and registered sexual predator."

According to the American Radio Relay League's *ARRL Letter*, the FCC said that "although Sharples' felony adjudications occurred more than seven years ago, the nature of the criminal misconduct, and the fact that the Amateur Radio Service is particularly attractive to children, call into serious question whether he should be permitted to obtain an Amateur Radio authorization."

Sharples had 20 days from the release of the Commission's Hearing Designation Order to file a written appearance. "He submitted to the presiding judge a document in which he set forth reasons for filing an [Amateur Radio license] Application, notwithstanding his felony convictions [and] the document was received as a good faith Notice of Appearance." Sharples, in a telephone call with the FCC requested more time to consider whether he would continue to prosecute his application, the *ARRL Letter* reported. The request was granted without objection.

Sharples subsequently sent a fax to the presiding judge withdrawing his application for an amateur radio license. The FCC's request to dismiss the application with prejudice and terminate the preceding was granted, as was Sharples' application for an amateur radio license, also with prejudice, the ARRL said.

APCO Applauds FCC For Action On 700 MHz

The Association of Public-Safety Communications Officials (APCO) International has hailed the FCC for its Second Report and Order in the 700 MHz proceeding, "providing for a nationwide, interoperable broadband network that is designed, built, and maintained to meet public safety requirements." The order was released in August.

"APCO International thanks and congratulates Chairman (Kevin) Martin, his fellow Commissioners and their staff, as well as the hard-working staff of the Public Safety and Homeland Security Bureau and Wireless Telecommunications Bureau, for the incredible effort that went into this order," APCO International President Willis Carter said. "We are still analyzing the specific details of the document, but we fully support the FCC's core decisions and the critical steps taken to promote a nationwide public safety broadband network."

Amateur License Renewal Denied After Repeated Violations

An Evansville, Indiana, radio amateur's license renewal has been denied by the FCC for "intentionally interfering with radio communications; broadcasting without communicating with any particular station; causing interference on amateur repeaters; using amateur repeaters without authorization, and using indecent, slanderous or harassing language."

David O. Castle, WA9KJI, was first notified by the FCC to "refrain from using the repeater system operating on 146.79/146.19 and 147.15/147.75 MHz," stemming from a complaint by the trustee of the Tri-State Amateur Radio Society, W9OG."

According to a report in the *ARRL Letter*, the FCC later notified Castle that it was designating his license renewal application for hearing in the wake of alleged misconduct extending

(Continued on page 83)

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Digital Two-Way Radio Technology Reaches Consumer Market

Frequency-Hopping Spread-Spectrum Trickles Down To The Mainstream

by Bernard Bates

For over a quarter century, *Popular Communications* has progressively covered developments in CB, GMRS, FRS, and MURS because they've been the most popular forms of personal two-way radio communications. Now a paradigm shift is about to dramatically change how we communicate via two-way radio, thanks to developments in digital frequency-hopping spread-spectrum (FHSS). This represents a logical progression in the trend from analog to digital radio that has so changed the cellular radiotelephone industry and numerous local, state, and federal two-way radio systems.

To see where we're headed with personal two-way radio communications it's helpful to look back at its history, so we'll briefly cover its evolution. We'll also explain some of the reasons behind the emerging trend from analog to digital personal two-way radio communications, while examining the greater capabilities and advantages digital radio offers (as well as its potential downsides).

Personal Two-Way Radio History

Analog two-way radio has been around for over a century, first using Morse code (CW) and later voice communications using amplitude modulation (AM) technology. But the average consumer had no readily accessible form of personal two-way radio communications until over half a century later, when CB radio entered the scene. What followed was a series of evolving popular communications explosions, demonstrating that the American public has an insatiable appetite for low-cost, portable, two-way radio communications options. The evolution of these communications options is accelerating and is poised to enter a new era.

Citizens Band (CB)

The first popular two-way radio service used by the general public (without any required technical exams, such as Amateur Radio requires) was the Citizens Band Radio Service, which was originally created by the FCC in 1958 by reallocating much of the 11-meter amateur radio band's 27-MHz frequencies. CB became a staple of personal communications for millions of Americans, and it skyrocketed in popularity during the 1970's CB culture craze. But its relatively long 11-meter wavelength made handheld CB radios unwieldy with their long antennas, so CB was relegated primarily to vehicular use.

CB's amplitude modulation makes it vulnerable to noise problems from electrical devices like vehicle ignition systems, electric motors, light dimmers, computers, etc.—much like regular AM broadcast receivers are. And an annoying AM heterodyne whine is heard when receiving simultaneous CB transmissions. Other issues that have plagued CB include an 11-year sunspot cycle, which at times propagates so many distant 27-

Bernard Bates holds a certificate in Telecommunications Engineering from Penn State University. His interests include radio communications, volunteering, and lunar astronomy.

Actress Hedy Lamarr is the mother of FHSS (Frequency-Hopping Spread-Spectrum) communications. Her secret pioneering work during WWII laid the foundation for a communications revolution that touches most of us every day, but she never received any compensation for its commercialization.

MHz skywave signals (or "skip") that the background noise level can greatly reduce CB radio's usable range to a fraction of the service's intended five miles.

Channel overcrowding was addressed in 1977 when the FCC increased the number of channels from 23 to 40, but that didn't help much as the number of CB users increased. To be heard over the crowd, some CB users resorted to violating the FCC's 4-watt RF power limit with illegal "linear" RF power amplifiers. This created more interference that also affected users of other radio services, including TV viewers. The problem became so bad that Congress enacted a law permitting local police jurisdictions nationwide to investigate and stop these CB-related RFI/TVI problems. Predictably, lack of police expertise and training exacerbated what was an ineffective approach to begin with.

Originally the FCC required CB operators to be licensed, but eventually gave up on that, along with the enforcement of other CB regulations, due to a lack of resources. Privacy is nonexistent with CB radio; the NSA even squelched a 1977 patent application for a scrambling device that would prevent casual eavesdropping on CB conversations.

General Mobile Radio Service (GMRS)

GMRS appeared to be an answer to the seemingly insurmountable problems with CB. Although GMRS had also been around for decades, its use of 23 UHF frequencies in the 462- and 467-MHz bands and its frequency modulation (FM) once made the cost of entry rather expensive. A personal GMRS license cost $75 and GMRS radios once cost hundreds more. GMRS shared many characteristics of most commercial and government two-way radio systems of the latter part of the 20th Century: FM provided clean-sounding audio with relatively little interference, and its capture effect let users hear only the strongest signal without those annoying AM heterodynes.

Higher power limits and the authorization of repeaters allowed even low-power GMRS radio users to communicate with others across dozens of miles. GMRS's shorter 65-centimeter UHF wavelength made compact antennas on handheld transceivers possible. Privacy is nonexistent with GMRS, but unlike CB, users of GMRS can choose to hear only desired transmissions by setting all radios in their group to an identical CTCSS tone encoding/squelch setting. The FCC requires GMRS users to be licensed, but a later development in personal two-way radio communications would cause mass violations of this regulation.

Family Radio Service (FRS)

In 1994 RadioShack saw a burgeoning market opportunity for low-cost, low-power, license-free UHF handheld radio transceivers for families, outdoor enthusiasts, and small businesses needing to communicate up to a mile or two away. In 1996 the FCC largely embraced and granted RadioShack's request and established the Family Radio Service (FRS). Fourteen FRS frequencies were allocated; seven channels in the 467-MHz band, plus seven more in the 462-MHz band were to be shared with incumbent GMRS users.

RF power output is limited to 500 mW (one-half watt) into a permanently attached low-gain antenna. This effectively limits FRS radio configurations to portable handheld units for communicating over relatively short distances, despite FRS radio marketers' exaggerated claims about many miles of usable range with their products. FRS repeaters are disallowed.

TriSquare's TSX-300 and Motorola's DTR-410 FHSS radios—the dynamic duo of the digital domain! Now the general public can get in on the FHSS radio action.

Like CB and GMRS, FRS offers no privacy (don't be fooled by the description of the standard CTCSS tone encoding/squelch feature as "38 Privacy Codes").

Industry analysts have estimated that 50 to 80 *million* FRS/GMRS radios have been sold in the United States. (The author purchased one for a mere $5 at a national drugstore chain.) Not surprisingly, in urban areas and at crowded events, the FRS/GMRS channels are often in a state of congested anarchy. Meanwhile, many of the approximately 80,000 licensed GMRS users lament that their once well-managed radio service has been "trashed."

Multi-Use Radio Service (MURS)

MURS is the most recent personal two-way radio service, established by the FCC in late 2000 as "a private, two-way, short-distance voice or data communications service for personal or business activities of the general public." MURS provides license-free use of three VHF frequencies in the 151-MHz band, plus two frequencies in the 154-MHz band. RF power output is limited to 2 watts, but external gain antennas are permitted.

While MURS repeaters are disallowed, the higher power level and the ability to use gain antennas—including fixed and vehicle-mount antennas—can give MURS users several miles' farther range than FRS. Therefore MURS has found a niche market for certain users, even though personal two-way radio industry sales figures indicate the popularity of MURS is much lower than that of CB, GMRS, and FRS. As with those services, there is no privacy with MURS communications.

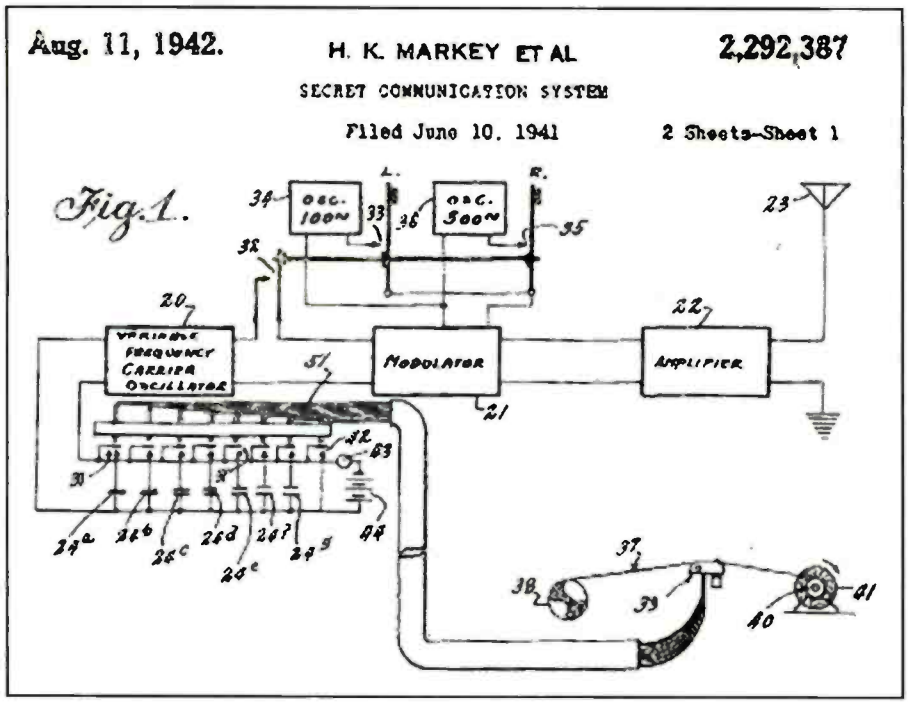

Figure 1. Hedy Lamarr used her married name, H. K. Markey, on her 1941 U.S. Patent application for a "Secret Communications System." Her brilliant concept wasn't formally acknowledged in public until the Electronic Frontier Foundation presented her with a special EFF Pioneer Award in 1997.

Analog Aggravation?

So far, every form of personal two-way radio communications mentioned here shares the following problems:

- Electrical interference
- Propagation interference (skip)
- AM/FM mode interference (heterodynes; multipath fading)
- Insufficient channels; overcrowding
- License cost & usage restrictions
- No privacy of communications

While not all users are bothered by the above, for those who are, digital radios—or more specifically FHSS radios—offer potential solutions.

FHSS To The Rescue

FHSS is nothing new. Surprisingly, actress Hedy Lamarr and composer George Antheil co-patented the concept in 1942 (see **Figure 1**). Their intended application used something like a player-piano roll to rapidly switch frequencies and make radio-guided torpedoes difficult for enemies to detect and jam. But FHSS probably wasn't used tactically until 1962, when the U.S. Navy used it to coordinate its blockade during the Cuban missile crisis.

The COMSEC (Communications Security) and interference-rejection potential of FHSS worked well then, and has been refined ever since for both military and civilian applications. TDMA (time division multiple access) and CDMA (code division multiple access), both used in many cellular/PCS and digital cordless phones, as well as the ubiquitous 802.11 wireless networking, are all forms of FHSS—but faster microprocessors have replaced the piano rolls.

Until recently, handheld FHSS transceivers cost well over $1,000 and were primarily purchased by big-budget users like government agencies where cost isn't a primary concern. But now they're available in a relatively inexpensive, license-free package.

Again, for personal and business radio applications this is merely a logical extension in the trend from analog to digital radios, which has already occurred with cellular/PCS and many government two-way radio systems. Spectrum efficiency, interference rejection, and communications security are some of the benefits. There are downsides, too, however: Digital voice communications have noticeable audio latency due to digital signal processing (DSP), low fidelity, and audio artifacts (robotic-sounding audio) that users of Nextel and digital cellphones are all too familiar with.

The Theory Behind Frequency Hopping

Frequency-hopping radios transmit briefly on one frequency, and then hop rapidly through numerous other frequencies in a pseudorandom pattern. Each pattern represents a virtual "channel," and a radio can have a very large number of patterns or channels programmed into it. Frequency hopping allows large numbers

A Word On Unlicensed Spectrum

The new personal digital two-way radios hitting the consumer market are *not* the result of a new radio service offered by the FCC, but they do take advantage of a long-existing chunk of unlicensed UHF spectrum called the 900-MHz ISM (Industrial, Scientific, and Medical) band. These frequencies between 902 and 928 MHz were allocated by the FCC in 1985 for unlicensed consumer radio applications, such as cordless telephones, baby monitors, wireless video cameras, etc., and for various industrial and medical applications. It is also shared by the Amateur Radio Service as the 33-centimeter band.

Since late 2000, FCC Part 15.247 regulations have permitted 1-watt FHSS voice communications in the 902- to 928-MHz ISM band if certain technical conditions are met, like using at least 50 hopping frequencies with the average time on any one frequency less than 400 ms during any 20-sec period. But until fairly recently it wasn't cost-effective to build personal digital two-way radios using sophisticated FHSS technology. Recent developments in DSP and software-defined radio technology now make it feasible to design and build personal FHSS two-way radios for a tiny fraction of what it would have cost back when this FCC regulation took effect.

Unlike CB, GMRS, FRS, and MURS handheld transceivers, these new personal FHSS two-way radios look more like a Nextel iDEN (for integrated digital enhanced network) phone or a cellphone, and have more digital electronics than radio inside them.

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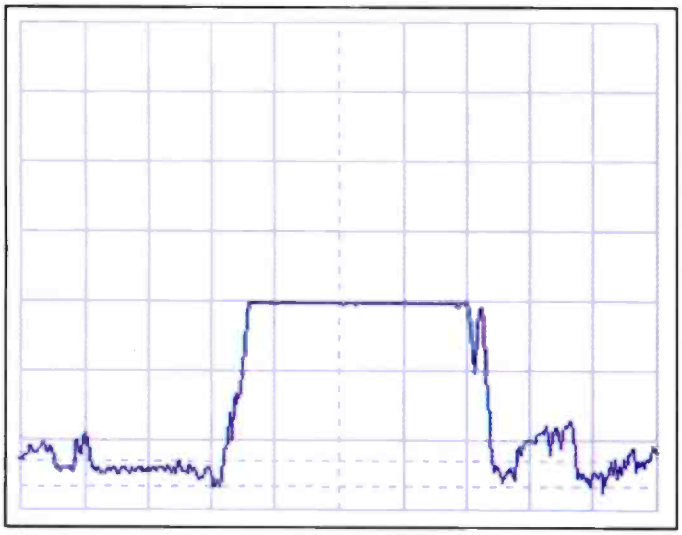


Figure 2. The TriSquare TSX-300 FHSS signal (30-sec cumulative sample). Rapid pseudorandom frequency hopping across the 902- to 928-MHz band can't be heard on scanners. A synchronization signal can be seen near the band edge.

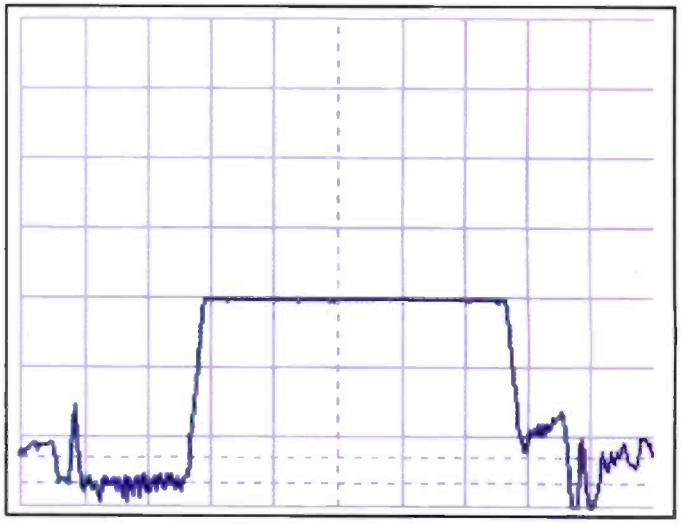


Figure 3. The Motorola DTR-410 FHSS signal (30-sec cumulative sample). Rapid pseudorandom frequency hopping across the 902- to 928-MHz band is nearly too fast to see on a spectrum analyzer—or be heard on a scanner.

of transceiver pairs or groups to simultaneously communicate in a given area, because of the large number of frequency patterns or channels to choose from. The pseudo-random selection of hopping frequencies flattens out the total signal energy across the entire band, minimizing interference between large numbers of concurrent users (see **Figures 2** and **3**).

This can be a huge advantage over traditional fixed-frequency narrowband AM and FM radios (see **Figure 4**) which have a relatively small number of channels from which to choose. Frequency hopping also provides much better interference rejection than traditional fixed-frequency narrowband AM and FM radios; the rapid hopping over a wide range of frequencies means no interfering signal can substantially affect the communications. (It's kind of like diversifying your investment portfolio: if a small number of your many diverse investments do poorly, the others will keep you from losing the farm.)

A common problem with traditional fixed-frequency narrowband FM radios is multipath fading (commonly known as picket-fencing), but it, too, can be largely eliminated by rapidly hopping across different frequencies. Because each frequency has a different multipath effect, multipath fading on one frequency will not affect the other frequencies.

Each time a FHSS radio transmits, and depending on the "channel" it is set to, the radio begins transmitting a signal that other radios listen for to determine if the transmission is for them (based on the transmitted ID code). If it is, the receiving radio acknowledges itself to the transmitting radio, and the radios negotiate and synchronize a shared frequency-hopping sequence.

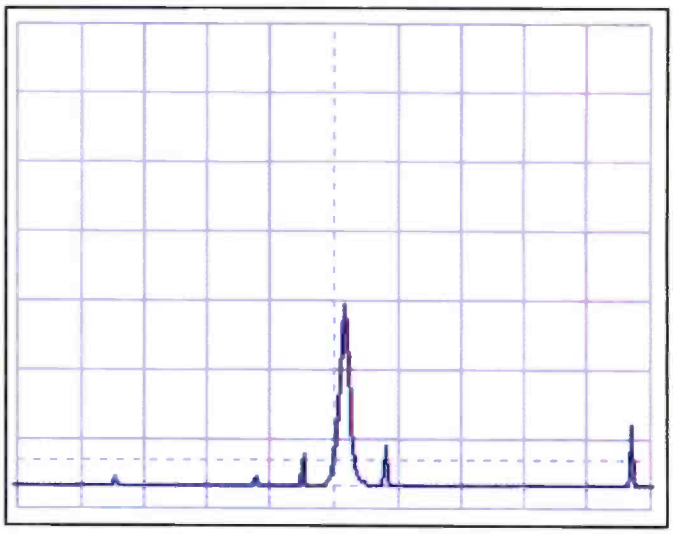


Figure 4. Typical low-end FRS/GMRS narrowband FM signal (real-time sample). Has this popular consumer analog two-way radio service become a victim of its own success?

Digital IDs And TalkGroups

The new personal digital two-way radio models hitting the market are manufactured with a unique 10- or 11-digit ID code, or require the user to program one in. This ID code identifies that radio to the other radios on a network. This ability of these radios to uniquely identify themselves allows users of some FHSS radio models to set up private talkgroups. You can set up private communications between specific groups of radios, or just between two radios ("fleet management" is a buzzword for this). If you're managing separate teams of people who don't all need to hear each other on a big party line, this can be very useful. Of course, you can also establish public talkgroups in which everyone hears everyone else.

An alphanumeric name like Frank or Warehouse can be associated with each ID code to allow that radio (or group) to be easily selected from a calling radio's navigable menu, similar to looking up a contact on a cellphone. When receiving a transmission, the name or ID code for each calling radio shows up like caller ID. Some radio models even let you associate unique "ring tones" for audibly identifying specific radio callers.

Affordable FHSS Radios

One such radio comes from a familiar source: Motorola (www.motorola.com). The company's DTR-410 uses FHSS with the VSELP (Vector Sum Excited Linear Predictive)

vocoder, the same vocoder used in Nextel's iDEN phones. A vocoder converts voice to data and vice versa, similar to a computer modem, but it also reduces the resulting bit stream by approximating the human voice with a computer algorithm. The result is that your communications will be more reliable but have less voice fidelity.

The DTR-410 has an 11-digit ID code and is limited to six virtual channels and public talkgroups. It can be cloned with a cloning cable. Motorola claims a two-mile range and penetration ability through 25 building floors. It's intended for the business market, but anyone can purchase it from resellers for a street price of under $240 per radio. Higher-end DTR models are available with more features at a higher cost.

Another offering comes from TriSquare (www.trisquare.us), which has been designing and manufacturing two-way radios since 1999. Its TSX-300 uses FHSS, but rather than a vocoder, employs a proprietary narrowband FM modulation technique. The radio uses a 10-digit ID code, can reportedly emulate *10 billion* virtual radio channels, and can be used in both public and private talkgroups. This radio can be cloned over the air at short range. It also supports text messaging to individuals and groups of TSX-300 users and has a NOAA weather receiver (without SAME).

TriSquare refuses to make specific operational distance claims, and instead claims the usable talk range of its radios will equal or exceed *any* other portable UHF two-way radios in most cases—even 5-watt models. TriSquare has very ambitious plans to overtake the FRS/GMRS market with its eXRS radios over the next two to three years, which would be quite a feat. The TSX-300 is intended for the consumer market and can be purchased from retailers for under $140 per pair. A lower-end model is available at a lower cost.

Interoperability And Communications Security

Motorola's and TriSquare's radios are not interoperable with each other and use proprietary modulation schemes. This is one downside of personal digital two-way radios. Conversely, analog narrowband FM radio is by its nature an open standard that any manufacturer can build and sell for interoperation with their competitors' radios. Not so with digital radios.

At the same time, proprietary modulation schemes provide a form of communications security-through-obscurity. Patent and licensing issues will likely prevent scanner manufacturers from ever releasing models that will demodulate these radios' communications.

Personal Digital Two-Way Radio And The Future

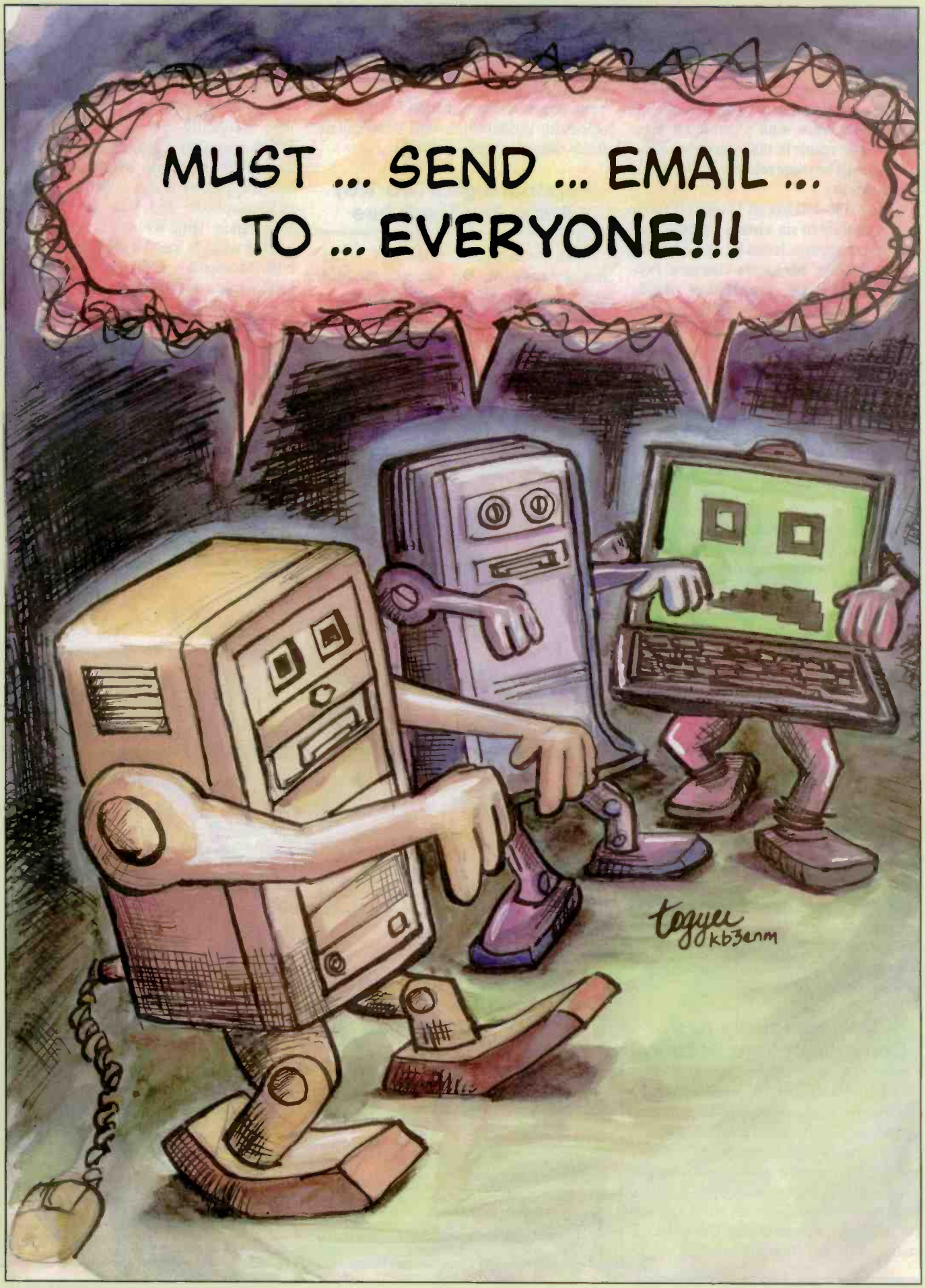
One could argue that the FCC's various attempts over the years to establish personal two-way radio communications services were largely failures of their own success. Eventual channel overcrowding and mass unlicensed use of licensed services has turned many users away from various personal two-way radio communications services, but digital radio technology could change that.

According to TriSquare, and the Kansas State University engineering study it commissioned, more than *100,000* eXRS users within talk range can enjoy uninterrupted communications. Several dozen FRS/GMRS users in the same physical space could render that band unusable. Channel overcrowding, as we know it, may become a thing of the past.

Spectrum overcrowding elsewhere may eventually spur the FCC to permit FHSS operation in other parts of the two-way radio spectrum available to consumers, just as it did with the cellular radiotelephone and 902- to 928-MHz ISM bands. Time will tell.

But what is known right now is that both Motorola's DTR and TriSquare's eXRS radio technologies use different and interesting approaches to some inherent problems with analog two-way radio. This represents the beginning of a dramatic development in the evolution of personal two-way radio communications.

Editor's Note—Look for reviews of Motorola's DTR-410 and TriSquare's TSX-300 radios in an upcoming issue of Pop'Comm.


MUST ... SEND ... EMAIL ...
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kb3enm

Zombie Army Of The Un-dead Computers!

How Intruders Can Hijack Your Personal Computer For Crime, Profit, Or Even Cyberwar

by Joe Cooper

In 1968, a student attending Carnegie Mellon University in Pittsburgh, Pennsylvania, by the name of George A. Romero, wanted to make some extra money. Being interested in filmmaking, he began producing TV commercials and industrial films in his spare time and the endeavour became a success. He and a group of friends were soon running a full-time business, but, being young, they wanted to do something more exciting than make commercials about used cars and soap. What they really wanted to do was make a horror film and, by using their connections in the film business, they were able to borrow $114,000 to do so.

To keep production costs down they used black and white film, which allowed the use of ordinary chocolate syrup as a substitute for authentic theatrical red blood, which was expensive. Movie critics of the day hated the film for its violence and poor production values, but the public loved it, and it eventually grossed over $42 million.

Despite its flaws, there was something special about the story, so much so that, in 1999, the Library of Congress entered the film into the United States National Film Registry along with other films deemed "historically, culturally or aesthetically important." The reason, plain and simple, was that this cheap horror movie came to define in the public mind the Zombie archetype that we still cringe at today!

A Little Back Story

The film in question was, of course, *Night of the Living Dead*, where Barbara, Ben, and a small handful of survivors fought off reanimated corpses while trapped in a small farmhouse in rural Pennsylvania.

What made the story so compelling was the fact that anyone could become a Zombie since they were "recruited" from live people. Good, bad, young, or old, everyone was vulnerable to becoming a Zombie, and all it took was for a person to be bitten by a Zombie! Almost immediately that "bitee" died, was re-animated and lurched around with one goal: find another person to bite!

What made the movie so scary was how determined the Zombies were to make more of themselves.

Getting rid of a Zombie was no picnic either, as they were already dead. The next thing you know—everyone's a Zombie!

What Is A Zombie And How Does Your Computer Become One?

Now you might just want to laugh this story off as a bit of cheap filmmaking that only appeals to those who like to sit in the dark watching scary stories. But what if I told you that right here, right now, all around the world *and* right in your own neighborhood, there is an army of Zombies who are at this moment planning to attack you!

No, you don't have to worry about your neighbors or friends dropping by to take a bite out of you. But if you have your home computer hooked up to the Internet, it is truly vulnerable to a very real army of living-dead computers!

You may already be aware that your computer can become infected with a software virus that can damage valuable files and crash hard drives. But did you also know that a specialized virus can hijack your computer, turn it into a Zombie, and then use it to attack other computers, just like Zombies attacked people in the movie?

This is a serious issue of national security. In fact, in 2004 roughly 64 percent of the businesses around the world that use the Internet were deliberately attacked through the use of Zombie computers. This was an increase of *45 percent* over 2003. Even the U.S. military is under attack from the Internet. According to Maj. Gen. Dave Bryan, vice commander of the Defense Information Systems Agency, in 2003 there were 25,000 documented attempts to attack defense systems computers. More importantly, 245 of these attacks were successful because some military personnel failed to follow computer security protocols.

At one time teenagers and young adults looking for an exciting way to play with computers undertook these attacks. Called "hackers," they would sometimes use crude and amateurish methods to hack their way into a computer system, often by brute force methods. Today, however, sophisticated and highly trained computer specialists called "intruders" are making big money working for rogue governments, organized crime, and terrorists to carry out these attacks.

Who Are Computer Intruders?

Rather than simply causing annoying pranks or minor damage the way hackers once did, these intruders are focusing their efforts upon having full access to entire computer systems. Intruders employed by organized crime aim to embezzle money, steal secret information, harvest identities and personal information, and sabotage the operation of entire networks in often sophisticated and hard-to-detect ways.

Joe Cooper has been using personal computers since the late 1970s and is head technical writer for a software development company.

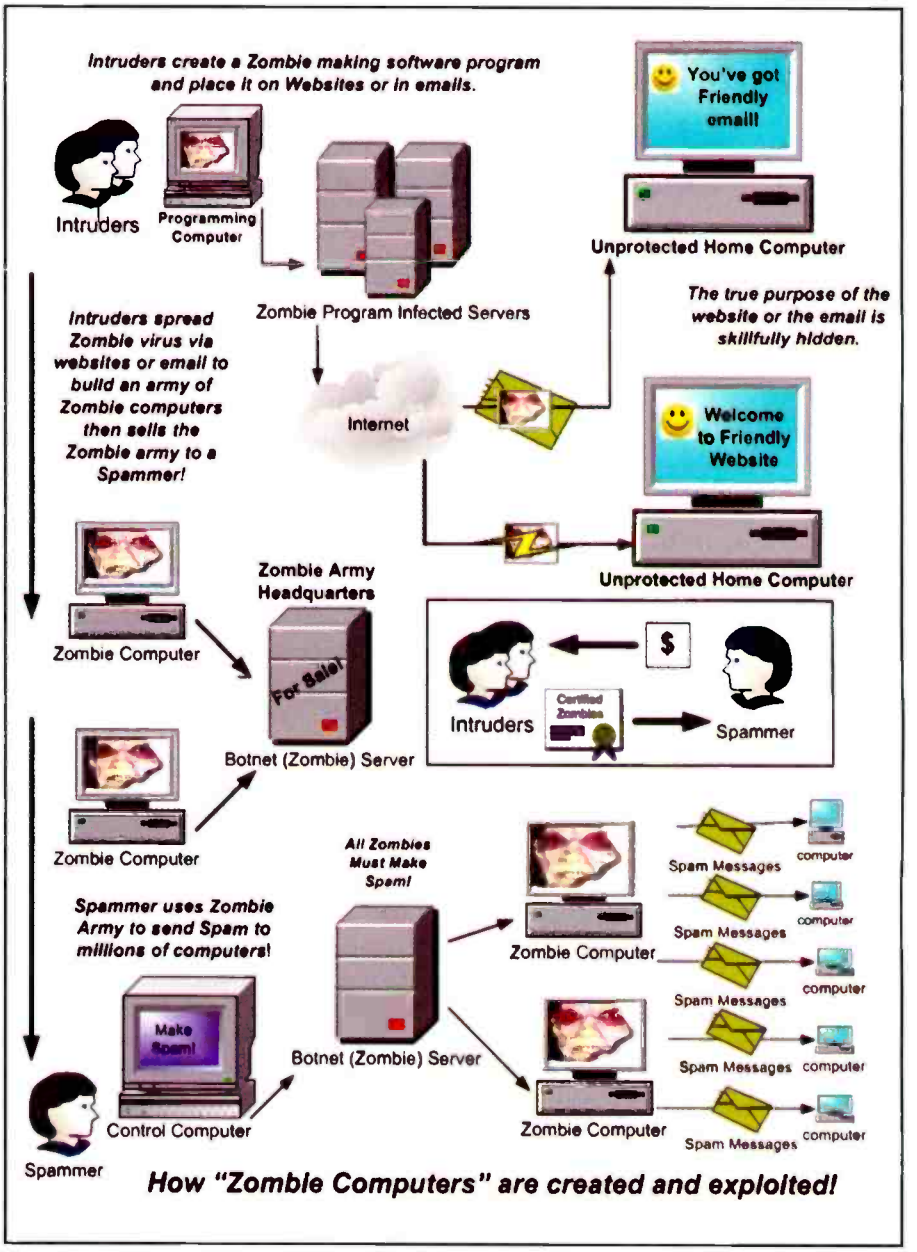
Intruders connected with terrorist groups, organizations, and governments are intent on doing the same things as those employed by organized crime, but go one step further. That is, they are also intent on damaging or crippling computer systems and costing businesses and governments billions of dollars in repairs.

This year the world saw its first real example of a true "cyberwar," which was carried out against the country of Estonia this past spring. When the government removed a statue honoring Russian soldiers from WWII, a series of coordinated attacks were unleashed on the computers of the Estonian government. For three weeks, computer attacks against the office of the president, the Estonian parliament, and the country's largest bank nearly reached the point of bringing the country to a standstill. While Russia denied any involvement in the attacks, experts in Internet security were able to trace the source of the attacks to a computer located inside the Kremlin!

This type of computer attack is known as a distributed denial of service, and it involves hitting a website with a vast number of requests from many sources for information from other computers. As the server tries to respond, the volume of requests multiplies so rapidly that the server is overwhelmed, causing the system to slow or crash.

The security experts who were brought in to help the Estonians discovered something about the attacks that disturbed them immensely. While the orders for the attack were being sent out from the computer in the Kremlin, ordinary computers from all over the world were conducting the assaults.

These computers had been infected with programs that transformed them into an unwitting army of Zombie soldiers—and almost one third of them were in the United States!



This illustration shows the life-cycle of a Zombie computer—how it's created by intruders, sold to spammers, and then used to send out thousands, if not millions, of spam email messages. And all the while the computer owner is completely unaware of the use to which the equipment is being put.

Zombie Software Infections!

A Zombie computer is created when someone unwittingly opens a harmless-looking email or visits a very ordinary website after clicking on a link or pop-up. If the email or link was *not* so harmless the computer becomes infected by a specialized computer virus called "malware." Normally this type of infection can be avoided, but far too many people do not use the proper software protection needed to stop this infection from happening.

Once it's made its home in the computer, the malware program waits for a special signal, such as the one that was sent out by the Kremlin, to suddenly spring into action.

What makes the matter even worse is that the owner of the computer may not even be aware of the infection and that it's being deliberately "recruited" by intruders. At most the user might feel his or her computer is running a bit slower than usual, or that the activity light on the modem connected to the Internet is flashing more often than normal. But these signs are so minimal that an estimated 150 million Zombie computers are in operation today around the world without their owners having any clue of their equipment's "secret life."

Intruders are now exploiting vulnerabilities that may exist on your computer's operating system (such as Windows XP or Vista) that allow them back-door access to your computer via software ports. A software port (usually just called a "port") is a virtual data connection used by computer programs to exchange data directly to another computer, rather than going through a "formal" exchange of files that would be visible in some way. The most

common of these are the TCP and UDP ports that exchange data between computers on the Internet.

The reason intruders are doing this, according to the U.S. Department of Homeland Security CERT (Computer Emergency Readiness Team), which is tasked with monitoring attacks on computer systems around the world, is that it is simple to do. While corporations, governments, and the military spend millions on network security blocking access to these computer software ports, most home computer users are only vaguely aware that ports even exist, and as a result, they're the least prepared for such attacks. So rather than try to battle with computer experts, intruders take the path of least resistance and simply let the unwary home computer user infect their systems through bad computer practices. This can lead to situations ranging from something as simple as providing a spawning ground for computer viruses and worms, to as severe as the complete outside control of the compromised computer by an intruder, such as the one operating from inside the Kremlin.

So all an intruder needs to do to recruit a new Zombie computer is to give one a figurative "bite' in order to infect it. Once that occurs, the software used to infect the computer will find an open computer port on that computer that can then be accessed by the intruder over the Internet.

How Zombie Computers Become Armies Of The Un-dead

Most people with an above average understanding of home computers know that there are common ports, such as the ones used for connecting to their printer or video monitor. However, there are actually hundreds of ports built into your home computer that perform a wide number of tasks, such as allowing you to connect to the Internet. Most of those ports are only used by special computer software or are accessible to people with advanced knowledge of computers.

As previously mentioned, in order for a computer to become a Zombie it must first have been "bitten" and infected. Once the computer is infected, intruders can use software programs on their own computers to communicate with their Zombie computers, or find ones that are created by other intruders. Once that's done, they can remotely control these computers without the owners knowing—even if they're sitting at their keyboards using them—and have them attack other computers.

"So now you know that an intruder can take control of a home computer via a computer port, but just how do they do it?"

The intruder can link individual Zombie computers together into a botnet, or robot network. Once created, the intruder then sells the botnet to any number of people who are interested in putting the Zombies to work on a wide variety of tasks. These tasks can range from emailing spam, searching for identity information on other computers, and even taking part in cyberwars, such as the attack in Estonia this year. The sad truth is that it's a very lucrative business for intruders to create Zombie Armies using people's home computers, and millions of dollars change hands on a regular basis.

Tools Of The Intruder's Trade

So now you know that an intruder can take control of a home computer via a computer port, but just how do they do it? Generally, intruders exploit what's known as computer "vulnerability." Vulnerability is anything within your computer system that allows an intruder access, sometimes called "exposure."

There are two broad groups of vulnerabilities that exist within a home computer: network security and virus attacks.

In the case of network security, there are many design flaws in your computer's operating system (particularly Microsoft Windows) that an intruder can take advantage of in order to gain control. For example, over the past year Microsoft has discovered at least one major security flaw *per week* in its software and operating systems. This also includes their newly released Windows Vista, which was supposedly designed to be "hardened" against vulnerabilities.

There may also be weaknesses in the way in which computer security is enforced by your computer that can allow an intruder to see information about your computer, particularly its network identity. This is something over which you have direct control and you need to properly set up protection and monitor that on a regular basis.

Then there is the computer virus, which has come to refer to several different types of attacks that can take place within your computer system. In general, a true computer virus is a software program that can run itself (often causing damage to your computer system) and then reproduce itself so that it can infect other computers. There are also other types of software-based threats, such as worms (which simply reproduce themselves over and over, taking up computer processing power and system resources) and Trojan horses (which hide within other programs and, when run, allow intruders to remotely control a computer, causing malicious damage to other computers).

Most people are now aware that many types of computer viruses are transmitted through the Internet via email. However, an increasing number of these types of programs are now being placed in computers when people "surf the Web" with an Internet viewing program, such as Microsoft's Internet Explorer.

Because many people now have antivirus software installed on their computers, intruders are increasingly employing a new weapon, called spyware. This is a type of software installed onto your computer, without your knowledge or permission, when you visit a website.

Spyware can be installed on your computer in several ways, with the most common being through software "cookies." Normally these "cookies" are harmless and are used by websites and Web browsers to communicate with each other. However, intruders can also use the same method that deposits a cookie onto your computer to deposit software that can take a more active role in your hard drive, such as monitoring your activity while you operate it. This is spyware.

Once spyware is installed, an intruder can simply track the Internet sites you visit, or actually take remote control of your computer.

Some intruders also use websites to plant Trojan horse programs on your computer as well.

There's also a threat hidden in those annoying pop-up windows that often appear when you visit a website. Because of how these pop-ups were first designed, a good computer programmer can hide a malicious computer program within them that may not be detected by anti-virus software. You may be the person who sets

Each month, we select representative reader letters for "Our Readers Speak Out" column. We reserve the right to condense lengthy letters for space reasons and to edit to conform to style. All letters submitted must be signed and show a return mailing address or valid e-mail address. Upon request, we will withhold a sender's name if the letter is used in "Our Readers Speak Out." Address letters to: Edith Lennon, Editor, Popular Communications, *25 Newbridge Road, Hicksville, NY 11801-2909, or send email via the Internet to editor@popular-communications.com.*

Want To Contribute?

Dear Editor:

I've been thinking that I'd like to write an article for *Popular Communications*. I've been a reader of your magazine for a very long time and have been involved in the hobby even longer, so I have some ideas and experiences that I think your readers might be interested in. What's the best way to go about submitting an article for publication?

Davis Trumbull
Via email

Dear Davis:

You've actually already taken the first and most important step: familiarized yourself with the magazine, its content and its style. The next step is to sit down and put your ideas in writing, being as specific as you can about what you would want to say in an article-length piece. At this stage, you're just selling your idea so you want to present a very brief summary—what we call a "pitch" in publishing. You can certainly send your pitch via regular mail to the address above, but if at all possible, I strongly request that you contact me via email. Then we'll take it from there.

Of course, if you already have a completed article, by all means send it in.

And that goes for any other would-be contributors out there...

—Editor

Camera Shy

Dear Editor:

I've noticed that the "VIP" feature, with a picture of some reader's monitoring post, hasn't been in the past few issues of *Popular Communications*. I hope that this isn't totally gone, because I really like it.

I always enjoy seeing other people's radio setup. They're almost always better than mine, but I enjoy thinking about someday having such a monitoring post.

I really enjoy your whole magazine too, except for when there's too much politics. I try to avoid the whole political mess as much as I can. I don't trust any of them, and I don't expect that to change anytime soon. It seems like about all they want to do is make my scanners and scanner listening illegal, and take more money from me.

But I like my radios, and all your great articles on radios and radio monitoring.

Chris
Via email

Dear Chris:

Thanks for the kind words about Popular Communications. *We're very glad you enjoy the magazine. Yes, you're right about the "V.I.P. Spotlight": it hasn't been in the last few issues. It seems our readers are a little camera shy. I'd like to see it come back, too, but until the V.I.P.-ers send something in...*

So how about it, readers? Let's not disappoint Chris.

—Editor

A Radio Brake?

Dear Editor:

I reread the "Tuning In" in the August 2007 issue. If this proposal [New Jersey's State Legislature's to expand the prohibition against the use of electronic devices while driving to include *listening* to electronic communications devices] is passed into law does this mean that any police officer must STOP his vehicle chase to use his radio?

Tom Price, KI4CVU
Via email

Dear Tom:

Good point. Let's file it in the "Be Careful What You Legislate..." drawer. As you no doubt know by now, that bill did indeed pass, but with an exemption for amateur radio. Luckily, you're a ham and can take full advantage of that exemption. Perhaps that's an idea for the cops as well...That's one way to expand the hobby.

—Editor

"The question then is how you protect your computer from the real threat of intruders other than completely disconnecting your computer from the Internet."

off that malicious program by clicking on a trigger in the pop-up, such as the one that says, "click here and win a free prize."

Worse yet, there are rogue pop-ups and websites that claim they'll provide you with a "free anti-spyware scan" that will allegedly check for such programs, but actually install them!

How To Protect Your Computer

The question then is how you protect your computer from the real threat of intruders, other than completely disconnecting your computer from the Internet. In an upcoming feature I'll outline a complete arsenal of very effective weapons that you can use to fight off intruders.

No, you don't need garlic, a wooden stake, or a sub-machine gun to keep intruders out of your home, but rather some very basic software, much of which is either free or already provided in Microsoft Windows. The truth is that most people already have the tools that they need already installed in their home computer or laptop, but they simply don't turn them on. There are also free software packages available for download from the Internet that will provide you with extra protection to compliment the measures you may have already taken.

But don't think that by simply having anti-virus software on your home computer means you're fully protected. You must learn how to implement an effective personal strategy to help keep your computer safe from compromise, for your own safety and that of the United States as well. This is a real opportunity for you to play an active role in helping to maintain a real measure of homeland security in the United States and in helping to prevent actual criminal or terrorist attacks on your country.

Meanwhile, the next time you sit down to work at your personal computer, pause to wonder: Are you really in control, or is your trusted equipment really the unwitting Zombie slave of an intruder or spammer? ■

Thanks For The (Digital) Memories

The Future Of Technology Actually Has A Pretty Cool Past

by Tom Swisher, WA8PYR

Have you ever taken a stupid pill? Remember the scene in the movie *Johnny Dangerously* when Johnny (Michael Keaton) hangs Danny Vermin (Joe Piscopo) on a hook, to which Danny replies "You shouldn't hang me on a hook, Johnny. My father hung me on a hook once. Once!" Well, I took a stupid pill once. Once. The result has been involvement in a pretty fascinating aspect of the monitoring hobby.

That stupid pill resulted in my acquiring a Model 15 teletype machine. If you're one of our younger readers, you might be asking "a what?" You probably know it, though. It's that large, ugly, noisy, clattering, dinging green or gray box spewing forth reams of yellowish paper in the back of the newsroom on so many movies and television shows. Yes, they really do make that clattering noise, and even an occasional series of "dings" from the bell!

Teletype was originally implemented by connecting the machines through a telephone circuit, and transmissions were sent by turning a current on or off. Signals were represented by "mark" and "space" conditions; "mark" indicated that the juice was on, while "space" indicated the juice was off. Different characters of the alphabet (as well as numbers and punctuation) were indicated by different mark/space sequences.

Radio is different, of course, since there's obviously no telephone circuit. Teletype modes are handled on radio by either shifting the frequency of the transmitted signal (Frequency Shift Keying, or FSK), or by shifting the frequency of the audio tone being sent (Audio Frequency Shift Keying, or AFSK). Of the two, AFSK is easier to implement, as it simply requires a connection to the microphone and speaker jacks of the transceiver to be used, whereas FSK requires certain modifications to the transmitter.

That Brings Me Back...

My first experience with teletype was in my college ham radio club in 1982. A Model 15 (probably a hand-me-down from the newsroom at the university TV station or newspaper) was resident in the shack, along with a homebrew terminal unit, which allowed the beast to be connected to the radio equipment and used for RTTY (Radio TeleTYpe). I was fascinated with the thing, and made it my goal to make it work again. It took some doing, but I finally got it going, and in short order reams of teletype paper were spewing forth a cornucopia of text from sources as diverse as ham radio operators, the Associated Press and other assorted news outlets, and the military.

Photo A. A Model 15 teletype unit, like the one which once lived in the author's basement. Photo courtesy of Jeff Seidel at www.railroad-signaling.com.

I was hooked, and when a Model 15 **(Photo A)** was offered to me free several years later, how could I pass it up? All I had to do was get it out of its old basement home and into its new basement home, which was quite a task as they're *very* heavy. However, it soon made it to my basement shack along with its terminal unit, was connected to my shortwave receiver, and began spewing forth that fabled cornucopia.

Unfortunately, by this time (around 1990) the cornucopia was getting a bit empty. Many agencies, once mainstays of the RTTY world, had by that time moved to satellite, and the only regular outlets were from third-world and/or communist countries, like North Korea and China, and military metro (weather) stations. While these are interesting to listen to, they're just not quite the same, as they present a pretty one-sided view of world events. It's always nice to hear what North Korea has to say about us loud-mouthed, swollen-headed, imperialist running dog philistines, however...

So, I moved on and acquired a Tono Theta 777 **(Photo B)** terminal unit. This interfaced between the radio and the computer, and allowed me to monitor several more modes other than simply RTTY. To this day, I haven't found anything that

Tom Swisher, WA8PYR, is *Popular Communications*' "Military Radio Monitoring" columnist.

Photo B. The front panel of a Tono Theta-777.

performs as well as that Tono Theta 777; its high-quality filters enabled me to pull many a signal out of radio noise and get good copy.

Foremost among the modes I wanted to try was AMTOR (AMateur Teleprinting Over Radio, also known as SITOR, for SImplex Teletype Over Radio). AMTOR/SITOR was very popular at the time for amateur and maritime use because it incorporates error correction as well as a somewhat higher transmission rate than RTTY. My primary interest at the time was maritime and government SITOR monitoring, and once I got my Tono hooked up, it was like a whole new world. There were traffic lists to ships at sea, grocery lists (including a request for 200 pizza crusts) from those ships, weather warnings, NOTAM (NOtice To Mariners) messages with navigational information, and a whole host of other traffic one might expect. SITOR is still heavily used by maritime outlets today, and can provide a fascinating look at the maritime world.

Crossed Bananas

One nifty feature of the Model 15 and the Tono was their tuning scope. A RTTY tuning scope (also known as an X-Y scope) displays the mark and space signals in the form of a plus sign on an oscilloscope. A perfectly tuned signal shows a very nice fat plus sign, also known as "crossed bananas," in the center of the scope; if you're off frequency the horizontal line (mark) will not be horizontal, and if the frequency shift is incorrect, the vertical line (space) will be off vertical. Once you get tuned in and the mark line is horizontal, simply alter the shift control on the terminal unit until the space line is vertical, and your Model 15 should start chattering away!

While the homemade terminal unit included with my old Model 15 had a built-in scope, the Tono included mark and space filter connections to allow use of an outboard scope (mine is made by the Hal company). Using a scope makes tuning much, much easier, and it looks pretty cool, too.

A La Modes

In the past, RTTY and AMTOR/SITOR were the mainstays of the monitoring world, but today there's an astonishing array of communication modes out there. In addition to RTTY and AMTOR/SITOR, the digital pantheon now includes Pactor and Pactor II, PSK31, Hellscreiber, G-TOR, Clover, MT-63, and a host of others. Another interesting mode worth a look is WEFAX (weather fax). This mode is used to send weather photographs and charts to ships at sea, and while it's not nearly as heavily used as in the past, there may still be some out there worth listening to.

Many of these modes are used by hams, rather than military, government, and commercial stations, but several are still quite popular among the non-amateur users. You never know when WLO Radio will send out a hurricane warning, or the French Navy will all of a sudden start cranking out a clear-text RTTY or SITOR message, but you had better be able to read French!

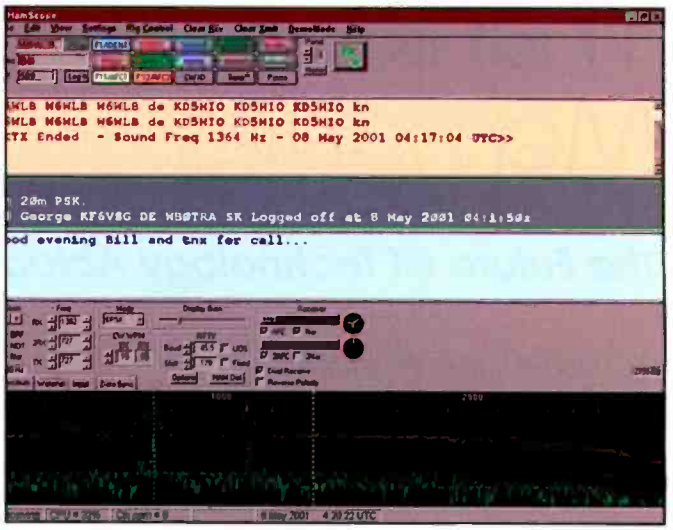


Photo C. A screenshot of Hamscope in RTTY mode from the Hamscope webpage.

Time And IC Chips March On

Making all this possible is the ongoing march of technology. While I still have it, that faithful Tono has been replaced by a host of computer-based programs. Modern decoding programs use the signal processing abilities of modern sound cards, which incorporate a really astonishing array of processing algorithms. All one needs is the software, and a connection from the speaker jack of your shortwave receiver to the input of your sound card. They're quite easy to set up, and many of them will decode multiple modes with the simple click of a mouse.

How do you get started? if you're interested in giving RTTY and other modes a try, check out the AA5AU RTTY Page at www.aa5au.com/rtty.html for an excellent tutorial. The WB8NUT Digital Modes page at www.wb8nut.com/digital.html also has excellent information. An excellent program to start with is Hamscope. Quite easy to use, and free to boot, Hamscope lets you send and receive PSK31 (both BPSK and QPSK modes), RTTY, ASCII, MFSK16, 1200-baud packet, and good old CW. Check out www.qsl.net/hamscope/ for more information and to download the program. Don't forget to check out www.hffax.de/index.html for all sorts of information on WEFAX.

Passing On The Past To The Next Generation

And what did I do with my old Model 15? It took years, but I finally gave it away to someone who was interested in playing with it. And *he* had to haul it from its old basement home to its new basement home. I was glad to get rid of it, as having bought a house I would shortly no longer have a basement—and I'm not even sure the floor of my second-story office would support the weight of something like that, anyway.

And that, boys and girls, brings us to the moral of our story...don't acquire anything that takes up half your basement—you might never be able to get rid of it, no matter how much fun it is. ■

German Wireless Of World War I

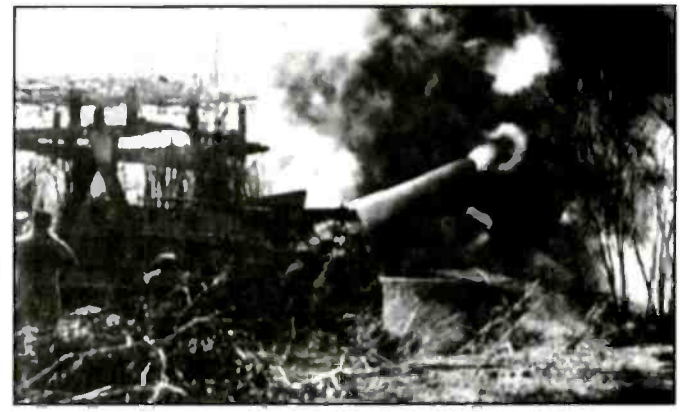
Early Radio Technology Foreshadowed The Force Radio Would Become In Warfare

by R.B. Sturtevant, AD7IL

It was over. At 11 a.m. on November 11, 1918, the four years, three months, and 14 days of the Great World War came to an end. It started when the Austro-Hungarian Arch-Duke Francis Fredrick was assassinated in Sarajevo, and ended in a railroad coach in the forest of Compiegne, France, after Europe was nearly bled white. Twenty-four nations had raised 42,188,810 soldiers and sailors for England, France, and the other Allied Powers and another 65,038.810 souls struggled for Germany and the Central Powers.

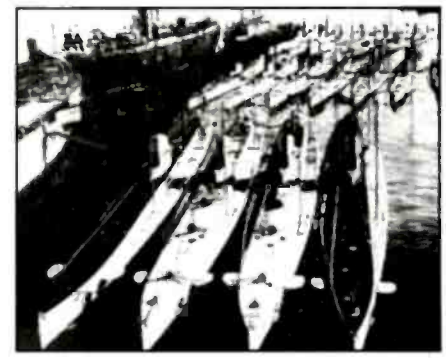
Casualties had amounted to a total of 11,016,000. The Allies lost a staggering 52.3 percent of their total raised forces, and the Central Powers suffered an even greater 57.6 percent of theirs. In all, approximately 7,450,200 human beings lost their lives. The Allies had spent $125,690,477,000 in American dollars of the day. The Central Powers had paid out $60,643,160,000 and were nearly bankrupt.

And what had all this blood and treasure bought? A new map of Europe, a lot of unemployed royalty looking for new homes, and seething hatreds that would lead to another war in about 20 years.



A German 38cm gun fires the first shot at Fort Douaumont in the Battle of Verdun. When the carnage of The Great War was finally over, nearly seven and a half million had lost their lives. (Photos courtesy of The Great War Society's website, Trenches on the Web, www.worldwar1.com)

A U35 running on the surface showing obstruction cables. By simply attaching insulators and an antenna lead, obstruction cables did double duty as antennas.



World War I German U-boats.

From The Mud, Advancement

But had any good come out of the "War to End All Wars"? One benefit did come out of this—as all wars: the improved technology that, when the shooting finally stopped, was put to work making the lives of average people better and more comfortable.

The two most noticeable improvements after WWI were in aviation and communications. The slow evolution of the airplane from the time of Kitty Hawk in 1902 to 1914 gave way to rapid advances at twice the pace during the war years. Telegraph and wireless made at least equal leaps forward, both in the number and quality of sending and receiving stations as well as the number of trained operators.

U-Shack Deconstructed

This improvement was clearly evident when Germany surrendered 122 of her feared U-boats to the Allies. Some of these U-boats wound up in Portsmouth, England. Four of the undersea killers were turned over to American crews attached to the British Flotilla. Not well publicized was the fact that American submarines had been working with the British in European waters for over a year. Among these American sailors was an amateur operator named J.A. Crowdus who, on arrival to inspect the captured U-boats, had three weeks to have a look at the German wireless shack aboard one of the captured U-boats.

The radio shack was in a corner of the central compartment. Everything was, of course, labeled in German, but that only

made the search for the various features into a language lesson as well as an equipment check. After being told by a Lieutenant Commander that he should "not monkey with any of the apparatus, and by no means take any of the instruments apart," Crowdus replied with the customary "Aye Aye Sir!" As soon as the officer left, however, the in-depth exploration began.

Taking the sets apart and putting them back together resulted in some extra parts, but when Crowdus finally finished his job he had gained some interesting insights. The materials and workmanship on the sets was excellent, but the hook-ups were "like a Chinese puzzle." The problem seemed to be that the Kaiser's men were trying to tune the receiver too finely. They had included too many taps, intermediate and standby circuits, as well as variable capacitors with only two plates. As a result the receiver, using German crystal detectors, couldn't bring in as loud a signal as was possible with American equipment.

Also aboard the U-boat was a transceiver that consisted of an undampened receiver, a 2-kW transmitter, and a two-stage amplifier. The transmitter was quench gap, which at that time was replacing spark gap in general use. The transformer and gap ventilating blower were built inside the set, as were the condensers. Crowdus was unable to get the transceiver to work in the boat explored. He figured that this was the work of the set's former operator who didn't want to turn over a working rig to his former enemy.

There were two generators aboard to run the wireless equipment, one of which was located in the next compartment ahead of the radio shack. The other was located astern in the Electric Control Compartment near the engines. This was probably so situated to assure wireless communications if one or the other compartment became flooded.

U-boats had been reported to have antennas that were lifted aloft by tall masts or even balloons. The truth was that the transmitter was designed for 425 meters and the power was at 16 amps when they used the obstruction cables as an antenna. (Obstruction cables are the twin cables from the bow of the boat over the top of the conning tower and to the extreme stern.) The cable was made of two heavy phosphor bronze cables and kept the U-boat from becoming fouled in lines, nets, or other obstructions it might encounter. By simply attaching insulators and an antenna lead, the obstruction cable did double duty as an antenna. This same system was used by the Allies.

One improvement developed by the Germans was another antenna made up of two 35-foot steel masts that were raised and lowered electrically from inside the boat. The antenna wire, also phosphor bronze, was kept tightly strung between the two steel masts at all times, even as the masts were raised or lowered. This second antenna had been previously unknown to the Allies.

The amplifiers found aboard were also below par by American standards and never worked as true two-stage amps. German tubes, although well made, performed poorly and were judged to be five years behind American ones. The Germans also had done away with binding posts in their equipment (common with American gear) and gone for plug-in type connections.

Crowdus also took note of the key, which was probably a Slaby-Arco and already considered out of date at the time. It weighed four pounds, and three of those pounds were in the lever. A real pump handle. It certainly was not a key that would be knocked off a table during rough weather.

Wireless Finds On Shore

Another seaman, a Merchant Marine wireless operator named Howard Pyle, was in Antwerp, Belgium, at about the same time and was amazed at how many War souvenirs there were to be had on the open market. Not in the mood for a bayonet or Kraut steel helmet, Pyle heard about a nearby railyard and thought he and a fellow "Sparky" should have a look. Armed with enough American cigarettes to make themselves welcome anywhere in Europe, they took off for the yard one morning.

While several Belgian guards were busy having a smoke, the two wireless men found a box car with a large shell hole in a siding. Upon investigation they discovered a packing crate that contained a 4 x 10-foot complete Telefunken Field Wireless Station. The station was contained in an aluminum cabinet with glass doors. The transmitter and receiver were permanently mounted on a shelf that served as an operating desk and which also held the key and antenna switch. The antenna itself and related equipment were in a coffin-like box. The antenna, when erected, stood 60 feet tall. The only thing missing from the station was the small gas engine and generator.

Carrying the whole unit three miles back to their ship seemed too daunting a task so they elected to take the transmitter and receiver out of the cabinet and carry as much of the rest of the Kaiser's wireless station as they could. Here again they found that the Germans built things to last, and it took some time to remove the equipment from the cabinet. With all the various pieces and parts filling their pockets and hanging over their shoulders both men reached their ship with the only Telefunken station in amateur service.

While going over their "find" back on the ship they discovered that the transmitter was a 500-cycle quenched spark device that put out a 500-watt signal. Trials on the way home showed that the transmitter put out 8 amps on 600 cycles, but they did not have proper equipment on board for a full evaluation.

The key was excellent. It was a well-balanced beauty with spring contacts that made sending much easier than the one Crowdus had found aboard the U-boat.

The Telefunken receiver was not as good on distance as the U.S. Navy model Pyle had on board his ship. He found it a loose coupling-type arrangement and just as inefficient as had been found on the U-boats. There was, however, a well calibrated secondary condenser that served as a wavemeter. By means of a few switches and plugs, the receiver could have been used as an exciter for a buzzer transmitter.

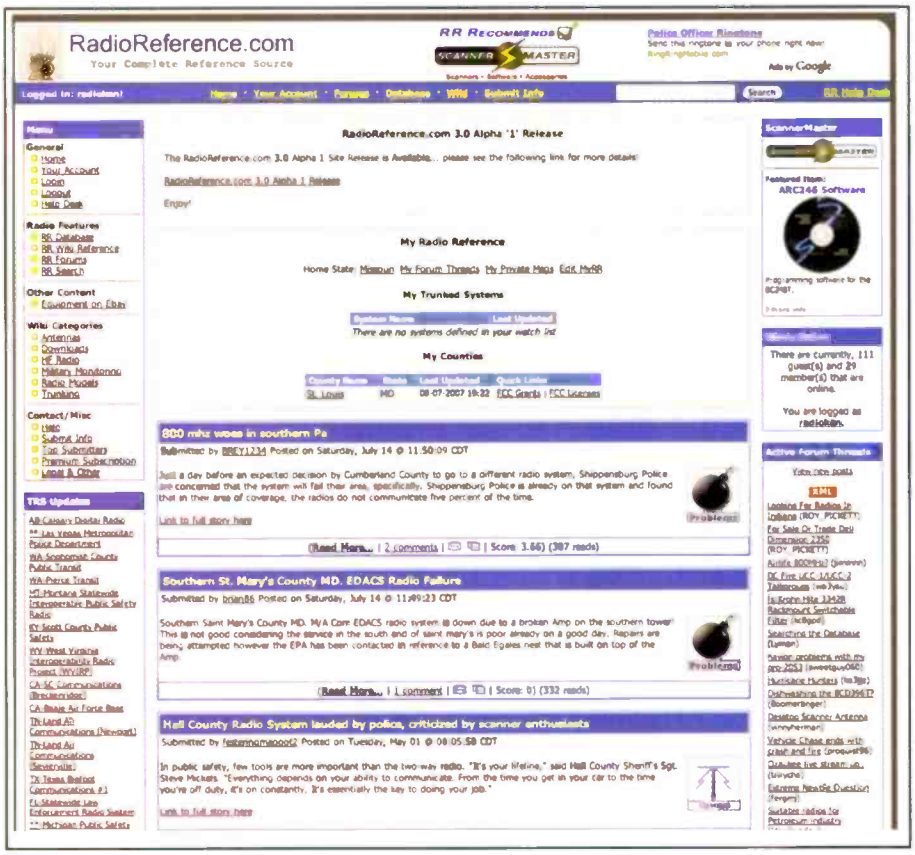
The Greatest Advantage

Wireless was never really trusted by those in command positions on either side, and generals used the telephone as their main tool. The American Army had been "married" to telegraph since the Civil War, and the British had bad luck with wireless during experiments in the Boer War (1899–1902). Germany had used radio intercept since the beginning of the War and so was aware of some of radio's weaknesses.

Because of these inherent prejudices, radio's part in World War I could not be called decisive. Wireless did, however, foreshadow the importance that radio would play in the next Great War. And, as always in war, whoever had the best communication equipment would have the biggest advantage. ■

by Ken Reiss, radioken@earthlink.net

RadioReference.com—The Place To Be



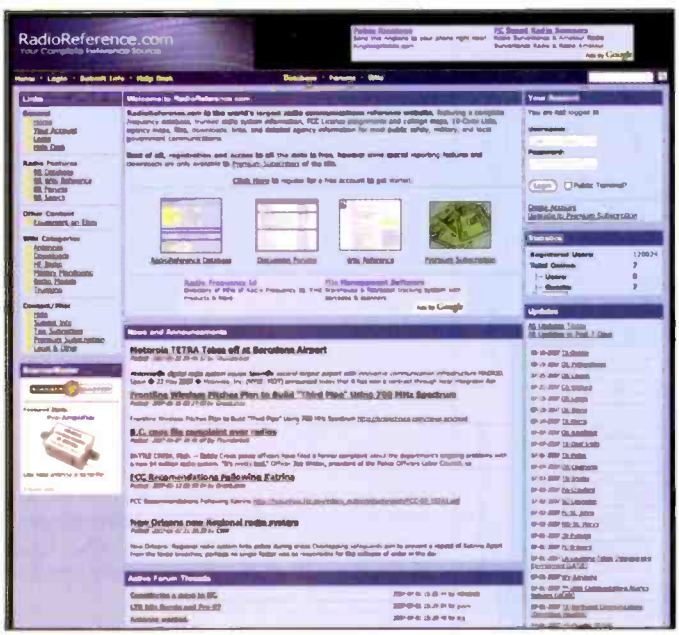
Here's the current home screen of radioreference.com. There's a lot of information even there, but most of the critical links are on the left side menu in the folders.

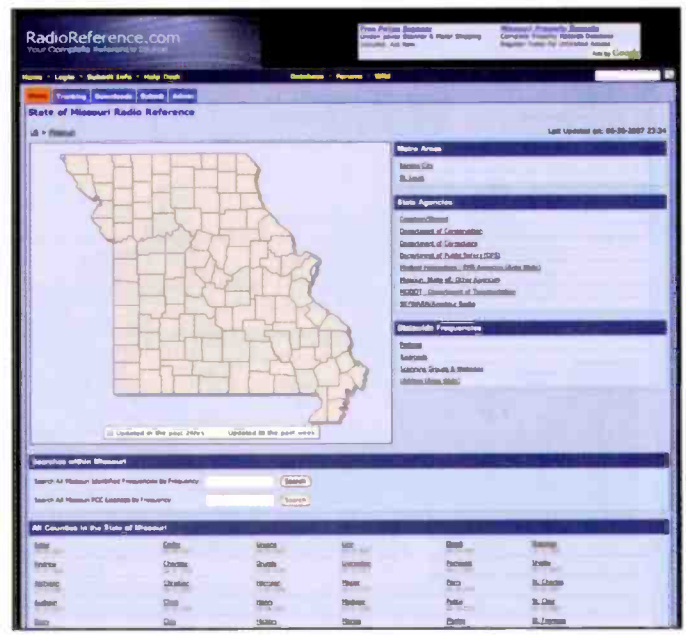
Getting good frequency information is always a big challenge for scanner enthusiasts, whether they're just getting started or are old hands. Frequency usage changes just often enough to make a completely up-to-date and accurate database difficult at best. RadioShack used to carry and recommend *Police Call* for new scanner users. But times have changed, prompting this letter from Dan S.

Since there is no more *Police Call* at RadioShack, or anywhere else for that matter, Dan wrote in to ask what is the best website for current scanner frequencies. I'm glad you asked, Dan, as I've

(Bottom Left) Here's the new and improved screen. Information seems easier to find, but the important stuff is still grouped on the left side.

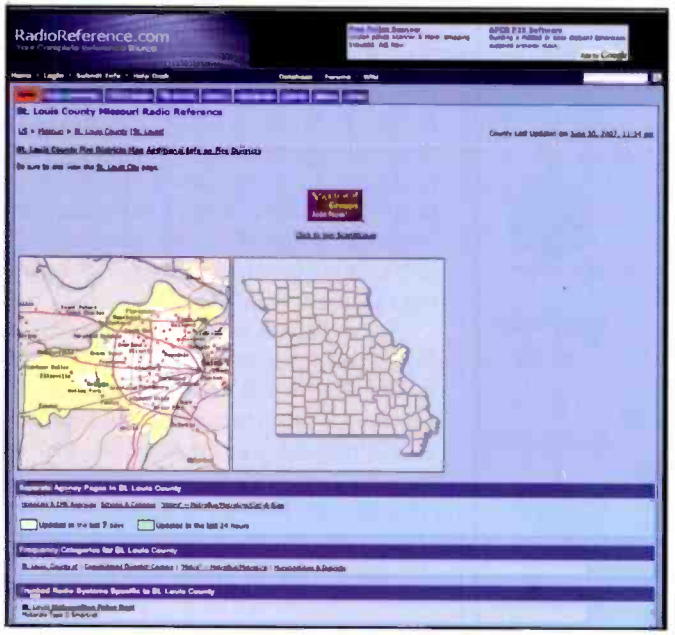
(Bottom Right) The real heart of the system is following the links for the frequency database. This allows you to pick a state or even major metro area that you're interested in, and then the real info begins to appear. Here's the Missouri page in the new style. At the bottom is a list of counties for the state—all of them as far as I can tell. Picking a county drills down to even more detailed information about that area.





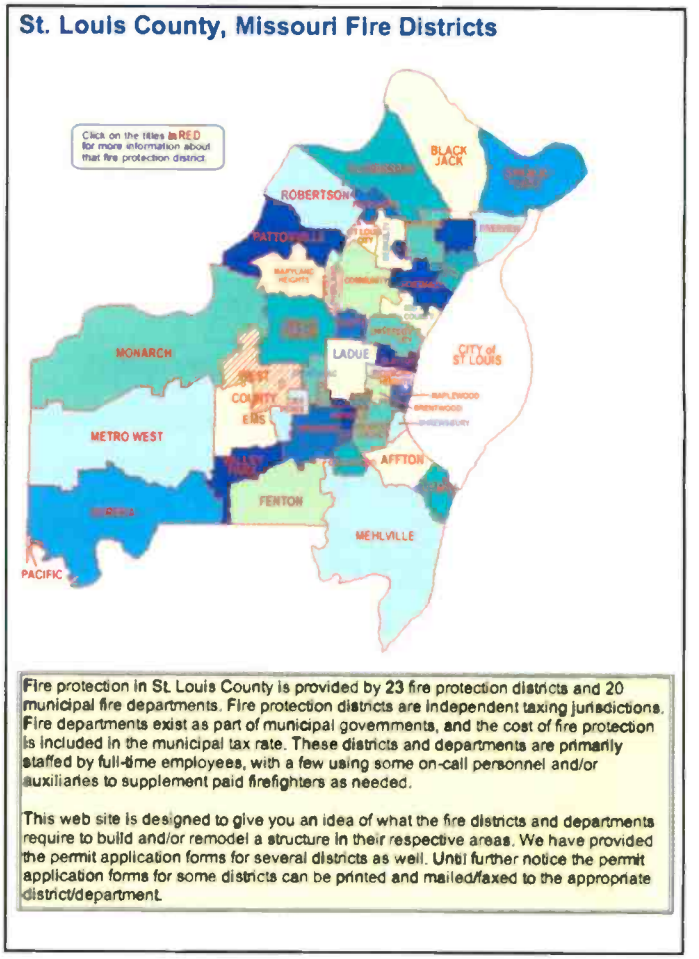
been struggling with that same issue. The good news is that there is significant help available at a site called radioreference.com. Described on its homepage as "the world's largest radio communications reference," it offers vast amounts of information on conventional frequency assignments, trunked radio systems, frequencies, talkgroups, FCC License assignments, maps, and so much more. Since a picture's worth a thousand words, I thought it would be helpful to take a look and see what they have to offer in pictorial form.

When I checked in with them for this "graphic review," I found that they're in the middle of what promises to be a significant site upgrade, which they're calling version 3.0. It's in beta testing now, and a link is provided from the home page. Not all the functions are working, but enough to tell that it will be a nice improvement when they get it working. In the meantime, the older 2.0 site is fully functional so I've included screen shots from both versions for that reason. Let's have a look!



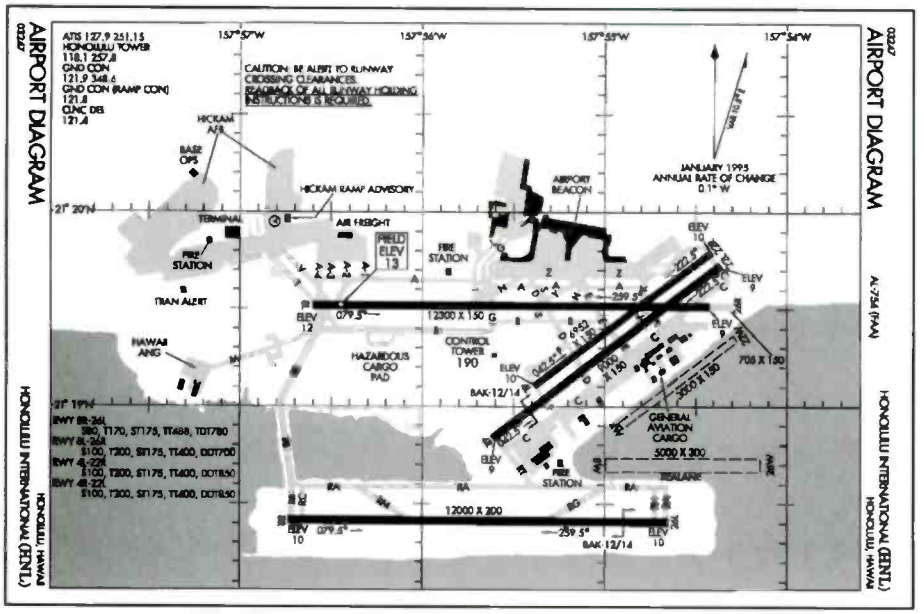
Here's the next page for St. Louis County, Missouri. Since it's one that I know something about, I figured it would be a good one to test. The position in the state is shown on the right with a more detailed map of the county, including major roadways so you can tell what you're looking at. Below is information and links for frequencies and other information that may be useful to the radio listener.

This map is actually provided on the St. Louis County website, but it was linked from the information page on Radio Reference. It's a handy map to have, and if you were new to the area it would help immensely in understanding the challenge of scanning in the St. Louis area. →

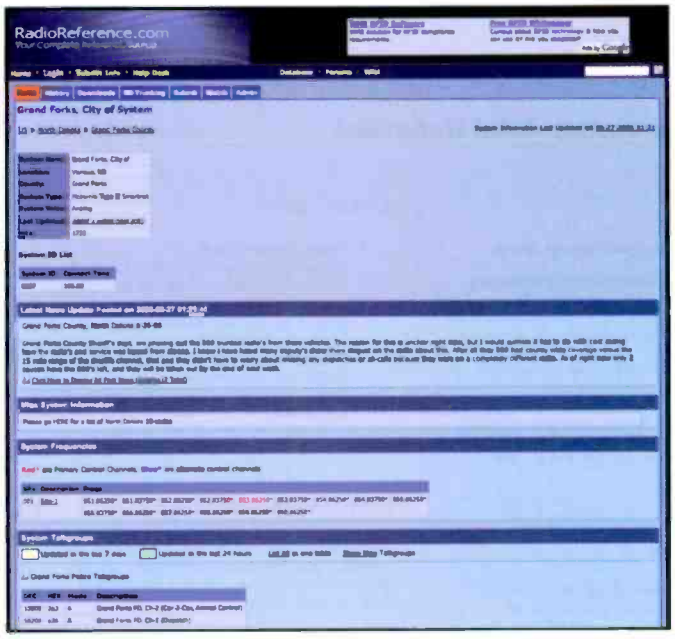


Fire protection in St. Louis County is provided by 23 fire protection districts and 20 municipal fire departments. Fire protection districts are independent taxing jurisdictions. Fire departments exist as part of municipal governments, and the cost of fire protection is included in the municipal tax rate. These districts and departments are primarily staffed by full-time employees, with a few using some on-call personnel and/or auxiliaries to supplement paid firefighters as needed.

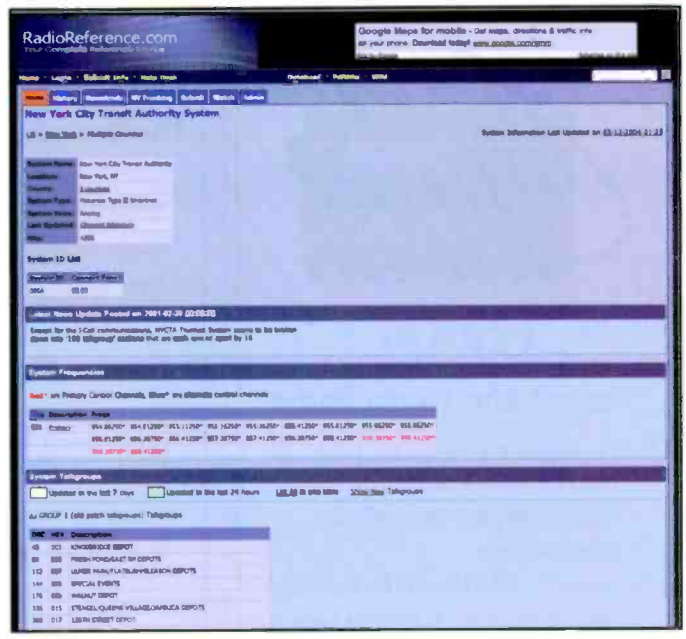
This web site is designed to give you an idea of what the fire districts and departments require to build and/or remodel a structure in their respective areas. We have provided the permit application forms for several districts as well. Until further notice the permit application forms for some districts can be printed and mailed/faxed to the appropriate district/department.



Here's a map of the Honolulu, Hawaii, airport provided by the FAA's website. It's great info for aviation enthusiasts. The Radio Reference site lists all major airports in a metro area. ←



Here's a trunked radio system info page for Grand Forks, North Dakota. The detail is quite good and seems to follow everywhere on the site. It also appears that local volunteers are used to keep the information up to date, judging by the comments in the "Latest News" section.



Here's info on the NYC Transit trunked system. The site provides frequency information at the top, with known control channels in red and talkgroup information at the bottom. Special fleet map settings and other material to help you program your scanner may also be included, if it's appropriate to the system.

Larger areas are well supported, too. Here's New York City's main page. There's lots of good stuff about trunked systems and conventional frequency info as well.

Frequency Of The Month

Each month we ask our readers to let us know what they're hearing on our "Frequency Of The Month." Give it a listen and report your findings to me here at "ScanTech." We'll pick a name at random from the entries we receive and give the lucky winner a free one-year gift subscription, or extension, to *Pop'Comm*.

Our frequency this month will be **859.4625**. Have a listen and let me know what you hear. Be sure to include your mailing address so we can enter you into our monthly drawing for a one-year subscription to *Pop'Comm*. Also, please put the frequency or the month on the email subject or envelope so it can be routed to the correct place. Send your entries to radioken@earthlink.net, or via more traditional methods to Ken Reiss, 9051 Watson Rd. #309, St. Louis, MO 63126.

Main Page

From The RadioReference Wiki

The RadioReference.com Wiki Reference

Welcome

This is the RadioReference.com Open Reference Source.

Anyone with a RRWiki user account can edit and change most of the pages here. Sign up for your account by using the link in the upper-right corner. Note that a RRWiki user account is separate from your normal RadioReference.com user account.

Please share your knowledge by contributing information to this wiki!

If you are new to Wikis, please see the Quick guide to editing pages for usage and editing help. Wondering What a Wiki Is? (http://wiki.org/wiki.cgi?WhatIsWiki) - click on the link!

General Information

- Antennas - The most important part of your station.
- Rebanding - A detailed article by UPman on the reallocation of services within the 800 Mhz spectrum. It will have a major effect on all trunktracking scanners.
- Scanner Laws (http://www.afn.org/~afn09444/scanlaws/index.html) If you have questions about the legal aspects of scanning, this site is the one to check first.
- Scanner Accessories - Anything from mounts, stands, battery packs and a great deal more
- Trunking - Numerous articles on the basics, FAQs, system types and terminology are stored here

Scanner Frequency Reference Information

- Common Frequencies in use across the world can be found here.
- Radio Reference Database (http://www.radioreference.com/modules.php?name=RR) should be the first place you start to search for and review frequencies for your local area.
- The Radio Reference Forums

Quick Links

- Create Account/Log In (http://wiki.radioreference.com/index.php?title=Special:Userlogin&returnto=Main_Page)
- The Radio Reference Homepage (http://www.radioreference.com)
- The Radio Reference Forums (http://www.radioreference.com/forums)
- Radio Reference Database (http://www.radioreference.com/modules.php?name=RR)

Location Specific Info

Interested in creating and managing your own local specific pages? Feel free to create a local specific page here which dynamically draws information from the RadioReference.com Database:

- United States
- Canada

Site Administration and Help

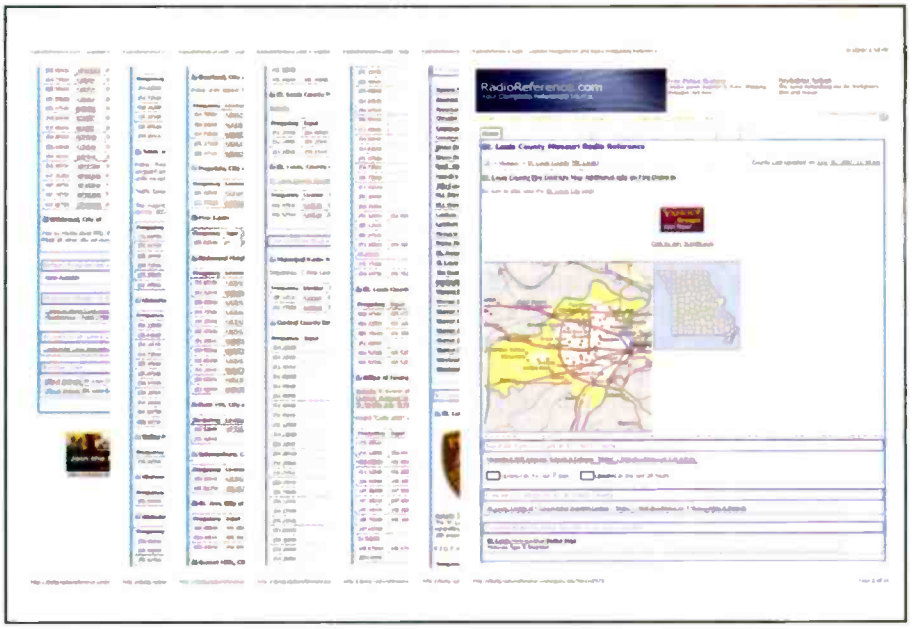
- RR FAQ - Frequently Asked Questions on RadioReference.com
- RR Database Submission Guidelines - Want to submit data to the Radio Reference Database? Look here for information on how to send us data.
- RadioReference.com Web Service is an XML interface to all of the information in the RR Database. See this link for more details.
- RR Wiki Extensions are a set of custom tags that can be used on the Wiki.
- Subscription Services and additional features available to paid subscribers.

http://wiki.radioreference.com/index.php/Main_Page Page 1 of 2

RadioReference also maintains a fairly extensive Wiki on radio terms and more that could be extremely helpful to the beginner.

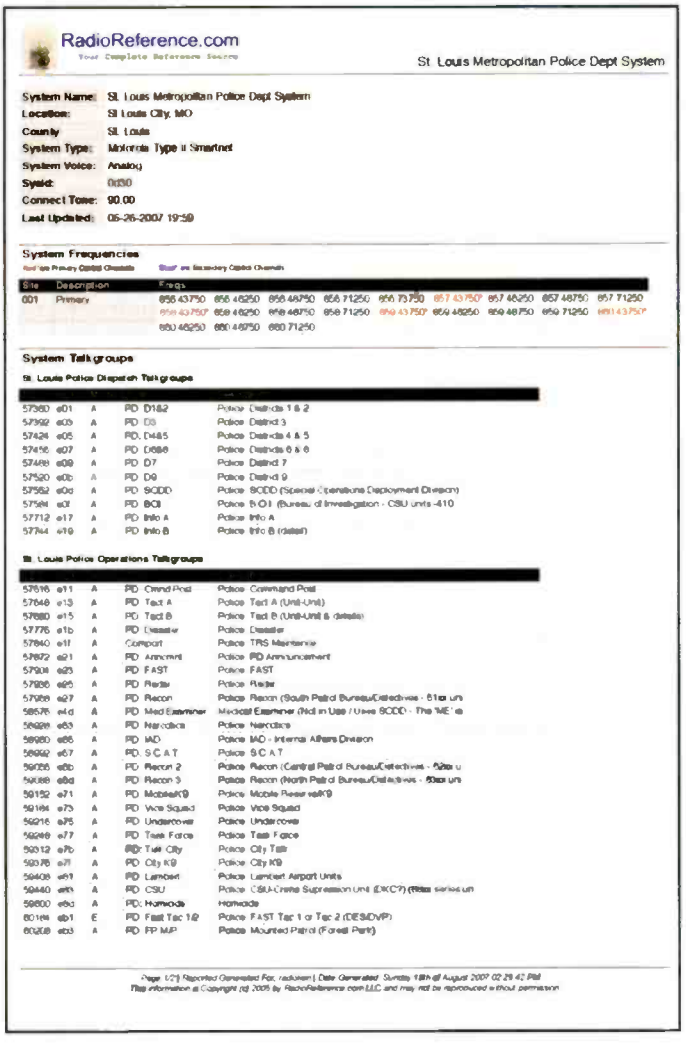
As if all that weren't enough, there's also a busy Forum where users can post questions and chat with other scanner enthusiasts. You have to register to post, but it's not a premium service so it's open to anyone willing to provide the required information. →

For a small fee ($7.50/90 days) you can get access to the Radio Reference Premium Service, which includes downloadable reports and custom watch screens, among other features. Here's part of a 16-page report on St. Louis County, providing great detail in an easy-to-read format. You also get the ability to download frequency lists in CSV format, which can be easily imported into many databases, spreadsheets for reference, or a control program, if you're so equipped.



So that's a glance at a great reference site. Look up your area and see what they have to offer. I don't think you'll be disappointed, even without the premium subscription.

Until next month, good listening! ■



RadioReference.com
Your Complete Reference Source

St. Louis Metropolitan Police Dept System

System Name: St. Louis Metropolitan Police Dept System
Location: St Louis City, MO
County St. Louis
System Type: Motorola Type II Smartnet
System Voice: Analog
Sysid: 0x30
Connect Tone: 90.00
Last Updated: 06-26-2007 19:59

System Frequencies

Site	Description	Freqs
001	Primary	856.43750 856.46250 856.48750 856.71250 856.73750 857.43750 857.46250 857.48750 857.71250 858.43750 858.46250 858.48750 858.71250 859.43750 859.46250 859.48750 859.71250 860.43750 860.46250 860.48750 860.71250

System Talkgroups

St. Louis Police Dispatch Talkgroups

57680	a01	A	PD D1&2	Police Districts 1 & 2
57692	a0b	A	PD D3	Police District 3
57424	a05	A	PD D4&5	Police Districts 4 & 5
57456	a07	A	PD D6&8	Police Districts 6 & 8
57488	a09	A	PD D7	Police District 7
57520	a0b	A	PD D9	Police District 9
57552	a0d	A	PD SCDD	Police SCDD (Special Operations Deployment Division)
57584	a0f	A	PD BCI	Police BCI (Bureau of Investigation - CSU Units 410
57712	a17	A	PD Info A	Police Info A
57744	a19	A	PD Info B	Police Info B (data)

St. Louis Police Operations Talkgroups

57616	a11	A	PD Comd Post	Police Command Post
57648	a13	A	PD Tact A	Police Tact A (Unit-Unit)
57680	a15	A	PD Tact B	Police Tact B (Unit-Unit & data)
57776	a1b	A	PD Disaster	Police Disaster
57840	a1f	A	PD Comport	Police TRS Maintenance
57872	a21	A	PD Announcmt	Police PD Announcement
57904	a23	A	PD FAST	Police FAST
57936	a25	A	PD Radio	Police Radio
57968	a27	A	PD Recon	Police Recon (South Patrol Bureau/Detectives - 61xx un
58576	a4d	A	PD Med Examiner	Medical Examiner (Not in Use / Uses SCDD - The ME is
58928	a53	A	PD Narcotics	Police Narcotics
58960	a55	A	PD IAD	Police IAD - Internal Affairs Division
58992	a57	A	PD S C A T	Police S C A T
59056	a5b	A	PD Recon 2	Police Recon (Central Patrol Bureau/Detectives - 62xx u
59088	a5d	A	PD Recon 3	Police Recon (North Patrol Bureau/Detectives - 63xx uni
59152	a71	A	PD Mobile K9	Police Mobile Police K9
59184	a73	A	PD Vice Squad	Police Vice Squad
59216	a75	A	PD Undercover	Police Undercover
59248	a77	A	PD Task Force	Police Task Force
59312	a7b	A	PD Twr City	Police City Twr
59376	a7f	A	PD City K9	Police City K9
59408	a91	A	PD Lambert	Police Lambert Airport Units
59440	a93	A	PD CSU	Police CSU-Crime Suppression Unit (DICC?) (Was series un
59600	a9d	A	PD Homicide	Homicide
60144	ab1	E	PD Fast Tac 1@	Police FAST Tac 1 or Tac 2 (DESIDVP)
60208	ab3	A	PD FP MP	Police Mounted Patrol (Forest Park)

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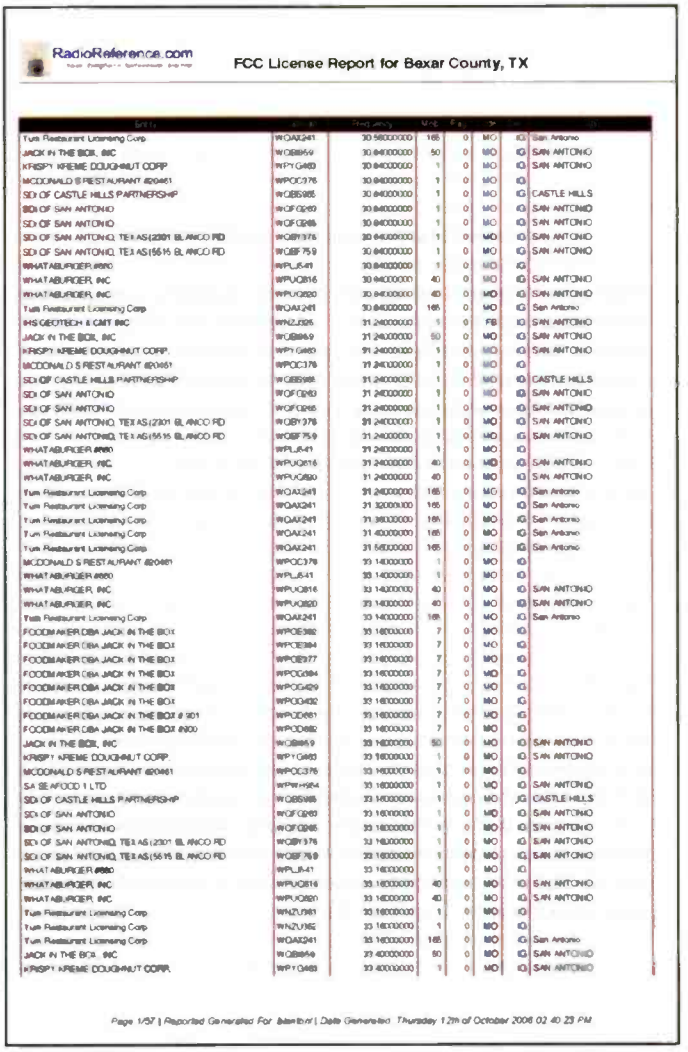
The premium service report on St. Louis Metropolitan Police includes an extensive list of talkgroups and frequency information.



RadioReference.com
FCC License Report for Bexar County, TX

Tum Restaurant Licensing Corp	WQAJ241	30 58000000	165	0	MO	IG	San Antonio
JACK IN THE BOX, INC	WQBB69	30 84000000	50	0	MO	IG	SAN ANTONIO
KRISPY KREME DOUGHNUT CORP	WPTG483	30 84000000	1	0	MO	IG	SAN ANTONIO
MCDONALD S RESTAURANT #20461	WPOC376	30 84000000	1	0	MO	IG	
SBC OF CASTLE HILLS PARTNERSHIP	WQBB988	30 84000000	1	0	MO	IG	CASTLE HILLS
SBC OF SAN ANTONIO	WQFQ269	30 84000000	1	0	MO	IG	SAN ANTONIO
SBC OF SAN ANTONIO	WQFQ265	30 84000000	1	0	MO	IG	SAN ANTONIO
SBC OF SAN ANTONIO, TEXAS (2301 BLANCO RD	WQBY376	30 84000000	1	0	MO	IG	SAN ANTONIO
SBC OF SAN ANTONIO, TEXAS (5615 BLANCO RD	WQBF759	30 84000000	1	0	MO	IG	SAN ANTONIO
WHATABURGER #880	WPLJ541	30 84000000	1	0	MO	IG	
WHATABURGER, INC	WPUQ816	30 84000000	40	0	MO	IG	SAN ANTONIO
WHATABURGER, INC	WPUQ820	30 84000000	40	0	MO	IG	SAN ANTONIO
Tum Restaurant Licensing Corp	WQAJ241	30 84000000	165	0	MO	IG	San Antonio
IHS GEOTECH & CMT INC	WNZJ926	31 24000000	1	0	FB	IG	SAN ANTONIO
JACK IN THE BOX, INC	WQBB69	31 24000000	50	0	MO	IG	SAN ANTONIO
KRISPY KREME DOUGHNUT CORP	WPTG483	31 24000000	1	0	MO	IG	SAN ANTONIO
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SBC OF CASTLE HILLS PARTNERSHIP	WQBB988	31 24000000	1	0	MO	IG	CASTLE HILLS
SBC OF SAN ANTONIO	WQFQ269	31 24000000	1	0	MO	IG	SAN ANTONIO
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WHATABURGER, INC	WPUQ816	31 24000000	40	0	MO	IG	SAN ANTONIO
WHATABURGER, INC	WPUQ820	31 24000000	40	0	MO	IG	SAN ANTONIO
Tum Restaurant Licensing Corp	WQAJ241	31 24000000	165	0	MO	IG	San Antonio
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Tum Restaurant Licensing Corp	WQAJ241	31 36000000	165	0	MO	IG	San Antonio
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Tum Restaurant Licensing Corp	WQAJ241	31 56000000	165	0	MO	IG	San Antonio
MCDONALD S RESTAURANT #20461	WPOC376	33 14000000	1	0	MO	IG	
WHATABURGER #880	WPLJ541	33 14000000	1	0	MO	IG	
WHATABURGER, INC	WPUQ816	33 14000000	40	0	MO	IG	SAN ANTONIO
WHATABURGER, INC	WPUQ820	33 14000000	40	0	MO	IG	SAN ANTONIO
Tum Restaurant Licensing Corp	WQAJ241	33 14000000	165	0	MO	IG	San Antonio
FOODMAKER DBA JACK IN THE BOX	WPOE382	33 16000000	7	0	MO	IG	
FOODMAKER DBA JACK IN THE BOX	WPOE384	33 16000000	7	0	MO	IG	
FOODMAKER DBA JACK IN THE BOX	WPOE977	33 16000000	7	0	MO	IG	
FOODMAKER DBA JACK IN THE BOX	WPOG384	33 16000000	7	0	MO	IG	
FOODMAKER DBA JACK IN THE BOX	WPOG429	33 16000000	7	0	MO	IG	
FOODMAKER DBA JACK IN THE BOX	WPOG432	33 16000000	7	0	MO	IG	
FOODMAKER DBA JACK IN THE BOX # 801	WPOD661	33 16000000	7	0	MO	IG	
FOODMAKER DBA JACK IN THE BOX #800	WPOD662	33 16000000	7	0	MO	IG	
JACK IN THE BOX, INC	WQBB69	33 16000000	50	0	MO	IG	SAN ANTONIO
KRISPY KREME DOUGHNUT CORP	WPTG483	33 16000000	1	0	MO	IG	SAN ANTONIO
MCDONALD S RESTAURANT #20461	WPOC376	33 16000000	1	0	MO	IG	
SA SEAFOOD 1 LTD	WPWH984	33 16000000	1	0	MO	IG	SAN ANTONIO
SBC OF CASTLE HILLS PARTNERSHIP	WQBB988	33 16000000	1	0	MO	IG	CASTLE HILLS
SBC OF SAN ANTONIO	WQFQ269	33 16000000	1	0	MO	IG	SAN ANTONIO
SBC OF SAN ANTONIO	WQFQ265	33 16000000	1	0	MO	IG	SAN ANTONIO
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SBC OF SAN ANTONIO, TEXAS (5615 BLANCO RD	WQBF759	33 16000000	1	0	MO	IG	SAN ANTONIO
WHATABURGER #880	WPLJ541	33 16000000	1	0	MO	IG	
WHATABURGER, INC	WPUQ816	33 16000000	40	0	MO	IG	SAN ANTONIO
WHATABURGER, INC	WPUQ820	33 16000000	40	0	MO	IG	SAN ANTONIO
Tum Restaurant Licensing Corp	WNZU981	33 16000000	1	0	MO	IG	
Tum Restaurant Licensing Corp	WNZU982	33 16000000	1	0	MO	IG	
Tum Restaurant Licensing Corp	WQAJ241	33 16000000	165	0	MO	IG	San Antonio
JACK IN THE BOX, INC	WQBB69	33 40000000	50	0	MO	IG	SAN ANTONIO
KRISPY KREME DOUGHNUT CORP	WPTG483	33 40000000	1	0	MO	IG	SAN ANTONIO

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Premium subscribers can also download PDF versions of an FCC frequency list that includes all licensees for a given area straight from the government databases. There is some customizable searching allowed as well.

by Rich Arland, W3OSS, richard.arland@verizon.net

What Price Communications?

This month we're going to start a multi-part series designed to get many of you (myself included) off of dead center and doing something positive regarding increasing our collective readiness to provide emergency communications. This issue's column will deal with my efforts to fabricate a "Bug-Out Box" based upon the equipment I have on hand at the Arland Ranch. My idea is to design and fabricate a quick reaction comm package tailored to my unique EmComm requirements without plunking down any more of my hard-earned money to buy more gear.

Your assignment: provide me with feedback, including pictures with captions and a brief write-up of your efforts to build your own Bug-Out Box or "Go-Bag" in support of your emergency communications taskings. Best part of all, if you impress me with your innovative, outside-the-box (pardon the pun) thinking, originality, and initiative, I will showcase your handiwork in an upcoming "Homeland Security" column *and* you will win a one-year subscription (or one-year renewal) to *Popular Communications* courtesy of yours truly. More on this later.

Now, let's get down to brass tacks and build us a portable quick-reaction package for emergency communications.

Thinking Outside The Box

Face it; if you're a ham radio operator, scannist, SWL, DXer, or emergency communications first responder, you are a gadget-happy dude (or dudette). It goes with the territory. About the only hobby that fosters more gadget happiness is photography, and interestingly enough, one of the major sideline hobbies for radio enthusiasts is photography.

Alas, we're doomed! Collecting "stuff" is natural, even more so in the radio hobby. I mean we collect stuff just to have stuff. The stuff we collect basically amounts to all sorts of junk (or more specifically, "junque," which is just like "junk," only cooler). We really can't use it right now, but we know sometime in the future we will need that little trinket, come hell or high water! What this means is that most of us have quite a collection of junque in our junk boxes with which to design and fabricate all sorts of unique communications projects. So let's get busy and build a Bug-Out Box for emergency communications.

Remember: what you see here is my idea of what I need to honor my emergency communications obligations. What works for me may or may not be right for you. Remember, too, that while my EmComm requirements are not really unique, yours might be entirely different, necessitating a radically different approach to a useful Bug-Out Box.

Proper Prior Planning Prevents... Well, You Know

The Seven "Ps" we were too polite to finish is an old military axiom that is oh-so-true throughout our journey in life. The idea of having a Go-Bag or Bug-Out Box full of radio gear captures the imagination of many of us EmComm volunteers. Being able to quickly deploy to a pre-arranged location prior to or during an emergency means that the comm gear has to be pre-packaged and ready to move out quickly when the call comes in for emergency comm support.

Trial fit of the FT-2800 2-meter FM radio set with the MFJ speaker in the 40mm ammo can.

Over the years I have personally acquired many radios and have put together any number of Go-Bags with which to fulfill my obligations in the event I was called upon to furnish communications during a natural disaster. About the only thing that's changed since 1976 is the physical size and the number of bells and whistles on the radio equipment.

One of the main problems facing the EmComm volunteer wishing to construct a Bug-Out Box/Go-Bag is what type of container to use. To be sure there are all sorts of containers available that can be pressed into service as a Bug-Out Box. They range from plastic toolboxes (with or without wheels), plastic military ammo boxes, and plastic file boxes, to metal versions of the same. Ballistic nylon backpacks/computer cases are also quite popular.

Of primary concern for the EmComm volunteer is the ability of the enclosure to protect the radio gear from damage and moisture. Ease of transportation (no one wants an ungainly, hard-to-manage box full of gear flopping around in the trunk or bed of a vehicle) is also high up on the list of desirable attributes for an EmComm Bug-Out Box.

While plastic cases range in price from a few dollars to several hundred (for the Pelican-style, waterproof, ultra-trough cases), I believe the best bang-for-the-buck lies with the surplus GI ammo cans that find their way to ham/computer fests, surplus houses, and military vehicle meets. After all, these are metal cases, reinforced for rough handling, and O-ring sealed for a 100-percent watertight fit, and they are designed and constructed to keep ammunition safe and secure while in transit. While some of these surplus ammo carriers are a bit awkward, the majority are easily handled by a single person. You have a wide selection of sizes to accommodate all sorts of radio gear and they are constructed of steel, which is pretty tough stuff.

Don't like the color (normally olive drab)? Grab some steel wool or #330 grit sand paper, rough up the exterior of the ammo

can and hit it with a couple of coats of spray paint available at hardware stores everywhere! Personally, I like that original OD color of the ammo cans and find that it lends a certain "official" ambiance to the emergency radio gear.

For this project, I borrowed several ideas from a couple of Internet sites to come up with my own personalized Bug-Out Box that I'm currently using. One of the primary goals regarding this project was to keep the total costs down and use whatever I had on hand rather than going out and buying specific gear for this project. This forced me to utilize some of the "priceless stuff" that I've had squirreled away for years and made my wife, the Beautiful and Talented Patricia, KB3MCT, very, VERY happy! (The pile of stuff was substantially reduced, indicating that I was making headway in our attempts to downsize.)

The Radio Equipment

Several months ago I picked up a great deal on a Vertex-Standard (Yaesu) FT-2800 2-meter FM transceiver at "that auction place." I had previously determined that I wanted a 2-meter radio set that offered more RF output than the normal 40 to 50 watts of power. In addition, the FT-2800 had an acceptable footprint and front panel ergonomics for ease of use in a cramped environment like the ammo can Bug-Out Box.

This particular radio is a well-suited addition to my emergency communications equipment arsenal for several reasons. First the FT-2800 has four pre-set RF output settings: 5 watts, 10 watts, 25 watts, and 65 watts. In its present configuration I can deploy with my Bug-Out Box and be operational in a matter of a few moments upon arriving at my designated site with at least 25 watts of RF output power using the internal dual 12-VDC-gel cell battery system I have in the box.

This is a shot of the portable mast system from Fair Radio Sales. This configuration offers a very light 20-foot fiberglass mast with 2-meter ground plane antenna and coaxial cable.

This is vitally important. Emergency communications is just that: essential command and control communications during the initial phases of a man-made or natural disaster. With my present setup, I can deploy and be on the air in a matter of minutes. Mission critical, time-sensitive communications is the name of the game. My Bug-Out Box allows me to respond and provide communications in a self-contained package that is not dependent on local power/antennas in the affected area.

Pass The Grenades

In looking over the plethora of steel ammo boxes available from sources on the Internet and local military surplus outlets,

The final fit of the radio, speaker, power/radio patch panel, and dual SLA batteries. The only hardware left to add is the SWR/PWR meter. The power/radio patchpanel on the extreme right allows the operator to charge one battery while using the other one. A second radio (scanner?) can also be added.

I settled on a 40mm ammo box. This is NOT the "standard" 40mm round associated with the Borfor cannon, but the 40mm grenades used in the automatic grenade launcher currently favored by our armed forces in Iraq and Afghanistan. This ammo box cost me $15 plus s/h from a surplus outlet in Ohio. I got it off the Internet after searching for "ammo boxes."

The overall size is big enough to hold dual 12-VDC 7-Ah sealed lead acid (SLA) batteries along with a 3.3-A 12-VDC switch-mode AC power supply, power/radio patch panel, RadioShack VHF/UHF RF power meter/SWR bridge, MFJ Model 281 "Clean Tone" external speaker, and the Yaesu FT-2800 2-meter FM rig. By carefully mounting the radio, speaker, power/SWR meter, AC supply and patch panel slightly below the level of the edge of the ammo can, the lid fits on and tightly seals the entire station in a water tight/moisture proof environment. The ammo can is reinforced on the outside with diagonal trusses to improve the ruggedness of the enclosure.

The FT-2800 radio set, MFJ speaker, 3.3-A/12-VDC switch-mode power supply, RF /SWR meter, and SLA batteries are held in place using industrial strength hook/eye fastener tape to the inside walls of the ammo can. If you use this approach, be sure to use some denatured alcohol (91-percent solution) to thoroughly clean the walls of the ammo can and the surfaces of the radio gear *before* applying the industrial strength hook/eye fasteners. This is important because if the surfaces are not squeaky clean, the hook/eye fasteners won't adhere to the box and the radio gear.

In addition, I keep the radio manual, copies of our ham licenses, ARES/RACES/MARS identification, along with a checklist of items included in the quick-reaction package in a heavy-duty zippered plastic bag to ensure the documentation is impervious to moisture. Also included is an ARES field manual, small note pad, pen/pencil, black magic marker, analog/digital 24-hour alarm clock, and two LED book lights for nighttime illumination.

Power To The Radio

Incidentally, when I programmed the radio, I ensured that each channel came up in the lowest power setting (5 watts), thereby minimizing the battery drain on the internal SLAs. If more RF power is needed then a quick touch of a button will bring up the next highest power level, up to 65 watts. Each of the SLA batteries is wired into the power patch panel and one can be charged while the other SLA battery is used to power the radio gear. If there's 120-VAC mains power available, then the AC power supply unit (PSU) can be used for operation up to and including 25 watts RF output power.

When using the SLA batteries I would strongly recommend that the RF output power on the radio be set at no higher than 10 watts to provide maximum battery life. If you can get away with lower RF output, by all means do so. Not only will you stretch your battery life, you will also reduce the chances of interfering with other nearby VHF radio systems in use by the disaster response force.

Since the FT-2800 is capable of 65 watts of RF output power, you always have the option of going to that power level should conditions warrant. For instance, if you are deployed to a remote location where you are on the fringe of your ARES/RACES/MARS repeater and you lack a gain antenna, like a Yagi or quad, the ability to jump from 25 to 65 watts may be critical in the completion of your EmComm mission. While I always try to abide by the FCC regulations regarding the use of just enough RF output power to maintain communications, there are always exceptions to the rule, and a real-world emergency is one place where running low power takes a back seat to providing disaster response communications.

Should I have the need to go to the maximum RF power output of 65 watts on the FT-2800, I would need access to an external power supply capable of at least 15 to 20 amps of DC current (at 13.8 VDC) to be able to use the high-power position of the radio set. This PSU can

Should You Choose To Accept It...

Don't forget your homework assignment: I need digital pictures (jpegs are fine, with a size of at least 1504 x 1000) with captions, along with a brief paragraph or two regarding your efforts to design and build your own Bug-Out Box/Go-Bag. Should you impress me to the point where I use your pictures and text in an upcoming issue of "Homeland Security" you'll be given a one-year subscription, or extension, to Popular Communications. Send your digital pix, text, and captions to my e-mail address (richard.arland@verizon.net). Be sure you put Bug-Out Box in the subject line of the e-mail so I don't accidentally delete it.

I cannot overemphasize the general objectives of this exercise:

Low cost
Ease of fabrication
Portability
Uniqueness of design
Operator friendly
Ease of duplication

The main goal of this homework exercise is to present a host of options and ideas for others to use in putting together their own Bug-Out Box with the least amount of hassle.

The idea of having all your emergency communications gear pre-packaged and located in one place, ready to roll at the first sign of an emergency, is a major asset in your ability to perform as an EmComm communicator. Besides, it's one less thing to be concerned about while trying to make muster during a real-world or exercise call-out.

And lastly, to all of you "Turtles" out there (and you know who I'm talking about), don't let fear hold you back; forward detailed text and pictures of your camping trailer and/or RV to me (use the address listed earlier in this text) and give me the rundown on how you went about turning your "Turtle" into an EmComm Turtle. There is a separate prize for those of you who inspire me!

The deadline for this "contest" is December 31, 2007. Anything received after that time will be returned.

Contest Rule #1: I am the one and only judge for this competition and all my rulings are final.

Contest Rule #2: If in doubt: refer to Contest Rule #1.

take the form of a large 12-volt deep-cycle (marine) battery or two or a 120-volt AC mains-powered high-current 12-VDC power supply. In either case the higher the RF output of your transceiver the more current you'll need to make things work.

Add An Antenna

This brings up the alternative scenario: the use of a VHF gain antenna. The easiest way to improve your overall efficiency on the VHF/UHF bands is to procure and use some type of gain antenna. Antennas, as opposed to RF amplifiers, are always the better choice for improving your signal since you will realize improvements in both your transmitted and received signals levels.

When comparing the cost of a gain antenna to that of an amplifier, you'll notice that antennas are relatively inexpensive and are a logical choice for the frugal ham. Add an inexpensive mast made from a paint pole (check Lowes, Home Depot, and the Internet for pricing). Also, Fair Radio in Lima, Ohio, offers a 20-foot fiberglass antenna kit, the GPA-MK-12 (www.fairradio.com/catalog.php?mode=view&categoryid=188), for $49.95, which includes three 47-inch-long (by 1 3/8 inch OD) green fiberglass mast sections that interlock and an 8-inch top section with low-band VHF ground plane antenna (resonant at around 81 MHz). I've taken this ground plane antenna and cut it down (using a Dremel cutting tool with a high-speed cutting disk) to a length of 19.5 inches per element, forming a nice little rugged, collapsible 2-meter ground plane antenna. The 12-foot mast kit is very lightweight and comes with a guy ring, guy rope (parachute cord), three guy anchors, a central mast anchor, and 16 feet of coaxial cable, terminated in BNC connectors at each end.

You can procure extra 47-inch-long mast sections (model MS-MK-12) for $12/each to fabricate any length of fiberglass mast that you need. I have two sets of the GPA-MK-12 antenna kits with spare MK-12 mast sections that I can quickly erect making two 20-foot fiberglass masts: one for VHF and the other for HF antenna supports. They easily pull apart and stow in a nifty green canvas bag for easy transport.

That's A Wrap!

Look over the pictures and carefully re-read the text of this month's column several times to get a good solid grasp of what I've done on my Bug-Out Box. I've taken this quick reaction package into the bush on several occasions and I have corrected several minor things that were not apparent when initially designing this system. All in all this has been a very interesting project. The entire cost to me: $15 for the ammo case, $15 for the hook/eye fastener tape from RadioShack, and my friend Joe Everhart, N2CX, provided the RadioShack VHF/UHF RF Power Meter/SWR Bridge in exchange for a book he'd been wanting for a while.

That's it for this month. Until next time remember: Preparedness is not optional.

Pop'Comm November 2007 Reader Survey Questions

This month we'd like to ask you about your feelings on the developments in technology. Please use the Reader Survey Card and circle all appropriate numbers. Thanks for participating.

How would you describe yourself when it comes to technology in the hobby?
I'm a purist, give me analog 1
I struggle with the newfangled concepts and equipment 2
I'm fascinated by the changes and can't wait for the latest gadgets 3
I'm more interested in the non-technical aspects of the hobby 4

What are your plans concerning your equipment?
I'm happy with my old tried-and-true equipment and am sticking with it 5
I might buy some new stuff when I can 6
I want to keep my communications gear as up to date as I can 7
I'm heading out as soon as I can to nab all the new toys 8

What would you like to see from upcoming articles in *Pop'Comm*?
Less of a technical emphasis 9
More articles on state-of-the-art technology and its theory 10
It's a good mix right now 11

by Gerry L. Dexter, gdex@genevaonline.com

Voice Of Tajik Waxes, Radio Nationale Tchadienne Wanes, And VOA Gets A Reprieve

Well now, here's a switch. In an age when stations are cutting back and governments are busting broadcasters' budgets, the state radio of Tajikistan is doing just the opposite! The Voice of Tajik (locally Ovazi Tajik) is expanding! The station is, or soon will be, operating for 16 hours a day (0200 to 1800) using seven languages, including English.

The planned schedule is:

1100 to 1500 on 11540
1325 to 1500 on 9865
1400 to 1500 on 7470,
1500 to 1600 on 7430, 7470, 7505
1500 to 2200 on 7540
1600 to 1700 on 7465
2315 to 0030 on 9975

The earlier morning hours on higher frequencies should provide us with the best chance to hear Tajik Radio. Reports can go to International Service, Tajik Radio, P.O. Box 108, 734025 Dushanbe, Tajikistan. As this is compiled, there aren't any known logs yet, but that could change at any time.

Another former Soviet state is also making changes. Radio Belarus has begun to relay its 24-hour local BR-1 service on all its shortwave frequencies: 6010, 6040, 6070, 6080, 6115, 6190, 7110, and 7145. Historically Radio Belarus doesn't usually shake the shutters with its signal strength, so this may prove to be a bit of a toughie.

Bolivia has a new one in operation. Radio Universitaria is using 4732 from the local university campus in Cobija. It's active from 1000 to 1300 and 2200 to 0200.

Radio Nationale Tchadienne has departed 6165. Now it's being heard, complete with distortion, on or around 7290. The transmitter is drifting badly and is also suffering modulation problems. This one fires up at 0430.

The seldom-received Wontak Radio Light in Papua New Guinea has stopped using 7120 and is now found on 7325, sometimes with relays of PNG's National Broadcasting Corporation. Also, the equally difficult PNG station on 4960, at first called the Catholic Radio Network, has been re-named Radio St. Gabriel. Eventually it will join the Catholic Radio Network there.

Radio Romania International has cut back on some of its broadcasts. Atypically, this news is not shrouded in concern. The cutback is only temporary as RRI modernizes its transmitters and antenna systems at both the Tiganesti and Galbeni sites. I've noticed a degrading of reception from Romania in recent years but just chalked it up to poor propagation. Apparently other factors are at work.

And it looks like the planned slashing of Voice of America languages and hours has been forestalled. The House committee overseeing such things has restored the funding that had earlier been denied and which had created a storm of protest. Also,

Be not afraid. It's only part of a QSL from the pirate Undercover Radio. (Thanks Rich D'Angelo)

many—if not all—of the cuts made to the budgets of RFE/RL and Radio Free Asia were rolled back. But there is also a fly in this soup. Late word has it that the Board of Broadcast Governors (BBG)—or is it the International Broadcasting Bureau?—is going to close the Delano, California, transmitter site, effective at the end of the A-07 season (meaning right about now). That will leave the United States with but one in-country site (Greenville, North Carolina). How long before these dummies find themselves having to buy time on WHRI?

Reader Logs

Remember, your shortwave broadcast station logs are always welcome. But please be sure to double or triple space between the items, list them by country, and include your last name and state abbreviation after each log. Also much wanted are spare QSLs you don't need returned, station schedules, brochures, pennants, station photos, and anything else you think would be of interest. And, c'mon now—where's that photo of you at your listening post! Okay. Let's get to it!

ALASKA—KNLS, 6890 at 1012 with "Postcard from Alaska." (Barton, AZ)

ALBANIA—Radio Tirana, 6110 at 0256 and 7425-Shajik with news at 0150. (Parker, PA) 6115 at 0245 with "Albanian People's History." (Brossell, WI)

ANGUILLA—Caribbean Beacon, 11775 weak at 2055. In a subsequent log attempt they were not on the air. (Maxant, WV) 1707 with the widow Scott calling for donations to help balance her operating budget. (Wood, TN)

ARGENTINA—RAE, 11710 at 0325 with tangos and FF anmts. (Strawman, IA) 15345 in SS at 1837. (Charlton, ON)

ASCENSION IS.—BBC Relay, 21470 with EE to South Africa at 1352 and 21630 in listed Hausa to West Africa at 1355. (Strawman, IA) 21470 to South Africa at 1455. (Parker, PA)

AUSTRALIA—Radio Australia, 5995-Shepparton at 1420, //6080. Also 11660-Brandon at 2125, 12080-Brandon at 0018, 15415-Shepparton at 0410 and 15515-Shepparton at 0402. (MacKenzie, CA) 9580-Shepparton at 1313. (Charlton, ON) 1005 with news and 15515 with interview at 0445. (Maxant, WV) 11660-Brandon at 2125, //11650. (Strawman, IA) 11880-Shepparton at 1209. (Brossell, WI) 12080 with rugby play-by-play at 0515. (Barton, AZ) 15240-Shepparton at 0250 and 15515 with rap and pop at 0426. (Parker, PA) 15230 with news at 2320. (Fraser, ME) 15250 at 0341 with a call-in

Help Wanted

The "Global Information Guide" consistently presents more shortwave broadcast loggings than any other monthly SW publication! (A whopping 370 shortwave broadcast loggings were processed this month!*) Why not join your fellow SWLs, let us know what you're hearing, and also become eligible for our monthly shortwave book prize! Send your logs to Gerry Dexter, "Global Information Guide," 213 Forest St., Lake Geneva, WI 53147. Or e-mail them to gdex@genevaonline.com (please see the column text for basic formatting tips.) Come join the party—we look forward to hearing from you!

**Not all logs get used; there are usually a few which are obviously inaccurate, unclear, or lack a time or frequency.*

pgm. Also 17785-Shepparton at 2313 with *Contact Asia*. (Wood, TN)

AUSTRIA—Radio Austria Intl, 9870-Moosbrunn at 0146. (Charlton, ON) 13785 via Canada at 0535. (Maxant, WV)

BOLIVIA—Radio Universitaria (t) 4732, Cobija, at 0149 in SS. Very poor with RTTY QRM. (D'Angelo, PA)

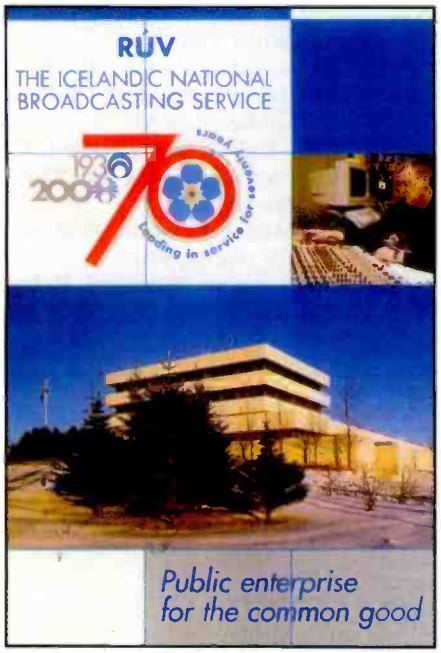
Radio San Miguel, Riberalta, 4930 with talk in SS at 0225. (Parker, PA)

BONAIRE—Radio Nederland Relay, 5975 in DD at 0410, 6190 in DD at 0356 and

A Guide To "GIG-Speak"

Here's a partial list of abbreviations used in the "Global Information Guide."

*	— (before or after a time) time the station came on or left the air
(l)	— (after a frequency) lower sideband
(p)	— presumed
(t)	— tentative
(u)	— (after a frequency) upper sideband
v	— variable time or frequency
//	— in parallel
AA	— Arabic
ABC	— Australian Broadcasting Corporation
AFN	— Armed Forces Network
AFRTS	— Armed Forces Radio TV Service
AIR	— All India Radio
Alt	— alternate
AM	— amplitude modulation, AM band
Anmt(s)	— announcement(s)
Anncr	— announcer
AWR	— Adventist World RadioBC broadcast(er)
BSKSA	— Broadcasting Service of Kingdom of Saudi Arabia
CA	— Central America
CC	— Chinese
Co-chan	— co-channel (same frequency)
comml(s)	— commercial(s)
CP	— Bolivia, Bolivian
CRI	— China Radio International
DD	— Dutch
DJ	— disc jockey
DS	— domestic service
DW	— Deutsche Welle/Voice of Germany
EE	— English
ECNA	— East Coast of North America
f/by	— followed by
FEBA	— Far East Broadcasting Association
FEBC	— Far East Broadcasting Company
FF	— French
freq.	— frequency
GBC	— Ghana Broadcasting Corp
GG	— German
GMT	— Greenwich Mean Time (UTC)
HH	— Hebrew, Hungarian, Hindi
HOA	— Horn of Africa
ID	— station identification
II	— Italian, Indonesian
Int/Intl	— international
Irr.	— irregular use
IRRS	— Italian Radio Relay Service
IS	— interval signal
JJ	— Japanese
KK	— Korean
LSB	— lower sideband
LV	— La Voz, La Voix (the voice)
MW	— mediumwave (AM band)
NBC	— National Broadcasting Corporation (Papua New Guinea)
OA	— Peru/ Peruvian
OC or O/C	— open carrier
PBS	— People's Broadcasting Station
PP	— Portuguese
PSA	— public service announcement
QQ	— Quechua
QRM	— man-made interference
QRN	— noise (static)
QSL	— verification
RCI	— Radio Canada International
Rdf.	— Radiodifusora, Radiodiffusion
REE	— Radio Exterior de Espana
RFA	— Radio Free Asia
RFE/RL	— Radio Free Europe/Radio liberty
RNZI	— Radio New Zealand International
RR	— Russian
RRI	— Radio Republik Indonesia
RTBF	— RTV Belge de la Communate Françoise
Relay	— transmitter site owned/operated by the broadcaster or privately operated for that broadcaster
relay	— transmitter site rented or time exchanged.
SA	— South America
SEA	— Southeast Asia
SCI	— Song of the Coconut Islands (transition melody used by Indonesian stations)
s/off	— sign off
s/on	— sign on
SIBC	— Solomon Is. Broadcasting corp.
sked	— schedule
SLBC	— Sri Lanka Broadcasting Corporation
SS	— Spanish
SSB	— single sideband
SWL	— shortwave listener
TC	— time check
TOH	— top of the hour
TT	— Turkish
TWR	— Trans World Radio
Unid	— unidentified
USB	— upper sideband
UTC	— Coordinated Universal Time (as GMT)
UTE, ute	— utility station
Vern	— vernacular (local) language
via	— same as "relay"
VOA	— Voice of America
VOIRI	— Voice of Islamic Republic of Iran
WCNA	— West Coast of North America
ZBC	— Zimbabwe Broadcasting Corporation



And another one bites the dust! R.I.P. to the Icelandic State Broadcasting Service shortwave relays. (Thanks Rich D'Angelo)

17895 in DD at 2100. (MacKenzie, CA) 9845 at 0012. (Charlton, ON)

BOTSWANA—VOA Relay, 4930-Moepeng Hill in EE to South Africa at 0347. (Parker, PA)

BRAZIL—(All in PP) Radio Rural, Campo Grande, 4755 heard at 0020 with PP talks, some vocals, simple "Rural" IDs. (D'Angelo, PA)

Radio Cancao Nova, Cachoeira Paulista, 4825 at 0336 with soft inspirational vocal, woman with ID and religious discussion. (D'Angelo, PA)

Radio Novo Tempo, Campo Grande, 4895 heard at 0050 with talks by man, some vocals, heavy CODAR QRM. (D'Angelo, PA)

Radio Nacional, Macapa, 4915 with music and ID at 0337. (Parker, PA)

Radio Clube do Para, Belem, 4885 with reverb anmts and music at 0323. (Parker, PA)

Radio Record, Sao Paulo, 6150 heard at 2350 with talk, ad string, ID and jingles. (D'Angelo, PA)

Radio Difusora do Amazonas, Manaus, 4805 at 0044 with Brazilian pops and man/woman hosts. Closes at 0100. (D'Angelo, PA)

Radio Brazil Central, Goiania, 11815 at 2335. (D'Angelo, PA)

Radio Nacional Amazonia, Brasilia, 11780 with music at 1710. (Wood, TN; Maxant, WV)

BULGARIA—Radio Bulgaria, 9400 in RR at 0512 with pops in RR and Slavic languages. Also 11700 with EE news features at 2305. (Wood, TN) 9400 in RR at 0315. (Parker, PA) 0333. (MacKenzie, CA) 11600 in RR at 2324 and 15700 in presumed BB at 1109. (D'Angelo, PA)

BURKINA FASO—Radio Burkina, 5030 at 2342 with FF talk and light pop vocals. Closedown anmts at 2359 and off at 0002. (D'Angelo, PA)

CANADA—Radio Canada Intl, 5840 via Sweden in AA to Mideast at 0228. (Parker, PA) 7325 in SS at 1210 and 9515 in FF at 1725. (Maxant, WV) 15235 at 1835 on origins of the Stanley Cup. (Charlton, ON) With pgm called "Blink" at 1851. IS, ID and into FF at 1900. (Wood, TN)

CBC Northern Service, 9625 at 1710 in a local Indian dialect. (Maxant, WV)

CKZN, St. John's, 6160 at 1000 on Labrador. (Maxant, WV)

CHILE—CVC—La Voz, 6070 in SS at 0404. (MacKenzie, CA) 11665, //11870 in SS at 0225. (Brossell, WI) 15230 with SS gospel music at 2030. (Maxant, WV) 17680 in SS at 1711. (Charlton, ON)

CHINA—China Radio Intl, 5915 in CC at 1405, 5965 in JJ at 1445, 9570 via Albania in CC at 0347, 9790 via Cuba at 0425 and 11840 at 2335. (MacKenzie, CA) 6020 via Albania at 0145. (Parker, PA) 6020 via Albania at 2359 with IS and ID. Also 11690 at 1213 mixing with HCJB and 11790 in CC at 2340. (Brossell, WI) 6040 via Canada at 1140 on the housing crisis there. (Fraser, ME) 0570 via Albania at 0006. (Charlton, ON) 15120-Beijing with EE to Asia heard at 0425. (Strawman, IA)

CPBS/CNR, 5030-Beijing in CC at 1348. (MacKenzie, CA) 9845-Beijing in CC at 1239. 11630-Lingshi in Mandarin at 2230. (Strawman, IA) 15385-Lingshi in CC at 0210. (Strawman, IA)

Voice of the Strait, 11590-Fuzhou in CC at 1205. (Brossell, WI)

Xizing PBS, 6110-Lhasa in Tibetan at 1140. (Brossell, WI)

Firedrake jammer, 7470 at 1155 against RFA via Mongolia. And 11540 at 1535 against RFA via Tajikistan. (Brossell, WI)

CROATIA—Voice of Croatia, 9925 via Germany in Croatian at 0018. (Chandler, ON) 2215 in EE. (Fraser, ME) 2330 in SS. (MacKenzie, CA)

CUBA—Radio Havana Cuba, 9505 with mailbag at 2058 and 9550 with news items at 2210. Also 11760 with DX pgm at 2050. (Maxant, WV) 11705 in SS at 0045. (MacKenzie, CA) 15370 in SS at 1729 and 15655 in SS heard at 1738. (Charlton, ON)

Radio Rebelde, 5025 in SS at 0334, also 6120 at 0350. (Wood, TN)

CZECH REPUBLIC—Radio Prague, 6080 at 0331 and 9445 at 0340. (Parker, PA) 6080 at 0345, 9870 at 0315 (MacKenzie, CA) 7345 at 0130. (Charlton, ON) 9415 at 2120. (Maxant, WV) 11600 at 2150. (Brossell, WI)

DJIBOUTI—Radio Djibouti, 4780 at 0300 sign on with music open, man with ID and anmts in AA. Koran recitation f/by long talk. (D'Angelo, PA) 0310 with talk in AA. (Wood, TN)

ECUADOR—HCJB, 9720 in SS at 0432 and 12040 in unid language at 0026. (MacKenzie, CA) 11720 at 2330. (Barton, AZ) 11960 at 1732. (Wood, TN)

La Voz del Napo, Tena, 3279 in SS with responsive prayers heard at 1007. (Wood, TN)

Radio Quito, 4919 at 1014 in SS with folk music and ID. (Wood, TN) 0248 with lively conversation, commls jingles and remote reports. (D'Angelo, PA)

EGYPT—Radio Cairo, 7270 with AA songs at 0255 and 9990 with EE ID at 2150. (Brossell, WI) 7270 at 0316 and 12050 in AA at 0020. (MacKenzie, CA) 9365 in AA at 0307. (Parker, PA) 9460 at 0001, 9990 at 2156 and 12050 in AA at 1633. (Charlton, ON) 9990 at 2110. (Maxant, WV)

ENGLAND—BBC, 6195 Singapore Relay, at 1435. (MacKenzie, CA) 9410 Cyprus Relay with soccer at 1917. (Parker, PA) 9480 (uncertain site) at 1225 and 11945 Thailand Relay at 1202. (Brossell, WI) 9660 at 1225. (Maxant, WV) 9660 via USA at 1110. (Fraser, PA) 15245-Wooferton in RR at 1608. (Charlton, ON) 15310 via Oman at 0319. (MacKenzie, CA) 15360 Singapore Relay with World Service at 0055. (Strawman, IA)

Far East Bcstng Assn., 9550 via Rwanda with AA vocals at 1926. (Charlton, ON)

FRANCE—Radio France Intl., 7135 in FF at 0426 and 17625 via French Guiana Relay in FF at 2125. (MacKenzie, CA) 11995 in FF at 1905. (Charlton, ON)

GABON—Africa Number One, 9580 in FF with news at 0533. (Wood, TN) 15475 in FF at 1650. (Charlton, ON)

GERMANY—Deutsche Welle, 6075 in GG at 0116 and 15705 in GG to South Asia at 1555. (Parker, PA) 9775 Rwanda Relay in GG at 2353. Also 11865 Portugal Relay in PP at 2340. (Brossell, WI) 9825 Portugal Relay in GG at 0332. (MacKenzie, CA) 15275 via Wooferton in GG at 1609, 15620 Portugal Relay in RR at 1746, 17860 Portugal Relay in FF at 1704. (Charlton, ON)

GREECE—Voice of Greece, 7475 at 0129. (Charlton, ON) 0410 in Greek. (Wood, TN) 9420 in Greek at 0319 and 15630 with EE news at 1533. (Parker, PA) 9420 in Greek at 0330. (MacKenzie, CA) 9420 in Greek at 2305 and 15630 in Greek heard at 0955. (Maxant, WV)

RS Makedonia, 7450 in Greek at 2205. (Brossell, WI)

GUATEMALA—Radio Buenas Nuevas, San Sebastian, 4799 in SS heard at 0314 with ID and what sounded like listener call-ins. (Wood, TN)

In Times Past...

Here's your monthly shortwave "blast from the past."

COLOMBIA—La Voz de Colombia HJCX, Bogota, 6018 in SS at 0510 on July 24, 1954. 5 KW. (Dexter, IA)

At least the Iranians are still friendly when it comes to issuing QSLs. (Thanks Rich D'Angelo)

Plovdiv has an ancient Roman Theater and is also home of Radio Bulgaria's main transmission site. (Thanks Jack Linonis, PA)

Radio Cultural, San Sebastian, 4800 at 0229 with rustic vocals and SS host. Off at 0252. (D'Angelo, PA)

HAWAII—KWHR, 12130 at 1224 with Jack Van Impe. (Brossell, WI) 17655 with pop/rock at 0045. (Barton, AZ)

HUNGARY—Radio Budapest, 6040 at 0059 sign on with multiple IDs, music fanfare and opening anmts. (D'Angelo, PA) 0125 in EE to NA. (Parker, PA) 6195 with DX pgm at 0250. (Brossell, WI) (*now in Hungarian only—gld*)

INDIA—All India Radio, 10330-Bangaluru in Asian language at 0210. Also 11620-Delhi in presumed Hindi at 0210. (Brossell, WI) 10330 in Hindi at 0405 and 11620 with their General Service at 1745. (Maxant, WV) 11620 in SS at 1635. (Charlton, ON) 15075-Bangaluru with "Dahliwood" music at 0243. (Parker, PA) 15185-Panaji (Goa) in listed Hindi service heard at 0413. (Strawman, IA)

INDONESIA—Radio Republik Indonesia-Makassar (Sulawesi) 4750 at 1020 with middle eastern-like music after long Koran session and anmts by man. (Barton, AZ)

IRAN—VOIRI, 7235 at 0226 giving frequencies and website URL. Off abruptly at 0228. (Brossell, WI) 11695-Sirjan at 1947. (Charlton, ON)

ISRAEL—Kol Israel, 11590 at 0340 with world news, headlines and weather. (MacKenzie, CA) 0330 opening with ID, news. (Wood, TN) 1900 with Farsi ID. (Charlton, ON)

Galei Zahal, 6975.4 heard at 0300 with news in Hebrew, woman with pops. (D'Angelo, PA)

ITALY—Radio Atalia Intl., 11800 in II at 0036. (MacKenzie, CA) 0126 in FF. (Charlton, ON) 2335 in II. (Fraser, ME) 11875 in presumed II at 2110 but deep in the mud with their familiar sign off. (Barton, AZ)

JAPAN—Radio Japan/NHK World, 6145 via Sackville at 0001. (Charlton, ON) 9535 at 1715 on private schools there. (Maxant, WV) 11730 on restaurants at 1545 and 11740 via Singapore in CC at 1210. (Brossell, WI) 11710 via Skelton in JJ at 1305. (Parker, PA) 17825 in JJ at 0343 and 17870 in EE at 2109. (Mackenzie, CA)

JORDAN—Radio Jordan, 11690 heard at 1547 with EE ID for "96.3 FM Radio Jordan." RTTY QRM on the low side. (D'Angelo, PA)

KUWAIT—Radio Kuwait, 9855 in AA at 2353. (Charlton, ON) 1945 in AA. Also 11990 in AA heard at 1755. (Charlton, ON)

LIBYA—Radio Jamahiriya, 17725 via France in EE with news items separated by brief instls. ID and pgm anmts at 1452. (Parker, PA)

LITHUANIA—Radio Vilnius, 9875 with EE ID at 2235. (Maxant, WV)

MADAGASCAR—RTV Malagasy, 5010 at 0348 with man in Malagasy and frequent mentions of Madagascar. ID at 0400 and choral singing. (D'Angelo, PA)

MALI—RTV du Mali, 5995 at 2245 with talks in FF and hi-life music. (Brossell, WI)

MEXICO—Radio Educacion, 6185 with SS music and anmts at 0700. (Maxant, WV)

MOROCCO—RTV Marocaine, 15345 in AA at 1619. (Charlton, ON)

Radio Medi Un, Nador, 9575 at 0519 in AA/FF with woman anncr and Middle Eastern pops. News at 0530. (Wood, TN) 2348 in FF. (Brossell, WI)

NETHERLANDS—Radio Nederland, 11655-Flevo at 1841, 15355 via Madagascar Relay in DD at 1614 and 17660 via Sackville in EE at 2025. (Charlton, ON) 11655 via Madagascar Relay in DD at 1750. (Brossell, WI) 15315 at 2040 on insurance claims there. (Maxant, WV)

NEW ZEALAND—Radio New Zealand Intl., 6095 with domestic events at 1000. (Barton, AZ) 6095 at 1430 with music of Count Basie. Also 15720 with pops at 0350. (MacKenzie, CA) 6095 at 0950, 9615 on real estate at 0520 and 11725 at 2045 with music from National Radio. (Maxant, WV) 9615 at 0539 on local storm damage. (Wood, TN)

NIGERIA—Voice of Nigeria, 7255 in an African dialect at 2203. (Brossell, WI) 15120 at 0749 in presumed Hausa, numerous mentions of Nigeria, into music and man with news. (D'Angelo, PA) 1923 with African music. (Charlton, ON) 2020 on troubles with oil refineries. (Maxant, WV)

NORTH KOREA—Voice of Korea, 6285 with martial music and talks in FF at 1143. (Brossell, WI)

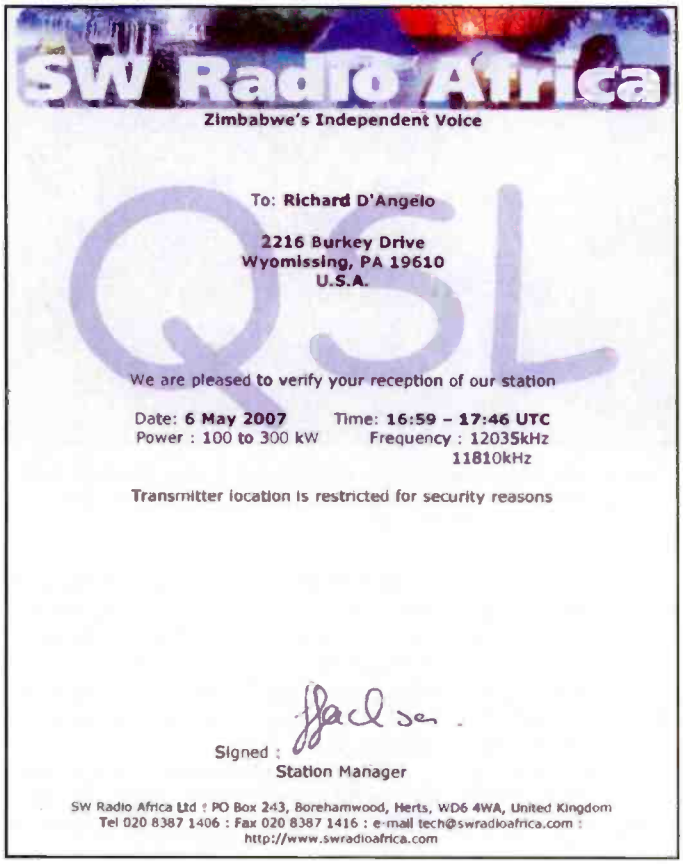
OMAN—Radio Sultanate of Oman, 17630-Thamarit in AA at 1530. (Parker, PA)

OPPOSITION—Open Radio for North Korea, 9930 via KWHR-Hawaii with soft instl music prior to opening of Korean language

This Month's Winner

To show our appreciation for your loggings and support of this column, each month we select one "Global Information Guide" contributor to receive a free book. Readers are invited to send in loggings, photos, copies of QSL cards, and monitoring room photos to me at *Popular Communications*, "Global Information Guide," 25 Newbridge Road, Hicksville, NY 11801, or by e-mail to popularcom @aol.com. The e-mail's subject line should indicate that it's for the "Global Information Guide" column. So come on, send your contribution in today!

Our book winner this month is **Robert Brossell of Pewaukee, Wisconsin**, who receives a 2008 edition of *Passport to World Band Radio* from Universal Radio. If you still aren't on the list to receive Universal's great free catalog of neat things radio it's high time you took action. Call them at (614) 866-4267, email them at dx@universal-radio.com, or drop them a note at 6830 Americana Parkway, Reynoldsburg, OH 43068. You'll be dealing with super people!



SW Radio Africa

Zimbabwe's Independent Voice

To: Richard D'Angelo

2216 Burkey Drive
Wyomissing, PA 19610
U.S.A.

QSL

We are pleased to verify your reception of our station

Date: 6 May 2007 Time: 16:59 – 17:46 UTC
Power : 100 to 300 kW Frequency : 12035kHz
11810kHz

Transmitter location is restricted for security reasons

Signed : Station Manager

SW Radio Africa Ltd : PO Box 243, Borehamwood, Herts, WD6 4WA, United Kingdom
Tel 020 8387 1406 : Fax 020 8387 1416 : e-mail tech@swradioafrica.com :
http://www.swradioafrica.com

SW Radio Africa, which beams to troubled Zimbabwe, doesn't put transmission sites on its QSLs "for security reasons." But most DXers know the locations, or know where to find the information. (Thanks Rich D'Angelo)

Radio Prague QSLed reception for Mike Adams in Florida way back in 1963!

pgm, which was mostly talk, and some EE pops. Closed with KWHR ID at 1158. (D'Angelo, PA)

Radio Marti, 11930-Greenville in SS at 1739. (Charlton, ON)

Radio Republica (to Cuba) 5900 in SS at 0243, 6100 in SS at 0332 and 6135 in SS at 0130. (Parker, PA) 5910 presumed via Germany with heated SS discussion at 0322. (Wood, TN)

Sudan Radio Service, 7120 via England at 0424. (MacKenzie, CA)

Radio Nacional Saharaui (to Morocco), 6300-Rabouni at 2342 with AA talk and music backgrounds, ethnic instrumentals, several IDs. Off at 2400. (Wood, TN)

Radio Free Asia, 11510 via Kazakhstan in unid Asian language at 1535. (Brossell, WI) 11605 via Tinian with Tibetan service at 1318. (MacKenzie, CA)

Radio Farda (to Iran) 9865 in Farsi at 0209. (Brossell, WI) 0550 with EE pops and anmts about Iraq in several languages. (Wood, TN)

Radio Liberty (to Russia), 11700 via Philippines in RR at 1208. (Brossell, WI)

Radio Voice of the People (to Zimbabwe) 9765 via Madagascar at 0357 sign on with open carrier. ID and frequency anmts at 0400 in EE and vernacular and IDs. (D'Angelo, PA)

PERU—Radio Altura, Cerro de Pasco, 5014 heard at 0247 with woman in SS, lively OA music from 0300. (D'Angelo, PA)

PHILIPPINES—Far East Broadcasting Co., 9430 at 1115 with a pgm of pops. (MacKenzie, CA)

PIRATES—Undercover Radio, 6925u variously at 0209, 0220, 1433, 1531, 1620, and 2355 with Dr. Benway. One time was testing new audio equipment, "broadcasting from the middle of nowhere." undercoveradio@gmail.com for emails. (Zeller, OH) 0030, 0303, and 2317 with mobile transmitter test, defeating Commander Bunny and the rodent revolution, email address. (D'Angelo, PA) 0115 saying "sit upright in a straight-back chair and listen to difficult music." Mentioned first anniversary broadcast from 2004, readings by William F. Burroughs. (Hassig, IL)

WBNY, 6925u at 1527 with trumpet fanfare and into talk by Commander Bunny, mention of Kracker Radio. Off at 1534. (Zeller, OH) 6950 at 0000 ranting about the Bush administration, talking about Commander Bunny for president. (Hassig, IL) 0121 with Paul Starr pushing votes for Commander Bunny, "Peter Cottontail" song, ID and what sounded like a bell for the end of a round of boxing. (Balint, OH)

The Crystal Ship, 6854 at 0126 with song from 60s "Hush," political editorial. (Hassig, IL) 6875 at 0050 and 0106 with rock and classic rock, some audio from *Life of Brian* and mention of Radio First Termer but also several Crystal Ship IDs and Belfast address. (Zeller, OH) 0130 with "The Poet," several IDs and rock. (D'Angelo, PA) 12471 varying to 12473 at 0146 with Bob Seeger songs, *Star Trek* parody. (Wood, TN)

Voice of Captain Ron Shortwave, 6925u at 0100 with heavy metal. (Hassig, IL) 0225 with heavy metal, numerous IDs. (Wood, TN)

WMPR, 6925u at 0012 with their usual pgming. Also noted at 0040 with techno, also at 0053 and 2349. (Wood, TN) 0008 with numerous IDs between techno dance, YL with "peace, love and understanding," however the male IDs always mentioned "dance party." As usual no address annced. (Zeller, OH) 0038 with rock, man with ID, woman with frequency anmt. (D'Angelo, PA) 6955 heard at 0115 with dance. (Hassig, IL)

Radio Free Euphoria, 6925u at 2302 with "Marijuana Get High" sung at open and close to the tune of "Hey, Hey, Goodbye." Captain Ganja discussing Jamaica, various sketches and rock. Said to be their "home grown service." (Zeller, OH) 2303 "Temple of the Expanded Mind in the Blissful State of Euphoria," article about marijuana research. Off at 2343. (D'Angelo, PA)

Radio 6/Radio 6X, 6936.7 at 0039 with oldies, doo-wop. Loud 60-Hz hum in their audio. (Hassig, IL)

KIPM, 6945u heard at 0041 with Ravel's "Bolero" under a story in which an actress invited Alan Maxwell to a play she was in and then to a party afterwards. (Hassig, IL)

Chicken Radio, 6925u at 2300 with talk and sketches on chickens, Chickenman material. No address heard. (Zeller, OH)

Wolverine Radio, 6925u at 0237 with rock, man annce, ID between numbers. Off at 0242. (D'Angelo, PA)

Pirate Radio Boston, 6925u at 0053 closing with "Beverly Hills." Earlier the same evening I heard the same host reading mail from listeners on 6924.83u. (Hassig, IL)

WTDR, 6945u at 2200 with heavy metal. (Hassig, IL)

MAC, 6850.8 at 0030 with "Paul Starr Show" playing The Beach Boys, Jan and Dean. (Hassig, IL)

Alas, no longer does the Kookaburra (Bokmakierie) bird's laughing call sound out on Radio Australia. (Thanks Mike Adams, FL)

Northwoods Radio, 6925u at 0312 with ID and call of the Loon. Also parody poetry and music. (Wood, TN)

PORTUGAL—RDP International, 15295 at 0145 with pop/dance. (Barton, AZ) (*I presume this was in PP—gld*) 15560 in PP at 1743. (Charlton, ON)

ROMANIA—Radio Romania Intl., 9535 at 1720 on film making. (Maxant, WV) 11735 at 1740 with variety pgm to 1757 close. (Strawman, IA) 9775-Tiganesti at 0014 and 11735-Tiganesti at 1732. (Charlton, ON)

RUSSIA—Voice of Russia, 7165-Vladivostok in CC at 1120. (Brossell, WI) 9515 at 0350. (MacKenzie, CA) 9665 via Moldova in SS at 0010, 9885 via Moldova in RR at 0159, 11675-Armavir at 1758 and 12040-Moscow in FF at 1909. (Charlton, ON) 9880-Armavir with "This is Russia" at 0403. (Wood, TN) 15425-Petropavlovsk in RR at 0256, 15475-Komsomolsk-Amur in RR at 0236 and 15605-Moscow in EE at 1528. (Parker, PA) 12040 with "Moscow Mailbag" at 1515. (Fraser, ME)

SAUDI ARABIA—BSKSA, 15435 in at 1752. (Charlton, ON)

SEYCHELLES—BBC Relay, 15420 at 0346. (Wood, TN)

SINGAPORE—Radio Singapore, 7235 in listed Indonesian at 1249. (Brossell, WI)

SLOVAKIA—Radio Slovakia Intl., 5930-Rimavska Sobota at 0120. (Chandler, ON) 9440 in SS heard at 0230 sign on. (Brossell, WI)

SOUTH AFRICA—Channel Africa, 9685 at 0545 with talk on science research there. (Wood, TN) 15235 in FF at 1645. (Brossell, WI)

SOUTK KOREA—KBS World Radio, 9515 monitored at 1635 on Caribbean embassies and 9650 (*via Canada—gld*) 1215 on truck production there. (Maxant, WV)

SPAIN—Radio Exterior de Espana, 6055 in SS at 0406. Also 1680 in SS at 2340 and 11815 Costa Rica Relay in SS at 0032. (MacKenzie, CA) 6055 in SS at 0331. (Wood, TN) 9535 in SS at 0004 and 17850 Costa Rica Relay in SS at 1809. (Charlton, ON) 11625 in SS with news at 2100. (Maxant, WV) 11815 with domestic rock at 2245. (Barton, AZ) 11910 via China in SS at 1205. (Brossell, WI) 17595 with SS soccer at 1512 and 21610 in SS at 1458. (Parker, PA)

SWAZILAND—Trans World Radio, 3240-Manzini at 0332 with choral vocals, religious talk in Ndau. Closed at 0345. (D'Angelo, PA)

SWEDEN—Radio Sweden, 6010 via Canada with news at 0139. (Charlton, ON)

TANZANIA—Radio Tanzania-Zanzibar, 11735 with usual Swahili at 2045. Off at 2100. (Strawman, IA)

TAIWAN—Radio Taiwan Intl., 7445 with markets and local weather at 1110. (Barton, AZ) 9680 via Florida in CC at 0440. (MacKenzie, CA) News in CC at 0505. (Maxant, WV) 11665 in CC with comedy pgm at 1545. (Brossell, WI) 11780-Huwai in CC at 1313. (Parker, PA) 15600 via Florida on preserving the Hakku culture heard at 2200. (Fraser, ME)

THAILAND—Radio Thailand, 9570-Udorn Thani on Thai-Chinese relations at 0016. (Charlton, ON)

TURKEY—Voice of Turkey, 5975-Emirler with news at 0308 and 17700-Ermirler in TT at 1445. (Parker, PA) 9460 in AA at 0325. (MacKenzie, CA)

TUNISIA—RTV Tunisienne, 7275-Sfax in AA/FF heard at 0422 with music and talk. (Wood, TN)

UGANDA—Radio Uganda, 4976 at 0402 with news, ID at 0417 and music segment. (D'Angelo, PA)

UKRAINE—Radio Ukraine Intl., 7440-Mykolayiv in EE at 0015. (Charlton, ON) 0205. (Parker, PA) 0335. (MacKenzie, CA) 0336 with pgm "Ukrainian Traditions." (Wood, TN)

UNITED STATES—Adventist World Radio, 12035 via Guam at 1805 with ID "We are the Voice of Hope." (Brossell, WI) 15235 via Julich at 2013. (Charlton, ON)

AFN/AFRTS, 5446.5u via Key West with ESPN Radio at 0356. (Parker, PA) 6350u-Pearl Harbor with sports heard at 1103. (Brossell, WI)

Family Radio/WYFR, 9280 via Taiwan in CC at 1233 and 11875 via Ascension at 2145. (Brossell, WI)

WMLK, 9265-Bethel on Yahweh at 1735. (Maxant, WV)

University Network, 7375 via Costa Rica with Dr. Scott's widow heard at 1015. (Maxant, WV)

Voice of America, 5890 in JJ at 1355. (MacKenzie, CA) 7555 via Kuwait with news items at 2335. (D'Angelo, PA) 11785 Thailand Relay in CC at 1117 and 12075 at 1215. I don't have a site or listing for this one. (Brossell, WI) 15150 Thailand Relay at 0035 with Firedrake jamming. (Strawman, IA) 15580 Morocco Relay heard at 1744. (Charlton, ON)

VATICAN—Vatican Radio, 7305 with news in EE and into SS at 0320. (MacKenzie, CA) 9645 at 2010. (Charlton, ON) 11625 at 0530 and 15570 at 1730. (Maxant, WV)

VIETNAM—Voice of Vietnam, 6175 via Canada in SS at 0338 in EE and 0400 into SS. (MacKenzie, CA)

YEMEN—Republic of Yemen Radio, 9780 in AA at 2145. (Brossell, WI)

ZAMBIA—Radio Zambia, 5915 at 0245 sign on with familiar fish eagle IS, choral anthem and opening ID heard at 0250, although voice modulation was muddy. (D'Angelo, PA)

And, once again, order is restored! An Everest of thank-yous to the following folks who sent in logs this time: Rick Barton, Phoenix, AZ; Stewart MacKenzie, Huntington Beach, CA; George Zeller, Cleveland, OH; Joe Wood, Greenback, TN; Jerry Strawman, Des Moines, IA; Robert Brossell, Pewaukee, WI; William Hassig, Mt. Prospect, IL; Robert Charlton, Windsor, ON; Charles Maxant, Barboursville, WV; Robert Fraser, Belfast, ME; Robert Parker, Pennsburg, PA; and Rich D'Angelo, Wyomissing, PA. ■

World News, Commentary, Music, Sports, And Drama At Your Fingertips

This listing is designed to help you hear more shortwave broadcasting stations. The list includes a variety of stations, including international broadcasters beaming programs to North America, others to other parts of the world, as well as local and regional shortwave stations. Many of the transmissions listed here are not in English. Your ability to receive these stations will depend on time of day, time of year, your geographic location, highly variable propagation conditions, and the receiving equipment used.

AA, FF, SS, GG, etc. are abbreviations for languages (Arabic, French, Spanish, German). Times given are in UTC, which is five hours ahead of EST, i.e. 0000 UTC equals 7 p.m. EST, 6 p.m. CST, 4 p.m. PST.

UTC	Freq.	Station/Country	Notes
0000	12040	HCJB, Ecuador	
0000	9775	Radio Romania International	
0000	9845	Radio Nederland, via Bonaire	
0000	9570	Radio Thailand	
0000	15150	Voice of America Relay, Thailand	CC
0000	6965	Galei Zahal, Israel	HH
0000	9925	Voice of Croatia, via Germany	Croatian
0000	6150	Radio Record, Brazil	PP
0000	6145	Radio Japan/NHK, via Canada	
0000	7115	IBC Tamil Radio, via Germany	Tamil
0030	15360	BBC Relay, Singapore	
0030	11800	Radio Atalia International, Italy	II
0030	11705	Radio Havana Cuba	SS
0030	4805	Radio Difusora do Amazonas, Brazil	PP
0030	4755	Radio Rural, Brazil	PP
0100	7475	Voice of Greece	GG
0100	6075	Deutsche Welle, Germany	GG
0100	6010	Radio Sweden, via Canada	
0100	5930	Radio Slovakia International	
0100	6040	Radio Budapest, Hungary	HH
0100	5025	Radio Rebelde, Cuba	SS
0100	4885	Radio Clube do Para, Brazil	PP
0100	4895	Radio Novo Tempo, Brazil	PP
0130	12085	Trans World Radio, via Russia	unid
0130	9870	Radio Austria International	
0130	11780	Radio Nacional Amazonia, Brazil	PP
0130	15295	RDP International, Portugal	PP
0130	6220	The Mighty KBC, Netherlands, via Lithuania	
0200	7440	Radio Ukraine International	UU
0200	9865	Radio Farda, USA	Farsi
0200	11665	CVC - La Voz, Chile	SS
0200	7235	VOIRI, Iran	
0200	4930	Radio Universitaria, Bolivia	SS
0200	4915	Radio Nacional Macapa, Brazil	PP
0200	4052	Radio Verdad, Guatemala	SS
0200	4965	The Voice, Zambia	
0200	7250	Voice of Russia, via Armenia	RR
0200	11925	Radio Bandeirantes, Brazil	PP
0200	3250	Radio Luz y Vida, Honduras	SS
0200	4834	Radio Maranon, Peru	SS
0230	15475	Voice of Russia	RR
0230	4780	Radio Buenas Nuevas, Guatemala	SS
0230	6115	Radio Tirana, Albania	
0230	4919	Radio Quito, Ecuador	SS; irregular
0300	5910	Radio Republica, via Germany	SS
0300	4780	Radio Djibouti	AA
0300	4800	Radio Buenas Nuevas, Guatemala	SS
0300	15310	BBC Relay, Oman	
0300	6055	Radio Exterior de Espana, Spain	SS
0300	3240	Trans World Radio, Swaziland	various local
0300	5446.5	AFN/AFRTS, Key West	
0300	7270	Radio Cairo, Egypt	
0300	7305	Vatican Radio	EE/SS
0300	5915	Radio Zambia	
0300	5014	Radio Altura, Peru	SS
0300	11710	RAE, Argentina	FF
0300	9460	Voice of Turkey	AA
0300	4825	Radio Cancao Nova, Brazil	PP
0300	4810	Radio Transcontinental, Mexico	SS
0300	4828	ZBC/Radio Zimbabwe	
0300	9970	RTBF, Belgium	FF
0300	3340	Radio Misiones International, Honduras	SS/EE
0300	4750	Radio Peace, Sudan	unid
0330	11590	Kol Israel	
0330	5010	RTV Malagasy, Madagascar	Malagasy
0330	15420	BBC Relay, Seychelles	
0330	4930	Voice of America Relay, Botswana	
0330	6175	Voice of Vietnam, via Canada	
0330	6100	Radio Republica, via England	SS
0330	4790	Radio Vision, Peru	SS
0400	7120	Sudan Radio Service	
0400	7275	RT Tunisienne, Tunisia	AA
0400	4976	Radio Uganda	
0400	9765	Radio Voice of the People, via Madagascar	
0400	9790	China Radio International, via Cuba	CC
0400	7135	Radio France International	FF
0400	10330	All India Radio	HH
0400	15185	All India Radio, Panaji (Goa)	Hindi
0400	15515	Radio Australia	
0400	4960	Voice of America Relay, Sao Tome	
0400	11530	Denge Mesopotamia	Kurdish
0400	5910	Marfil Estereo, Colombia	SS
0400	6110	Radio Fana, Ethiopia	vern
0400	7260	RT Algerienne, Algeria, via England	AA
0430	9745	HCJB, Ecuador	SS
0430	3220	Radio Sondergrense, South Africa	Afrikaans
0430	4770	Radio Nigeria	

UTC	Freq.	Station/Country	Notes
0500	7255	Voice of Nigeria	
0500	4775	Trans World Radio, Swaziland	unid
0500	9580	Africa Number One, Gabon	FF
0500	9575	Radio Medi Un, Morocco	Ff/AA
0500	9400	Radio Bulgaria	RR
0500	6010	La Voz de su Concencia, Colombia	SS
0500	4777	Radio Gabon	FF
0500	7240	Channel Africa, South Africa	
0530	9615	Radio New Zealand International	
0530	9685	Channel Africa, South Africa	
0530	9865	Radio Farda, USA	Farsi
0530	11625	Vatican Radio	
0530	6185	Radio Educacion, Mexico	SS
0530	5005	Radio Nacional, Equatorial Guinea	SS
0600	4845	Radio Mauritanie, Mauritania	AA
0700	9525	Star Radio, Liberia, via Ascension	
0700	6010	Radio Mil, Mexico	SS
0800	9690	Voice of Nigeria	Hausa
0800	6030	CFVP, Canada	relay CKMX
0900	4910	ABC, Australia	
0900	5035	Radio Aparecida, Brazil	PP
0930	7320	Radio Rossii, Russia	RR
1000	4919	Radio Quito, Ecuador	SS
1000	6095	Radio New Zealand International	
1000	7375	University Network, via Costa Rica	
1000	3279	La Voz del Napo, Ecuador	SS
1000	6890	KNLS, Alaska	
1000	6160	CKZN, Newfoundland, Canada	
1000	4747	Radio Yura, Bolivia	SS
1000	15190	Radio Africa, Equatorial Guinea	
1100	9430	Far East Broadcasting Co., Philippines	CC
1100	7165	Voice of Russia	CC
1100	6350	AFN/AFRTS, Hawaii	
1100	7445	Radio Taiwan International	
1100	9930	Open Radio for North Korea, via Hawaii	KK
1100	15700	Radio Bulgaria	BB
1100	3205	Radio West Sepik, Papua New Guinea	
1100	3925	Radio Nikkei, Japan	JJ
1130	6285	Voice of Korea, North Korea	FF
1130	4750	Radio Republik Indonesia, Makassar, Sulawesi	II
1130	4930	Radio Universitaria, Bolivia	SS
1200	11590	Voice of the Strait, China	CC
1200	11700	Radio Liberty, via Philippines	RR
1200	9650	Radio Korea, South Korea	
1200	11690	China Radio International	
1200	12130	KWHR, Hawaii	
1200	11740	Radio Japan/NHK, via Singapore	
1200	11850	Polish Radio, via Germany	
1230	7235	Radio Singapore International	
1300	13580	Radio Havana Cuba	
1300	9485	Shiokaze, Japan via Taiwan	JJ
1300	11605	Radio Free Asia, Via Tinian, No. Marianas	Tibetan
1300	72905	Traxx FM, Malaysia	
1300	9525	Voice of Indonesia	various
1300	9780	KNLS, Alaska	CC
1330	13680	Gospel For Asia, via Germany	various
1430	21470	BBC via Ascension	
1430	17775	Voice of Turkey	TT
1500	15705	Deutsche Welle, Germany	GG
1500	17725	Radio Jamahirya/V. of Africa, Libya	
1500	17595	Radio Exterior de Espana, Spain	SS
1530	17630	Radio Sultanate of Oman	AA
1530	11510	Radio Free Asia, via Kazakhstan	unid
1530	11690	Radio Jordan	
1600	9515	Radio Korea, South Korea	
1600	15345	RTV Marocaine, Morocco	AA
1600	15475	Africa Number One, Gabon	FF
1630	15235	Channel Africa, South Africa	FF
1700	15435	BSKSA, Saudi Arabia	AA
1700	17860	Deutsche Welle, Germany, via Portugal	FF
1700	9535	Radio Romania International	
1700	9625	CBC Northern Quebec Service, Canada	unid
1700	11775	Caribbean Beacon, Anguilla	
1700	13830	Voice of Oromo Liberation, via Germany	Oromo
1730	11735	Radio Romania International	
1730	11930	Radio Marti, USA,	SS
1730	11990	Radio Kuwait	AA
1730	11620	All India Radio	
1730	15560	RDP International, Portugal	PP
1800	11655	Radio Nederland	
1800	12035	Adventist World Radio, Guam	
1830	15235	Radio Canada International	
1830	15345	Radio Nacional, Argentina	SS
1900	9410	BBC, Cyprus Relay	
1930	9550	Far East Broadcasting Co., England, via Rwanda	AA
1930	11695	VOIRI, Iran	
2000	17660	Radio Nederland, via Canada	
2000	15120	Voice of Nigeria	
2000	15320	CVC - La Voz, Chile	SS
2030	11735	Radio Tanzania, Zanzibar	Swahili
2100	17625	Radio France Intl, via French Guiana	FF
2100	9990	Radio Cairo, Egypt	
2100	11875	Radio Atalia International	II
2130	9780	Rep. of Yemen Radio	AA
2130	11600	Radio Prague, Czech Republic	
2200	7450	RS Makedonias, Greece	GG
2230	9875	Radio Vilnius, Lithuania	
2230	11815	Radio Exterior de Espana, Spain	SS
2230	5995	RTV Malienne, Mali	FF
2230	9704	La Voix du Sahel, Nigeria	FF
2300	9420	Voice of Greece	Greek
2300	15230	Radio Australia	
2330	6300	Radio Nacional Saharaui, Algeria	AA/SS
2330	9855	Radio Kuwait	AA
2330	7555	Voice of America Relay, Kuwait	
2330	9775	Deutsche Welle Relay, Rwanda	GG
2330	11975	China Radio International, via Mali	CC
2330	6020	China Radio International, via Albania	
2330	11815	Radio Brazil Central, Brazil	PP
2330	5030	Radio Burkina, Burkina Faso	FF
2330	4835	RTV du Mali	FF
2330	9490	Democratic Voice of Burma, via Germany	Burmese

New, Interesting, And Useful Communications Products

Blaster Corporation's PB B'laster breaks loose the surface tension of frozen parts and protects against further rust and corrosion.

Blaster Corporation's PB B'laster

Those of you heading out this fall to tackle the maintenance of rusted, corroded antenna and tower hardware might want to bring along a can of Blaster Corporation's PB B'laster (Part #16-PB), an all-purpose penetrating catalyst that can also be used as a lubricant and rust inhibitor. According to the company, PB B'laster's capillary action allows it to squeeze into the tightest cavities and attack rust from all angles. Its surfactant works on parts even when they're wet, and it displaces moisture.

PB B'laster costs $4.50. For more information, visit www.blasterproducts.com.

CCRadio-SW

C. Crane has announced a new addition to its product line, the CCRadio-SW AM/FM/Shortwave Radio. According to the company, the radio's built-in Twin Coil Ferrite AM Antenna provides AM reception in the same class as the CCRadio plus, in addition to FM. As a shortwave receiver, right off the whip antenna, it combines sensitivity, selectivity, and audio performance unusual in a radio of this price and size (7.25 x 11.25 x 3.5 inches HWD; weight: 4.2 pounds). The five-inch speaker is accurate, pleasant, and reproduces deep bass sounds.

The CCRadio-SW offers a large, easy-to-read LCD display. Its features include RF gain control, bandwidth control, bass and treble controls, fast and slow tuning, 50 memories, lighted buttons, stereo line output and headphone jack, and IF Output for input to a computer. It runs on four "D" size batteries or four backup "AA" batteries (not included). A built-in charging circuit will recharge optional NiMH batteries right inside the radio. AC Adapter and antenna connectors included.

The cost is $149.95 with free shipping. For more information, visit www.ccrane.com.

C. Crane's CCRadio-SW AM/FM/Shortwave Radio offers a five-inch speaker for accurate, pleasant, deep bass sounds.

MFJ Telescopic Masts

MFJ has announced two new versions of telescopic masts: the MFJ-1906/1908 Hose Clamped Telescopic Mast and the MFJ-1906H/1908H Military QuickClamped Telescopic Mast. According to the manufacturer, these are very strong, heavy-duty telescoping masts manufactured of .125-inch-thick wall fiberglass tubing. Each has a 2-inch O.D. bottom section and a 3/4-inch O.D. top section. They will support small Yagis, verticals, loops, full-size dipoles, G5RVs, and other antennas.

The MFJ-1906/MFJ-1906H (which retail for $139.95/$189.95, respectively) are 33 feet extended, 6 feet collapsed, come in six 6-foot sections, and weigh 13 pounds. The MFJ-1908/MFJ-1908H ($179.95/$229.95) are 43 feet extended, 8 feet collapsed, and come in six 8-foot sections, and weigh 16 pounds.

The MFJ-1906 and MFJ-1908 have five stainless steel hose clamps (use nut/screwdriver); the MFJ-1906H and MFJ-1908H have five military-quality UV protected QuickClamps. MFJ-1906/1908 fiberglass telescopic masts must be guyed at two levels minimum when fully extended.

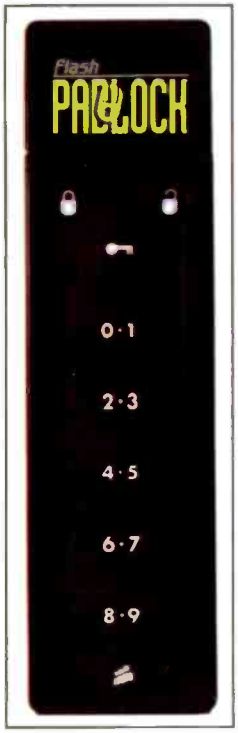
An optional mast base mount, the ATB-65, retails for $69.95 (see www.hygain.com).

MFJ's Telescopic Masts are protected by the company's No Matter What one-year limited warranty. To order, receive a free catalog, or for your nearest dealer, contact the company at MFJ, 300 Industrial Park Road, Starkville, MS 39759; Phone: 800-647-1800; Fax: 662-323-6551; Web: www.mfjenterprises.com.

The MFJ-1906 Hose Clamped Telescopic Mast will support small Yagis, verticals, loops, full-size dipoles, G5RVs, and other antennas.

Corsair Introduces "Flash Padlock" Secure USB 2.0 Drives

Corsair, a provider of computer and flash memory products, launched the Flash Padlock family of affordable USB 2.0 drives for securing data while on the go. The Flash Padlock line addresses the need for secure data storage through hardware technology, rather than software. It features "Auto-Locking" so the user doesn't need to remember to enable the protective feature; it will automatically lock and protect itself after removal from the computer.



Corsair's Flash Padlock USB 2.0 drives secure your data with "Auto-Locking"—they will automatically lock and protect themselves after removal from a computer.

With a simple user-programmable touch-pad security PIN entry system, Flash Padlock can be unlocked quickly for use as a standard USB flash data drive. It is impervious to "brute force" hacks or keystroke loggers. Additional features include platform independence (works on Windows, Mac, and Linux platforms without the need of additional software) and ease of use (direct keypad access and indicator lights make locking/unlocking simple and understandable).

Corsair Flash Padlock 1-GB and 2-GB versions are available immediately and are priced at $29.99 and $39.99, respectively. For more information, visit www.corsair.com/products/padlock.aspx.

Vivee, A Voice Interactive Voice Enhanced Email Service From USTelematics

Vivee, short for Voice Interactive Voice Enhanced Email, is a new online service from USTelematics that reads your email or text to you while you're driving or otherwise engaged with more important things. When you have incoming emails or texts, Vivee alerts you so you can *listen* to your messages instead of trying to read them. Compatible with many different digital devices, it features an animated character that "speaks" your email and SMS text messages to you. Vivee connects to the Internet through the Verizon Wireless EVDO high-speed network. When fully installed in any compatible device, including laptops and USTelematics Multimedia Car PCs, it also offers full wireless Internet connectivity, at speeds comparable to many DSL services.

The service is available through software loaded on your existing Windows or Windows Mobile device, with more compatibilities coming soon, including iPhone. Vivee software for pre-existing devices costs $29.99. The Vivee service is offered on a free 90-day-trial basis and then costs $4.99 per month.

For more information, visit www.ustelematics.com.

Vivee's animated character "speaks" your email and SMS text messages to you so you can keep your eyes on the road.

Holiday Gifts Ideas from CQ

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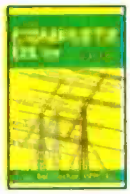

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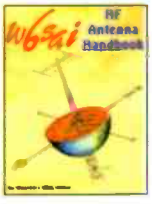

One of ham radio's most respected authors, W6SAI was known for his easy-to-understand, down-to-Earth, writing style. In keeping with this tradition, this book is a thoroughly readable text for any antenna enthusiast, jam-packed with dozens of inexpensive, practical antenna projects that work!

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by Ron McCracken, KG4CVL / WPZX486

Know The Joy Of Serving

Missing child! Word spread through our school like wildfire. Nothing strikes terror in any heart like those two words.

The police were alerted. A search was mounted in no time by anxious parents and teachers. Some had CB radios. Quickly, we realized how much those radios increased the efficiency of the searchers.

Late that night, the student was found safe and sound, in a railway station, 40 miles away. The lesson of the CB radios stayed with me. Soon, some of those searchers launched a REACT Team to serve our area in future emergencies.

That was my introduction to CB radio, and to REACT. For almost 30 years our REACT Team has continued to serve its community and the surrounding area with safety communications. Over those years it has built a close relationship with police and other emergency services it supports.

Years later, another student was struck and killed as he bicycled on a nearby highway. Although that outcome was tragic, our REACT Team took consolation in knowing that its CB radios had sped help to the scene in minutes. Emergency personnel arrived as fast as humanly possible, all thanks to those CB radios.

Luckily, happy endings far outnumber the sad. Our REACT Team helped summon aid for a disabled ice fisherman trapped in a sudden blizzard that swept our lake. REACT monitors have assisted a number of boaters in distress on Lake Simcoe, Ontario, Canada, over the years, too.

I hope I helped save a driver stranded in his big rig during a Kansas blizzard one bitter cold February night. "Skip" propagation brought that call in at 2 a.m. It took 30 minutes to piece together from his broadcasts the information I needed to give his dispatcher. What a glow of satisfaction you experience after helping with such an incident. I never did hear the outcome of that call.

And those are only just a few of the many REACT experiences that have thrilled just one Team over the decades.

New Roles

In more recent years, the cell phone's advent has changed our REACT Team's role. Oh, we continue to monitor for distress calls and to assist authorities in emergencies. In fact, REACT Teams invested hundreds of thousands of hours last year in the monitoring of distress frequencies.

But now, more than ever before, the REACT role focuses on emergency *prevention*. Teams provide safety communications for the many community walkathons, bikeathons, local fairs, car rallies, you name it.

REACT volunteers stationed along routes or embedded in parades and other events watch for and report injuries, safety hazards, etc. When a medical emergency or other incident does arise, help can be on the way in an instant. Missing children, separated from their parents in the crowds, can be reunited with mom and dad in short order.

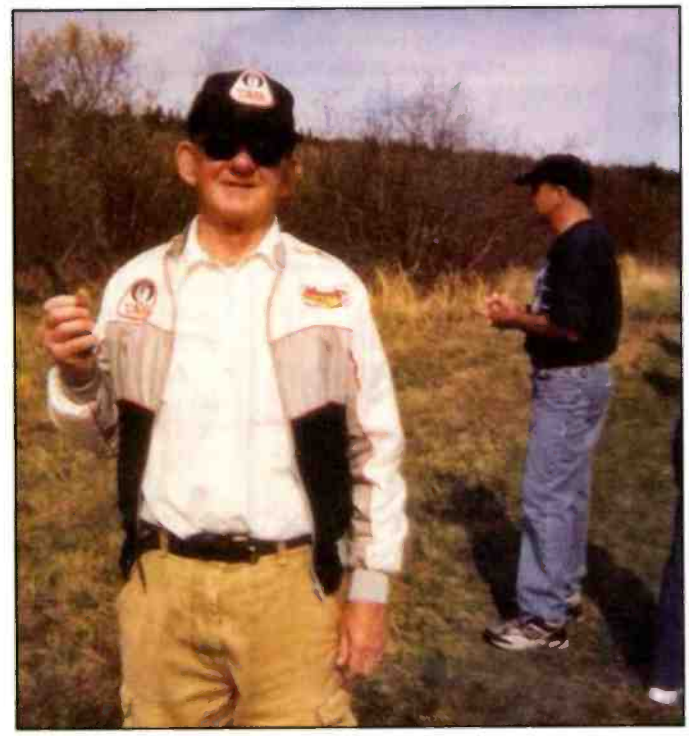
Teams also provide guest speakers who address safety topics for community groups. REACT safety displays in malls, at fairs, and other venues offer information to the public on radio safety, severe weather, and other subjects.

FRS radio is all the rage these days. Shoppers, campers, and hunters all use FRS to keep in touch. Many new REACTers enter the service through FRS. REACT Teams have begun to conduct "SOS Drills" across the continent to show people just how valuable their FRS radios can be in emergencies. They also teach owners how to use their radios correctly in emergencies. (The Kansas distress call above that took 30 minutes should have taken only one or two. Precious time was wasted. That can cost lives.)

You, Too

Whether or not you even have a radio at this point, you can combine your desire to serve your community with your interest in the radio hobby. Thousands of small towns across this nation need a REACT Team to bolster their emergency services. Local organizations need the benefits of REACT safety radio communications for community events.

If your town has a REACT Team, join it and add your radio skills to those of other dedicated volunteers. If there is no



Penobscot, Maine, REACTer Jim Koritzky helps a blind birder enjoy an outing at Fields Pond Audubon Nature Center. REACT volunteers accompany blind bird enthusiasts to provide safety communications while they enjoy their hobby.

REACT Team, form one. It only takes you and a couple of like-minded friends to launch a Team.

FRS units can be your starter radios. CB is another possibility. Check yard sales for some great CB bargains that can get your Team started. Neither type requires a license. (Note, however, that GMRS channels 15 through 22 in the newer FRS/GMRS "combo" radios do require an FCC license. Please avoid those channels. In an emergency, those licensed GMRS operators can be a great help to someone—maybe even you—so your consideration will pay off.)

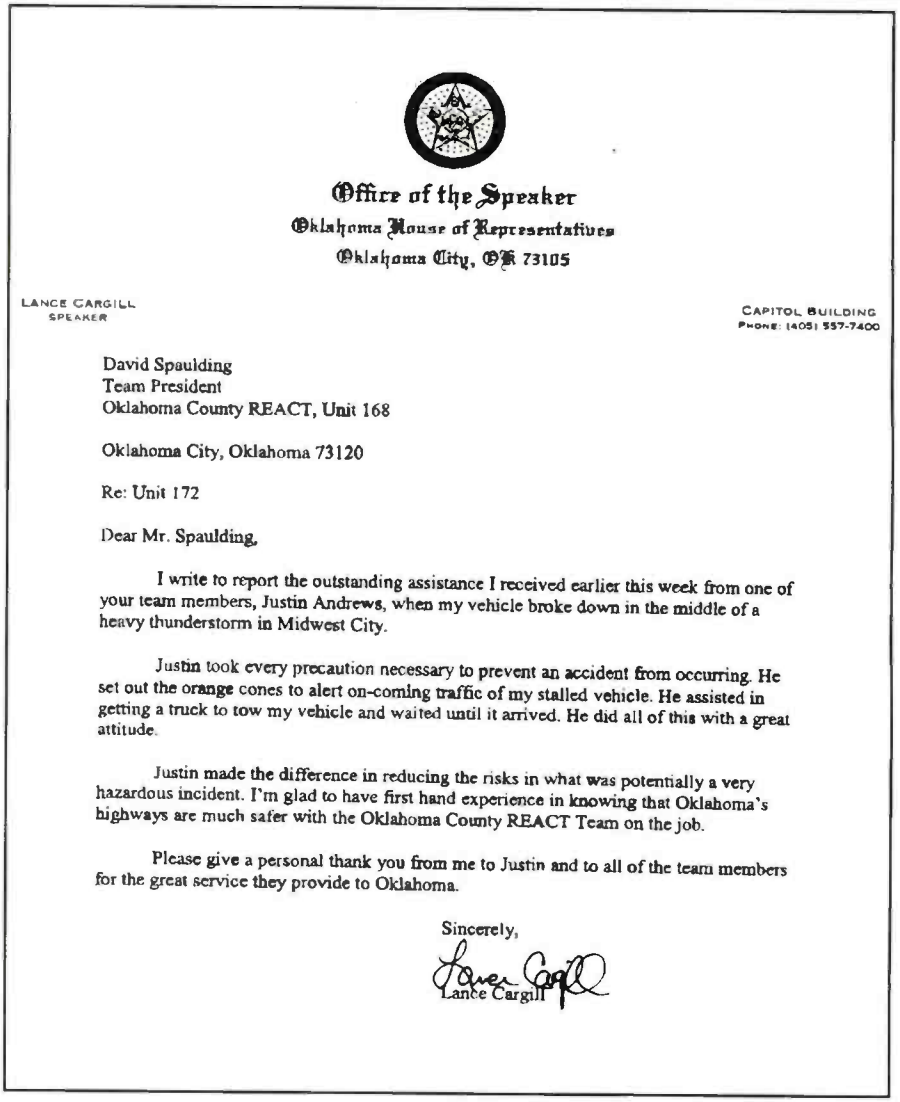
Visit www.REACTintl.org and click on "Team Directory." Then click on your state on the map for a list of Teams and contact information. If there is no Team nearby, request a "Team Charter Application Kit" to form a Team. You, too, can know the joy and satisfaction of serving your community while you pursue your radio hobby as part of a REACT Team.

What Joys There Are In Helping

Penobscot REACT (Maine) puts its radios to work for the blind. REACTers accompany blind birders on nature walks and bird counts at the Fields Pond Audubon Nature Center. What joy that gives to sighted REACTers. Radios enable them to maintain contact or summon aid in an emergency.

Oklahoma County REACT (Oklahoma) recently received a surprise letter. It came from the Speaker of the Oklahoma State Assembly. His vehicle was disabled on a busy roadway, blocking traffic and creating a safety hazard. A passing REACTer stopped to assist, setting out safety cones to divert traffic and calling for a wrecker. He checked with the driver only to discover whom he'd been assisting. The letter will be a nice testimony to the Team's abilities and a source of great pride.

And there was more mail...REACT HQ recently received a nice letter of thanks from a motorist who had been stranded on busy I-90 in the Cleveland area. He wanted to thank the REACT Team that had helped him, but hadn't gotten its name. Great Lakes REACT (Ohio) turned out to be his benefactor. He was so grateful he determined to get his thanks to them via REACT HQ. A nice surprise for another deserving Team.



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PHONE: (405) 557-7400

David Spaulding
Team President
Oklahoma County REACT, Unit 168

Oklahoma City, Oklahoma 73120

Re: Unit 172

Dear Mr. Spaulding,

I write to report the outstanding assistance I received earlier this week from one of your team members, Justin Andrews, when my vehicle broke down in the middle of a heavy thunderstorm in Midwest City.

Justin took every precaution necessary to prevent an accident from occurring. He set out the orange cones to alert on-coming traffic of my stalled vehicle. He assisted in getting a truck to tow my vehicle and waited until it arrived. He did all of this with a great attitude.

Justin made the difference in reducing the risks in what was potentially a very hazardous incident. I'm glad to have first hand experience in knowing that Oklahoma's highways are much safer with the Oklahoma County REACT Team on the job.

Please give a personal thank you from me to Justin and to all of the team members for the great service they provide to Oklahoma.

Sincerely,

Lance Cargill

Thank You letters like this are rare. Oklahoma County REACT was proud to get it after unknowingly helping the Speaker of the Oklahoma House of Representatives.

Your Feedback Is Welcome

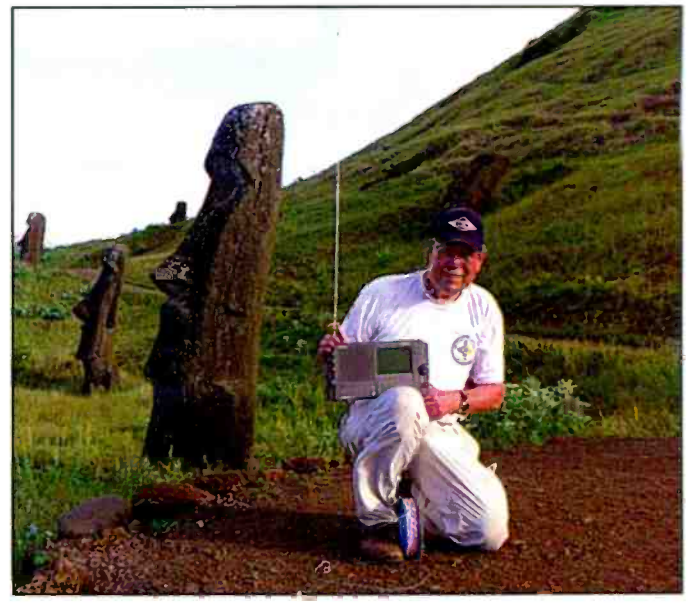
Your feedback to this column is a joy, too. Lately, it has picked up and we greatly appreciate that. Last month's column brought input from the Civil Air Patrol and the U.S. Marines. We welcome your take on it, too. Drop a note to Editor@PopularCommunications.com, and please indicate that it should be forwarded to "REACT In Action." We look forward to hearing from you. ■

by Bruce A. Conti, BAConti@aol.com

DXpedition!

Like the naturalist on an African safari, the mountain climber seeking to conquer another peak, and the astronomer searching the sky for undiscovered galaxies, intrepid DXers will travel to extremes for the excitement of capturing rare long-distance AM broadcast signals. They go on a DXpedition (a radio expedition, that is), solo or as a group, to a remote location away from noise and interference. And every November, "Broadcast Technology" highlights DXpeditions from various locations around the world. Here are four such DXpeditions from exotic tropical environs to more familiar stateside surroundings, recounted in the words of DXpeditionists who partook.

There are two common denominators to all of these DXpeditions. Foremost is the location, as each took place on the seashore. The combination of the high conductivity of salt water along with a clear horizon creates optimal conditions for long-distance reception. Secondly, the 800-kW signal of Radio Farda on 1575 kHz from the United Arab Emirates was logged at all locations, an amazing testament to the advantages of high power and a "split" frequency exactly halfway between the domestic channels of 1570 and 1580 kHz. Each report includes selected logs, all times are UTC.



John Bryant, with Eton E1 receiver and a roll of wire, preparing to DX under the watch of the Moai stone heads of Easter Island.

Easter Island—John Bryant

Recently, aspects of my life aligned so that I was able to fulfill a lifelong dream and visit fabled Easter Island in the southeastern Pacific. Although my primary purpose was to visit the myriad archeological sites, view the hundreds of giant stone heads and get to know the inhabitants of this "most isolated community in the world," I could not possibly visit such an exotic location without testing its potential as a location for very long-range mediumwave DXing. Since the nearest concentrations of MW broadcasters were on the west coast of South America, 2,300 miles to the east, and in New Zealand, 4,300 miles to the southwest, there was every likelihood that Easter Island might be a prime DX location.

Easter Island is a triangular volcanic island measuring about 10 miles on a side. The 3,300 inhabitants are concentrated in a single village, Hangaroa, on the southwest corner of the island, also the only location of an AC power grid. Since I knew that I would be 12-volt DXing from, at best, a rental car, and since I was quite concerned about luggage weight and security screening, my DXing equipment choices were both critical and limited. After a good deal of thought, I chose the marvelous Eton E1-XM as my primary receiver and the small Kaito KA1103 as back-up; the Eton E1-XM had recently supplanted my long-cherished Sony 2010 as my favorite DXing portable. I was not disappointed in either receiver!

In my many years of seaside DXing, I've never found an antenna that performed as well as a Beverage, so I selected two 500-foot wires as my antennas; weight and bulk concerns led me to adopt the Beverage-On-Ground (BOG) configuration and a very light 28-gauge, Teflon-coated wire. I was concerned about the BOG configuration and using such tiny wire; again, I was not disappointed.

My favorite full-size headphones, a magnificent new Edirol R-09 digital audio recorder and my trusty *World Radio TV Handbook* (*WRTH*) rounded out the DX package.

The distances involved in Pacific-based DXing are enormous. With the 2,400-mile-width of the United States in mind, the distances from Easter Island to anywhere are simply staggering: it is 2,300 miles to Chile, 4,300 miles to New Zealand, and 5,300 miles to the nearest edge of Australia; most of the United States, including the Hawaiian Islands, lies at about the distance of eastern Australia, 5,300 miles. Beyond those "close-in" locations, distances get truly planetary: Western Europe and Japan are about 8,500 miles away, while coastal China lies out at 9,500; to go beyond that at MW frequencies is simply unthinkable.

As I planned the DXpedition, I anticipated hearing quite a few coastal South American stations from my Easter Island location. I also expected to hear a decent number of New Zealand broadcasters, mixing with a few of the stronger Australians. I also eagerly anticipated hearing a number of stations from the island nations of the Pacific. Since friend and well-known South American DXer Rocco Cotroneo had recently heard several of the largest Japanese MW stations from the Chilean coast, I, too, hoped to hear the biggest of the NHK [Japan's Nihon Hoso Kyokai] stations.

My DX shack turned out to be a small Japanese SUV, ruggedized and adapted to the rut and rock-strewn gullies that are laughably called "main roads" outside of Hangaroa village. My location on the island, except for the first familiarization session, was near the Te Peu archeological site on the upper portion of the northwest shore. This was as far north of Hangaroa, about six miles, as the road ran; since none of the more popular archeological sites were nearby and the road was so poor, the site was about as isolated, both electrically and physically, as possible.

The remote Easter Island DXpedition site on the edge of a cliff overlooking the Pacific Ocean.

The isolated island cottage off the coast of Salvador de Bahia, Brazil.

The view of an inviting tropical beach from the Brazil DXpedition site.

The spot that I chose was on a plateau atop a 200-foot northwest-facing cliff, looking out across the broad Pacific into quite magnificent sunsets. I ran one antenna due west, unterminated, directly to the cliff, 480 feet away. That antenna was used, directly, for all Pacific DX and "over the shoulder" for South America. The second BOG ran due north, pointing at Central and North America.

The DX during my first familiarization evening session was about what I expected: I started at 0039 UTC, almost an hour before local sunset, and I found the MW dial covered with either carriers or audio from South America. The only surprise that evening was from how far north many of the signals were coming: my first logged station was Radio Programas del Peru, 730 kHz, Lima, which was just booming in. That logging was closely followed by Radio San Francisco, 850 kHz, Guayaquil, Ecuador, practically off the side of my east-west Beverage and booming in, as well.

The rest of that evening followed suit. By sunset, there was what seemed to be South American audio on almost every channel from 540 to 1700 kHz. I logged a number of Argentine stations, especially above 1600 kHz, and what seemed to be every station on the air in either Lima or Guayaquil.

Since there was already DX on the band when I turned on an hour before sunset, I decided to begin all other sessions at 0000 UTC, fully 90 minutes before sundown. When I flipped the switch, I began the most surprising and thrilling DX session of my 53-year DX career. In one night, I logged all continents, 22 countries, and 122 stations...all but a few were IDed by station ID or by parallels. The conditions were absolutely fabulous: in one night, I logged from Egypt clear around to India! I logged 70 stations from Australia and New Zealand combined. The best receptions of the first full night were hearing my only Brazilian, Radio Tupi, 1280 kHz in Rio, my first from North Africa, Algeria on 531 kHz, and hearing 1566 AIR Nagpur for 20 minutes, including a full English ID and the 5-minute English news that followed. I had no idea that the whole world would be open to me on MW from isolated Easter Island!

The remaining three all-night DX sessions followed very much the same pattern: Carriers from Europe, North Africa, and the Middle East would appear about 90 minutes before local sunset, on the 9-kHz spacing. There would also be a few early-bird South American carriers or low audio about the same time. At 60 minutes before sunset, European, et al, audio signals would appear. Most of those signals would be only moderate level, but some of the Spanish and some of the Middle Eastern signals were startling in their strength.

The really long-haul signals were pretty much done by the time the sun touched the horizon at 0130, but by then South Americans crowded the dial. By 0230, full dark, signals from eastern North America began to shoulder aside many of the South Americans. In the next two hours, the spotlight seemed to travel rather swiftly westward across the United States, with Cleveland and Charlotte being followed by Chicago and St. Louis and then by Denver, Salt Lake City, and Albuquerque.

By 0500, the spotlight had swung to the U.S. west coast, with the large majority of the stations being heard from central and southern parts of the states. Indeed, there was at least some California presence until dawn on Easter Island. For reasons that I don't begin to understand, the strongest station from California was 1530 KFBK Sacramento, which far outshone the more southerly stations, high band or low.

By 0730 UTC, the New Zealand stations would begin to appear on the 9-kHz channels, with the Aussies joining the mix by 0900 hours. Although a few Japanese appeared as early as 0830, they were mostly logged during the pre-local dawn 1200 to 1300 time span.

One of the biggest surprises of the DXpedition was the absolute dominance of Chinese stations during the 30 minutes before and after the 1330 local sunrise on Easter Island. Chinese stations, lots of Chinese stations, traveled more than 9,500 miles to populate the band during dawn enhancement! Things got so busy on the best Chinese dawn that I was forced to choose between noting the presence of all the Chinese signals on the band or tak-

John Bryant flying the DX flag on the Outer Banks of North Carolina.

ing the time to identify just a few and ignore the rest. Since the presence of so many extraordinarily long-distance signals seemed more important than the exact identity of a few, for the first time in my life, I just IDed the language positively, noted "unidentified Chinese station" and moved on.

Each of the all-night sessions closed out with one extraordinary signal lasting long after the other signals faded out...and long after dawn. The first of these began with my innocently listening to 1566 HLAZ, the super-power Christian broadcaster from South Korea. It was doing quite well 40 minutes after dawn. Soon, I noticed something beneath HLAZ. As this second signal built, it certainly sounded like Hindi and I remembered that AIR Nagpur on 1566 had been heard by Patrick Martin on the Oregon Coast and was one of our "Holy Grail" targets at the Grayland, Washington, DXpedition site. As you already know, that signal did prove to be AIR Nagpur, over 11,700 miles away.

The magical pre-sunset hour the following evening was highlighted by the first of several receptions of the U.S.-operated Radio Farda on 1575 kHz broadcasting to Iran from the United Arab Emirates, a distance of 11,400 miles. The reception was made even more memorable by the content of the pop music program: a Michael Jackson tune followed by some rap music in Farsi. That must drive the Iranian authorities crazy; it sure does it for me!

That second all-nighter was closed out with another extraordinary reception. Well after dawn (and time to try again for Nagpur on 1566) on my way up the dial, I noticed an unusual signal on 1413: it sounded (and was) Hindi and I was fascinated. Checking in the East Asia-Pacific section of *WRTH*, I could find no major station on 1413 that ought to be transmitting Hindi at that hour. The Hindi talk programming contained a few English words mixed in the conversation, not unusual in itself, and then there was one full interview in very British English. Wow! I kept listening, hoping for station identification...and then I heard a website given out: it was something like "hindi.bbc.uk." A light bulb lit: 1413 is the MW frequency for the huge BBC Oman relay station! Sure enough, their schedule shows an hour of Hindi, beamed eastward to India (and directly at Easter Island) at the proper hour.

Further listening on subsequent mornings proved beyond a doubt that I was hearing the Oman relay station, and from well over 13,350 miles away. If you combine the reception of Radio Farda before sunset (11,400 miles) with the Oman reception of 13,350 miles, I was able to more than circle the globe in a single DX session, on MW. I never imagined that it would be possible and I feel extraordinarily privileged to have witnessed such.

I would especially like to express my thanks to numerous senior members of the MW DX community who helped me in the planning of this DXpedition and in identifying many of the stations listed below. Without their help, so freely given, this experience would have been ever so much less enjoyable and productive. The final all-session count was 236 stations received in 40 countries, on all continents. However, as wonderful as the DX was, the scenery, the monuments, the archaeological sites almost without number, and the extraordinarily friendly inhabitants of Easter Island were even more memorable.

530 FIRS Port Stanley, Falkland Islands, at 0250 BBC World Service feed at good level.

531 4KZ Innisfail, Australia, at 1146 '60s rock, "This is 4KZ Innisfail." Fair level in mix of stations.

531 Chaîne 1, Ain El-Beida, Algeria, at 0100 noted several evenings before local sunset.

558 Radio Fiji 1, Suva, Fiji, at 0757 island music until top of the hour, then presumed ID in Fijian into news. Excellent level, heard several mornings.

570 WTBN Pinellas Park, Florida, at 0200 double ID for WTBN 570 and WTWD 910 Plant City, interference from Radio Reloj, Cuba.

585 7RN Hobart, Australia, heard at 1107 briefly at good level with ABC news and sports.

585 RNE1 Madrid, Spain, at 0105 heard each evening with "Radio Nacional de España" parallel 684 kHz.

657 Pyongyang BS, Kangnam, North Korea, at 1403 news in Korean, dominating 2YC New Zealand.

660 OCX4R Radio Inolvidable, Lima, Peru, at 0156 "La Inolvidable, tu mejor recuerdo 93.7 FM 660 AM!" Heard most evenings.

684 CNR6 Putian, China, at 1352 noted each morning parallel 909 kHz. Excellent, post-dawn.

684 RNE1 Sevilla, Spain, at 0101 heard nightly, was the strongest Spanish station.

690 XETRA Tijuana, Mexico, at 0232 dominated the frequency early each evening, and often through the night. At least part of the time, it was IDing as part of the Cadena W network of XEW Mexico City.

700 LV3 Radio Cordoba, Cordoba, Argentina, at 0156 excellent level, multiple very fast mentions of Cordoba and Argentina, but only one clear "Radio Cordoba" ID.

747 JOIB Sapporo, Japan, at 0816 NHK2 network programming. Fair parallel 774 kHz.

760 OBZ4X Radio Mar Plus, Chorillos, Peru, at 0230 "Radio Mar Plus...Tropicaliente" multiple IDs, booming in!

770 KKOB Albuquerque, New Mexico, at 1020 ID, "The Talk Monster, KKOB Albuquerque!"

774 ERTU Abis, Egypt, at 0120 General Arabic program.

780 WBBM Chicago, Illinois, at 0154 heard "WBBM news time is 8:54."

850 KOA Denver, Colorado, at 0256 usual talk format. Heard nightly and well.

900 4YC Southern Star, Dunedin, New Zealand, at 1307 "Southern Star" ID, quiet music parallel 882 kHz.

927 4CC Grafton, Australia, at 0830 "Grafton, 4-double-C" ID. Good level.

1100 WTAM Cleveland, Ohio, at 0150 mention of "wtam.com," and Cleveland. Good.

1110 WBT Charlotte, North Carolina, at 0202 "WBT News" after top of the hour. Good briefly.

DX vehicles overlooking the open Atlantic from Granite Pier in Rockport, Massachusetts.

1120 KMOX St. Louis, Missouri, at 0327 ID, "NewsTalk 1120, KMOX." Excellent level.

1160 KSL Salt Lake City, Utah, at 0328 "KSL Radio" heard throughout the DXpedition.

1170 HLSR Gimje, South Korea, at 1231 Radio Korea in Japanese; good.

1380 CB138 Radio Corporación, Santiago, Chile, at 0107 ID, heard well throughout the DXpedition.

1410 XECF Los Mochis, Mexico, at 0850 "La Mexicana...Tropicaliente...más grande catorce-diez de AM." Briefly quite good.

1413 BBC Relay, A'Seela, Oman, at 1407 with a long discussion of Indian cricket, World Cup, Team India, etc. After 1430, mentions of bbc.hindi.com, etc. Good level for most of the reception. May have left air or shifted pattern at 1458. Sunrise was at 1325. Last audio heard at 1456 UTC.

1440 JOWF Sapporo, Japan, at 1357 noted with commercial string and network ID. Good level.

1494 DYAB Cebu City, Philippines, at 1340 at excellent level with phone-in program. Typical mixture of English and Tagalog.

1530 KFBK Sacramento, California, at 0700 ID, "NewsTalk 1530, KFBK." Heard every night at truly local levels.

1566 AIR Nagpur, India, at 1411 first noted in Hindi talk by woman, mixing with 3NE Australia and HLAZ. Dominant by 1420, ID in English at 1430, five minutes of English news at 1430. Very good at times.

1566 HLAZ Cheju Island, South Korea, at 1340 with fabulous level at dawn, with Japanese programming. "Nihon FEBC desu!" Heard every morning.

1575 Radio Farda, Al Dhabiya, United Arab Emirates, at 0130 noted each evening of the DXpedition. Often running Farsi pop music. Never above a fair level.

Morro de São Paulo, Brazil—Rocco Cotroneo

Morro de São Paulo is an island 100 kilometers off Salvador de Bahia, where I had the opportunity to use a friend's small cottage, on a 150-meter hill not far from the beach, for an exciting week of MW DXing. Conditions of terrain there do not allow long wires or Beverages in a straight direction, so I opted for a K9AY configuration, with the upper point on a tree, about 6 meters from the ground. It was an excellent choice in a situation where various beamings are necessary and nulling of strong Brazilian stations from the southeast is important. A simple 100-meter BOG was also used for Africa. Interestingly the wire received early signals from Africa better than the K9AY, when local noise was low, only to succumb later.

The location is electrically quiet and only solar power 12-volt energy is used in the cottage. It's a little precarious to charge batteries and a laptop during many hours and through cigar lighter plugs, but it works.

Conditions were very good. Transatlantic signals were regularly coming in from about 2000 UTC (17 local time), about one hour before local sunset. Magic time here was 2000 to 2200, when Far East, Middle East, and African signals reached their best levels (and they all use the same frequencies). The strongest EU stations, especially from Spain and France, were regular all night long.

Highlights were five Far East stations from Taiwan and China, with good signals at greyline hour. All of them were almost antipodal distances, 11,000 kilometers and more from here. A few African stations are new for me, such as Nigeria on 638, Angola on 1134, and especially Reunion on 666 kHz. A lot of Arabic speaking stations were hugely dominant for hours, mostly from Algeria, Iran, Egypt, and Saudi Arabia, but they are too difficult to ID for me. Next time I'll take a fast checking parallel list.

South America offered a good number of Venezuela and Colombia stations, but the most robust signals for a couple of nights came in from the Caribbean region, Cuba and Dominican Republic. I also had a tentative Martinique on 1310, apparently reactivated after many years. Most U.S. loggings were from the East Coast, particularly from the New York area. Canada came in on 740, while a local powerhouse was off.

531 Chaîne 1, Algeria, at 2340 noted in Arabic.

550 YVKE Mundial, Caracas, Venezuela, monitored at 0650 news, Chavez speech.

657 Rai Radio 1 synchros, Italy, at 2140 noted parallel 1062 kHz.

660 WFAN New York, New York, at 0430 noted with sports.

666 Radio Reunion, St. Pierre, Reunion, at 2030 a man and woman in French with music and local news. At 2220 interference from an unidentified African station with music. The end of 9 years hunting for this station!

730 Radio Lider, Bogotá, Colombia, at 0700 "Cadena Melodia de Colombia" and "Radio Lider, siempre contigo."

740 CHWO Toronto, Canada, at 0130 with oldies, the local Sociedade da Bahia station was off.

765 BSKSA Saudi Arabia, at 2120 heard Koran parallel 1512 kHz.

783 ORTAS Tartus, Syria, at 2130 parallel 567 kHz, always dominant over Mauritania.

880 Radio Venezuela, Ciudad Guayana, Venezuela, at 0600 with a list of affiliates, "Circuito Radio Venezuela." WCBS New York heard at 0055.

909 VOA Botswana, at 1945 news in English. Also caught 0300 sign on.

936 RTM Tanger, Morocco, at 2050 Koran parallel 999 kHz.

954 QBS Al Arish, Qatar, at 2035 heard in Arabic, huge signal, regular.

1098 Radio Free Asia, Taiwan, at 2100 ID in English and Chinese. Strong signal at times.

1170 Radio Sawa, United Arab Emirates, at 0220 news in Arabic, overpowering all co-channel Brazil stations with a great signal.

1134 CNR1, Golmud, China, at 2100 an incredibly huge signal.

1179 Emissão Provincial de Zambézia, Mozambique, at 2000 national news in Portuguese.

1180 Radio Rebelde, Cuba, at 0510 noted with strong echo effect due to different transmitters on the frequency.

1224 VOIRI Abadan, Iran, at 1945 heard in Arabic. Always the first transatlantic carrier and then first audio during my stay here, up to two hours before local sunset.

1314 Romania Actualitata, Romania, at 2040 heard with classical music.

1377 CNR1, Yingyang, China, monitored at 2110 noted parallel 4800 kHz; fair.

1377 Radio Free Africa, Tanzania, at 2230 music, Swahili, not as regular as a few years ago.

1386 CRI Lithuania at 2200 in English with talk, Chinese lessons, and full ID. No trace of Guinea this night.

1404 ERA Komotini, Greece, at 2108 network program parallel 981 kHz.

1431 Radio Sawa, Djibouti, at 2010 and regular, often with pops and overpowering Brazil stations on 1430 kHz.

1539 Aap Ki Dunyaa, United Arab Emirates, at 2105 with music, international news and IDs in Urdu. Strong.

1548 VOR Grigoriopol, Moldova, at 1950 strong in Slavic language. The most regular European here in Brazil at sunset.

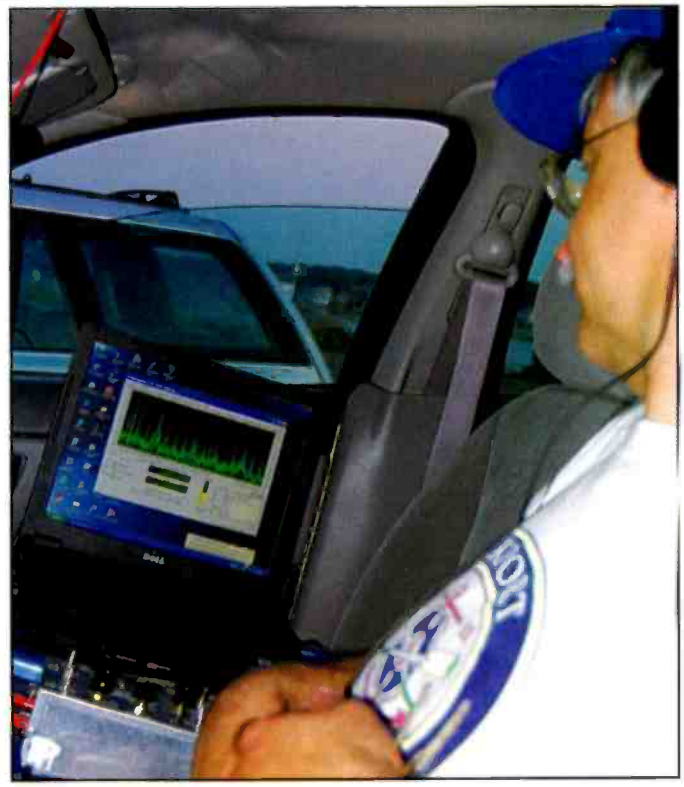
1566 AIR Nagpur, India, at 2005 noted parallel 9425 kHz.

1575 Radio Farda, Al Dhabiya, United Arab Emirates, noted at 2100 and all night long.

1640 WTNI Biloxi, Mississippi, at 0755 with ESPN Radio, the most regular x-band signal of the DXpedition.

Bodie Island, Outer Banks, North Carolina—John Bryant And Harold Cones

This was the third annual DXpedition at Bodie Island, on North Carolina's beautiful Outer Banks barrier islands, leading south to Cape Hatteras. Harold alternated between his new WinRadio 313e and the Eton E1, while John Bryant cruised MW via his E1. The DX shack was a 15-passenger van with the bench seats removed.



Mark Connelly, WA1ION, demonstrates the RFSpace SDR-IQ software-defined radio.

This year, we decided to leave the somewhat unobtrusive Beverages in place during the daylight hours. It was out of season on the Outer Banks and few tourists walk the beach in the rather brisk weather. Our laziness was rewarded by the theft of a 500-foot dual-conductor (light zip cord) Beverage. Oh well!

Conditions seemed to be only fair, with the best DX being heard from one-hour prior to sunset to one-hour after sunset. None of the openings were very good and most signals were fair, at best. Individual receptions seldom lasted more than 10 minutes at even marginally listenable levels. Many of the identifications had to be made by inference or by the process of elimination.

That being said, the DXing was thoroughly enjoyable each evening and very genteel...with us usually asleep by 10:00 p.m. local time and no dawn efforts to disturb our beauty rest. We may have missed a few overnight catches and—surely on shortwave, at least—some things at dawn. However, both of us came on this DXpedition pretty well worn down, so the four-hour sessions beginning at about 4:40 p.m. local time were just about perfect.

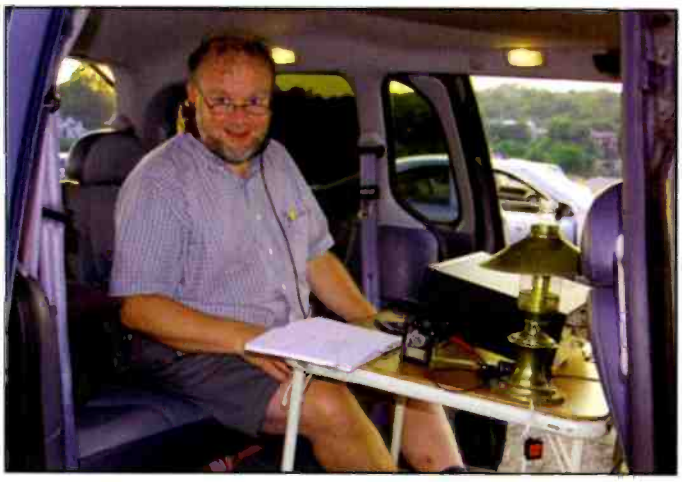
530 Radio Visión Cristiana, Turks & Caicos, at 0117 and heard throughout the DXpedition with religious programming. Usually about equal strength with the co-channel Cuban.

549 Chaîne 1, Les Trembles, Algeria, at 2230 at a fair level with a popular Arabic female singer parallel 153 kHz.

555 ZIZ Basseterre, St. Kitts & Nevis, at 2306 and heard throughout the DXpedition, sometimes at very good levels. Island programming and BBC news noted.

585 RNE1 Madrid, Spain, at 2205 good level Spanish talk, mentions of several Spanish town names.

999 RTM A, Tanger, Morocco, at 2233 RTM Arabic programming with traditional Arabic music into what may have been Koranic chanting. Poor level.



Gary Thorburn, KD1TE, converted his minivan to a comfortable remote DXpedition workspace.

1044 SER synchros, Spain, at 2350 presumed this noted briefly with poor level, but clearly Spanish. The same short opening yielded even more tentative notes of RNE5 synchro programming on 1098 and 1107 kHz.

1089 TalkSport synchros, United Kingdom, at 0010 TalkSport programming in lovely Auld Country English. Phone calls, deep-voiced host.

1134 Glas Hrvatske, Zadar, Croatia, at 2228 and heard in both Croatian and English throughout the DXpedition, the most reliable signal. Runs at least a half-hour of news/commentary at 2300 daily. ID in English, "You are listening to Croatian Radio, The Voice of Croatia."

1521 BSKSA Duba, Saudi Arabia, at 0044 and heard throughout the DXpedition, with some difficulty, since we lacked phasing equipment. Mixtures of Arabic talk and music.

1557 France Info, Fontbonne, France, at 2237 French info programming with usual male and female presenters was in all evening, sometimes at good level.

1575 Radio Farda, Al Dhabiya, United Arab Emirates, at 0052 and throughout the DXpedition sometimes at good levels. Always in Farsi. Mixture of Western and Farsi-pop music. Noted parallel 9585 kHz after 0030.

1620 WDHP Frederiksted, St.Croix, U.S. Virgin Islands, at 2304 easily heard from the Outer Banks of North Carolina with BBC news on the hour, then delightful island programming.

Rockport, Massachusetts—Boston Area DXers

The annual "DX Clams" midsummer expedition by the Boston Area DXers (BADX) has always been great camaraderie and an opportunity to showcase new technology. This year was no exception. Diehard BADXers Mark Connelly, WA1ION; Bruce Conti; Paul Graveline, K1YUB; Briggs Longbothum, AB2NJ; and Gary Thorburn, KD1TE, once again converged at Woodman's in Essex to feast on Chubby's fried clams before heading out to the "fabled" Granite Pier in Rockport.

Gary situated himself comfortably in his minivan converted to a rolling radio shack with the Drake R8A and a remotely tuned loop aimed east; Bruce tested a mini SuperLoop terminated loop antenna phased with a 20-foot vertical into a Drake R8B; and Mark fired up the laptop to demonstrate the RFSpace SDR-IQ software-defined radio with a car rooftop phased array.

This DX Clams was a chance to test a compact SuperLoop antenna with considerably smaller dimensions than the original specifications, typically in the range of 23-meter vertical by 30-meter horizontal. The SuperLoop is a super-sized terminated corner-fed broadband loop, a variant of the Flag and Pennant antennas, the design concept introduced in the August edition of *Popular Communications* magazine. The SuperLoop for DX Clams measured 10 feet vertical by 20 feet horizontal, and was terminated with 1150 (470 + 680) ohms.

Test results were better than expected. A quick pretest on 880 kHz proved a cardioid backside null of WCBS New York was effective; 20 dB high with the termination shorted out, and a wobbly S9 terminated. The east-aimed "mini" SuperLoop alone was enough to log all transatlantic MW signals, no pre-amplification or phasing required. However DX conditions weren't all that impressive, with transatlantic signals from Spain and France dominant, and Latin American signals buried in summer lightning noise.

In demonstrating the RFSpace SDR-IQ software-defined radio, Mark used the spectrum analyzer display to zoom in on the known off-frequency RNE Spain synchronized station at 1107.13 kHz, easily showing the signal separate from the pack on 1107 kHz. Mark also recorded a few 190-kHz wide segments of RF with the SDR-IQ to later demodulate at home for additional logs. Although the SDR-IQ is susceptible to overload in the presence of strong local signals, it had no problem with the phased antenna array, with performance comparable to the highly regarded Drake R8A/B receiver.

603 RNE5 synchros, Spain, at 0141 fair with synchro echo; teletalk parallel 585 kHz.

612 RTM A, Sebaa-Aioun, Morocco, at 0140 strong; talk parallel 207 kHz.

670 YVLL Radio Rumbos, Caracas, Venezuela, at 0054 "Radio Rumbos, la emisora de Venezuela"; briefly over Cuba and another Latin American.

693 RDP 1, Terceira, Azores, at 0149 parallel 666 kHz with mellow jazz; good, way over the BBC5 UK synchros.

702 Chaîne 1, Djelfa, Algeria, at 0114 fair; Koran parallel 153 and a strong 891 kHz.

720 ZYK276 Radio Guaiba, Porto Alegre, Brazil, at 0049 reverberated Portuguese talk by man. 0056 man in Portuguese with Guaiba mention; noted during fade of YVQE Venezuela.

729 RNE1 synchros, Spain, at 0046 parallel 774 kHz with musical fanfare, woman in Spanish; through 730 WJTO and CKAC slop.

783 Radio Mauritanie, Nouakchott, Mauritania, at 0024 talk; 20 dB better than 4845 kHz parallel.

860 YVYE Enlace 860, Valle de la Pascua, Venezuela, at 0036 "Esta es Enlace, Ocho Sesenta, La Emisora de la Mar"; noisy.

864 France Bleu, Paris, France, at 0032 excellent; Led Zeppelin "Stairway to Heaven" parallel 1494 kHz.

890.97 Chaîne 1, Algiers, Algeria, at 0040 mentions of "arabiya" in newscast; good. 0141 ud music and male vocal; good.

1035 Radio Clube, Belmonte, Portugal, at 0135 a romantic emotional pop female vocal; good with 1030 WBZ Boston phased.

1044 RTM A/C, Sebaa-Aioun, Morocco, at 2350 loud and clear; Koran. Signed off shortly after 2400 leaving SER Spain in clear.

1089 TalkSport synchros, United Kingdom, at 0102 promo for "football live on TalkSport"; briefly good.

1107 RNE5 synchros, Spain, at 0131 parallel 1098 kHz with newstalk; over Egypt and 1107.13 kHz off-channel RNE growl.

1160 VSB3 Hamilton, Bermuda, at 0059 BBC World Service ID; in the clear during audio pause on WSKW.

1170 Radio Sawa, Al Dhabiya, United Arab Emirates, at 0101 Mideast pop vocal; slightly over co-channel signals.

1220 ZYJ458 Radio Globo, Rio de Janeiro, Brazil, at 0100 Globo ID in Portuguese talk by man. 0102 up to a good level with mentions of cities including São Paulo.

1224 COPE synchros, Spain, at 0108 good; "la Cope" ID by woman into talk, parallel 999 kHz.

1296 SRTC Reiba, Sudan, at 0056 African drums, then weak talk not parallel 999 COPE Spain.

1341 BBC Radio Ulster, Lisnagarvey, Northern Ireland, at 0134 good; BBC5 talk parallel 909 kHz.

1431 Radio Sawa, Arta, Djibouti, at 0026 parallel 1548 Kuwait with segment of Bush speech in newscast, then man in Arabic used phrase "million dollars"; loud. 0117 Arabic news; excellent.

1494 France Bleu, Bastia, Corsica, at 0032 fair; Led Zeppelin "Stairway to Heaven" easily paralleled 864 kHz.

1512 BSKSA Jeddah, Saudi Arabia, at 0049 good; ud solo. 0148 Call of Islam parallel 1521 kHz.

1521 BSKSA Duba, Saudi Arabia, at 0030 talk by a woman then instrumental music and a man who said "salaam aleikum"; huge. 0113 Koranic male vocal; local-like, annihilating 1520 kHz.

1575 Radio Farda, Al Dhabiya, United Arab Emirates, at 0030 "Radio Far-DAH" ID, emphasis on last syllable; good. 0112 pulsating Mideast dance music; over SER Spain.

1584 RadiOlé, Ceuta, at 2345 good; Spanish rock music. 0156 huge local-like signal; Spanish pop vocal.

"Let's do it again!" is a universal sentiment at the conclusion of any DXpedition. Some legendary seacoast sites have become recurrent sojourns for DXers: Rockport, Massachusetts; Long Beach Island, New Jersey; Miscou, New Brunswick; Cappahayden, Newfoundland; Grayland, Washington, and Seefontein, South Africa—all were highlighted previously.

Ultimately, there are more remote locations yet to be explored by expeditionary DXers, perhaps someday to be added to the list of legendary DX paradise destinations. ¡Saludos! to all DXpeditioners willing to go the distance.

Till next time, 73 and good DX! ■

by Gordon West, WB6NOA, WB6NOA@arrl.net

Some Of The World's Remotest Islands Go Radio Active

Sailors heading to and from Hawaii from the South Seas rely on marine single sideband for weather reports and direct contact with the United States Coast Guard in the event of a medical emergency. The best time to intercept these skywave marine sideband signals is in the evening to 0000 hours Zulu (Universal Time Coordinated).

These are the most easily heard frequencies, coming out of the South Pacific, heard here in the United States.

Routine Ship/Ship and Ship/Shore	Ship to Coast Guard
8294 kHz USB	8291 kHz USB
8297 kHz USB	12290 kHz USB
12353 kHz USB	16420 kHz USB
12356 kHz USB	
16534 kHz USB	
16537 kHz USB	

Marine single sideband is the principle "intercom" for sailors to help one another during their long three-week passage between Hawaii and the hundreds of islands in French Polynesia. For an emergency, there is only one tiny hospital along the route, situated just miles north of the Equator.

Far And In Need

"Classified by the World Health Organization (WHO) as one of the most remote and most medically needy atolls in the world, the Line Islands are 1,200 miles south of Hawaii and almost 1,200 north miles of Tahiti. They offer sailors emergency medical help in the middle of nowhere," said Carlton Smith, T32CS, KE5EUL, a philanthropist who regularly gets medicines, supplies, eyeglasses, and radio equipment to the three Islands, Kiritimati (Christmas), Tabuaeran (Fanning), and Teraina (Washington).

These islands are home to 9,000 villagers who mostly live a subsistence life, surviving on fish, coconuts, and some imported rice they pay for by trading dried coconut (copra). The one hospital, and its English-speaking doctor, Dr. John, is located on Christmas Island and sometimes can be heard communicating on upper sideband HF radio at night on 7312 kHz to the other two islands. This is the long-range radio high-frequency channel that carries life-saving medical instructions among the islands and to their Ministry of Health, 2,000 miles east, in the capital of Tarawa.

Neither of the other two islands had radio support from the main hospital on Christmas, nor for the nursing stations on the other islands.

These islands are no longer radioactive from the nuclear tests conducted in the 1950s, but most recently have become "radio active" on VHF frequencies at the hospital and remote nursing facilities.

"VHF signals in the 156- to 157-MHz range easily propagate throughout Christmas Island, and can even travel via tropospheric ducting to the other two islands," said Smith, after he and I brought in 25-watt VHF radios and worked them into 6-dB gain collinear marine VHF antennas. Each VHF radio runs on a simple 12-Ah gel battery, charged daily with plenty of Equatorial sun on the 1-amp solar panel.

"VHF and high frequency is all they have to stay in touch around the island," added Smith. "When the British operated Christmas Island for nuclear testing, phone lines and power cables were all buried underground. Sea water has ultimately seeped into these cables, so radio is all the Line Islands have for medical comms."

The Christmas Island medical staff receives radios and medicines. Author Gordo, fourth from left, looks just as pleased.

For keeping costs down regarding the donation of radios, marine VHF transceivers were the best bargain in town! A $129 marine VHF brings in 25 watts output, 1/2-microvolt sensitivity, 55 marine VHF channels for emergencies involving nearby yachts, and additional channels beyond the normal 55 marine channels. About the only problem encountered was fixed low-power preset to keep the medical teams from chit-chatting to the point of exhausting the batteries! Low power did the trick.

Distant Signals

Most amazing were the tropical tropospheric ducts over a 400-mile path

Gordo helps out as the head nurse on Christmas Island gets her first radio call from a nearby ship.

The one ambulance on the island now has VHF radio!

A powerful three-fan, 250-watt marine SSB hospital radio on 7312 kHz.

among the Line Islands. At sun up and sun down, as the Trade Winds abate, VHF signals intensify over amazing distances.

There were some interesting radio and television opportunities for the islanders. CB radio antennas were all over the place, and CB Channels 1 through 40 were full of chatter day and night. Every so often, I would spot television antennas, usually associated with many of the large church facilities on the island. These single and stacked deep fringe, long boom antennas were aimed generally north, but where could they be picking up TV signals from the remotest atoll in the world?

"We watch Honolulu TV!" exclaimed one of the Kiritimati Islanders. "We see signals better on Channel 7 through 13, and sometimes get them in color too!"

Amazing! Honolulu, 1,000 miles north, a straight water shot for TV DXing at its best. This was not sporadic-*E* propagation either! I would expect that on the lower channels, not Channel 7 through 13. They indicated the reception would last for days. So, truly, tropospheric ducting to the north!

I then asked some of the local harbor guys if they ever got VHF marine band reception from far away, down on the Equator, and they all answered with "Sure," sometimes picking up Hawaii weather channel signals and sometimes Channel 16 Coast Guard calls over 1,000 miles away.

The Ministry of Health frequency, 7312 kHz, worked well among the islands with a simple ham radio 40-meter dipole. Daytime signals were reliable—as long as the other *very* remote islands would regularly clean their solar panels from bird droppings (we're going back, by boat, to upgrade their battery systems). At nighttime, 7312 kHz will easily span 2,000 miles for comms to their capital of Tarawa, with shortwave listener reports from Hawaii and the west coast. Remember, 7312 kHz is received *upper* sideband.

Their transmitting equipment is the Vertex Standard Yaesu system 600 commercial SSB, which also included all marine HF channels, too.

Bright white LEDs, from West Mountain Radio, were distributed to each remote nursing station drawing negligible power from the single 12-Ah battery at night. Dipoles came from RadioWavz, trimmed to the top of the 40-meter band.

The heat and humidity kept radio antenna installation time limited to daybreak and sundown; the rest of the time was spent enjoying no-power-line-noise HF band conditions on 20 and 15 meters.

A Worthy Pursuit

It's truly inspirational to meet the inhabitants of these remotest of islands and to witness the dedication of the people involved in helping them communicate in emergencies. Two-way radio is truly a lifesaver for anyone needing medical attention in the middle of nowhere, far away at the Equator, on the Pacific. ■

by John Kasupski, KC2HMZ, kc2hmz@wzrd.com

The Lockheed C-130 Hercules: HF "Frequent Flier" For Over 50 Years

Niagara Falls, New York, August 2007—As part of the festivities surrounding the "Thunder Over Niagara" air show at the joint Air Force Reserve/Air National Guard base here, several Civil Air Patrol (CAP) cadets climbed aboard one of the eight C-130H3 cargo aircraft belonging to the 914th Airlift Wing (USAFR), which subsequently took off for a demonstration of aerial refueling. One of the nine KC-135R Stratotanker aircraft from the 107th Air Refueling Wing, New York ANG (callsign FUZZY) and the C-130 from the 914AW (callsign BISON) rendezvoused at high altitude, and the CAP cadets got to experience an airborne "gas-and-go," in which both the aircraft participating were built before most—and probably before all—of them were even born!

The C-130 "Hercules" was named for a mythical character, but the aircraft that bears his name has become a legend in the real world. It's been 55 years since the U.S. Air Force issued the General Operating Requirement that became the C-130, and 52 years since the prototype YC-130, serial number 53-3397, made its 61-minute maiden flight from the Lockheed plant in Burbank, California, to Edwards AFB. It was the second prototype, but the first to actually fly.

Today, more than 70 variations of this aircraft exist, and "Herkybirds" are being flown by more than 60 nations—and utility monitors around the world continue to log this aircraft, in its many variations, on the HF airwaves on a daily basis.

Perhaps the C-130's greatest asset, other than its unparalleled versatility, is its impressive short takeoff and landing (STOL) capability. One of the C-130's first accomplishments, back in 1963, was to set the world record for the largest and heaviest aircraft to land on an aircraft carrier. In October and November 1963, a U.S. marine Corps KC-130F landed (see **Photo A**) on the deck of the *USS Forrestal* 21 times—without benefit of arresting gear, no less. It also managed to take off from the *Forrestal* without catapults. That very aircraft remained in active service until 2005 and is now part of the collection at the National Museum of Naval Aviation at NAS Pensacola, Florida.

Along with that, the C-130 is probably the most versatile tactical transport airframe in aviation history. Although designed as a transport aircraft for troops, cargo, and medical evacuation, the C-130 has also been employed for scientific research, weather reconnaissance, aerial refueling, aerial firefighting, airborne assault, search and rescue, tactical and strategic communications, and—in its AC-130 Spectre variation—as the most powerfully armed gunship ever to take to the skies. The C-130 has recovered space capsules, worn skis to land in Antarctica, and conducted maritime surveillance and airborne early warning.

Then, of course, there is Fat Albert, the C-130T that serves as the support aircraft for the Navy's Blue Angels flight demonstration team. Operated by the Marine Corps and with a crew consisting entirely of Marine personnel, Fat Albert supports a Navy squadron (the Blue Angels) and takes part in some air shows featuring the team by performing flyovers and demonstrating its jet-assisted takeoff system.

Photo A. Yes, this is a C-130 on the deck of the aircraft carrier USS Forrestal. *(U.S. Navy photo)*

The C-130's success with the Air Force led to its adoption by the Navy, Marines, and Coast Guard as well as by other nations, literally from A to Z (Algeria to Zambia). The list of variants also spans most of the alphabet, from the AC-130 gunship to the three YMC-130H aircraft that were specially modified for the planned Iran hostage rescue mission. In between there are C, D, E, H, J, K, L, M, P, R, S, T, V, and WC-130 variants as well as C-130A, B, E, F, G, H, J, and T tactical airlift models. The airframe has also spawned three civilian versions, the L-100, L-100-20, and L-100-30.

Its most modern version, the C-130J, features a new glass cockpit, and, for Air Force use, is equipped with the latest in aviation technology, from GPS navigation to electronic collision avoidance to missile warning systems, electronic countermeasures, such as chaff and flares and infrared jamming, and heads-up displays for each pilot. This newest variation has a usable cargo bay volume of over 4,500 cubic feet, and can handle loads slightly in excess of 37,000 pounds.

Photo B. USCG HC-130H aircraft, CG 1504, in the skies over Satellite Beach, Florida. (Photo by Allan Stern)

I could fill the pages of this magazine with photographs of the C-130 in its numerous variations, but my editor would not be amused, so we'll settle for just one (see **Photo B**) of Coast Guard 1504, taken this August by Al Stern of Satellite Beach, Florida. This is the HC-130H variation, five of which are currently in use by the USCG, designated 1500 through 1504. The one that Al snapped, 1504, is homeplated at CGAS Clearwater, Florida; the other four are homeplated at CGAS Elizabeth City, North Carolina.

There are also 22 HC-130H7 and six HC-130J versions in Coast Guard custody. All but one of the HC-130H7s are designated sequentially from 1700 through 1720. The lone exception is Coast Guard 1790, deliberately numbered out of sequence to commemorate the August 4, 1790, establishment of the Revenue Cutter Service, to which the military roots of the Coast Guard can be traced (the modern-day Coast Guard is the amalgamation of that and four other originally independent Federal agencies; the others were the Lighthouse Service, Steamboat Inspection Service, Bureau of Navigation, and Lifesaving Service).

The six HC-130J aircraft, numbered 2001 to 2006, are currently with the Coast Guard Aircraft Project Office at CGAS Elizabeth City and are expected to be mission-ready by August 2008. These new aircraft will meet long-range patrol requirements in the Pacific Ocean that medium-range surveillance aircraft cannot handle. They will also provide heavy air transport and possibly serve as an airborne command center, and will also be equipped with capabilities that will allow for insertion of special Department of Homeland Security operations teams.

For us utility monitors, hearing a C-130 on the utility bands, whether in voice or digital communications modes, is made easier by the versatility and widespread use of the aircraft. The Coast Guard C-130s can be caught in upper sideband voice regularly on the 5696.0 and 8983.0 safety-of-flight channels, as well as on various Coast Guard tactical frequencies. Digital comms can be heard on the COTHEN (Customs Over The Horizon Enforcement Net) and TISCOM (Telecommunications & Information Systems Command) ALE nets. On these nets, the "1" digit is dropped from the numeric used as a part of the voice callsign, so, for example, Coast Guard 1504 would use 504 as its ALE identifier, Coast Guard 1720 would use 720.

The COTHEN nets can be found on frequencies 5732.0, 7527.0, 8912.0, 10242.0, 11494.0, 13907.0, 15867.0, 18594.0, 20890.0, 23214.0, and 25350.0. The known TISCOM frequencies are 3053.0, 4730.0, 6709.0, 8859.0, 8980.0, 9034.0, 11196.0, 13221.0, 15082.0, and 17988.0, which are used by USCG cutters and shore stations as well as aircraft. In addition, earlier this year, Coast Guard cutters were logged using ALE on 8337.6 and 10993.6. Secure digital voice communications using ANDVT mode have been noted on several of these frequencies as well.

Air Force and Marine C-130s are frequently heard on the HF-GCS frequencies making use of the various services provided by the HF-GCS ground stations. The primary HF-GCS frequencies, monitored 24 hours a day, seven days a week, 365 days a year, are 11175.0 and 8992.0. The backup frequencies during local daytime are 13200.0 and 15016.0, while 4724.0 and 6739.0 are the backup frequencies during local night at any given ground station. The HF-GCS also has its Scope Command ALE network on HF, which includes not only the HF-GCS ground stations but several other ground stations as well. So far, I've noted 4721.0, 5708.0, 6721.0, 9025.0, 11226.0, 13215.0, and 15043.0 active and suspect that other frequencies may also be in use.

Many of the REACH callsigns you hear on HF are C-130s, although they can also be other transport aircraft, but C-130s will, of course, not always use REACH as their callsign. HERC and HERKY, for obvious reasons, are often used as generic C-130 callsigns, TEAL is used by the WC-130 "Hurricane Hunter" aircraft out of Keesler AFB, and there are countless individual unit callsigns, such as BISON, mentioned at the beginning of this article.

You'll also want to listen for C-130 aircraft working USAF MARS operators on the commonly used USAF MARS phone patch network frequencies, which include 4557.0, 7633.5, 13927.0 (primary), 14606.0, 18617.0, and 20992.0 (note that they have reverted back to the original frequencies ending in "0" and "5" as previously noted in this column).

Wherever you happen to "catch" a C-130, you're hearing a voice from an aircraft whose family has been part of the backbone of the U.S. Air Force throughout most of its existence. In the 60 years since the USAF was formed as a separate branch of the military, in 1947, only one other aircraft has reached 50 continuous years of service, that being the B-52 Stratofortress.

Reader Logs Former *USS Dorchester*

Regular contributor Steven Jones of Lexington, Kentucky, checked in this month with a QSL letter (see **Photo C**) from a commercial vessel he logged during a SITOR radio check with NMO (USCG Honolulu), and which turned out, after some investigation, to have an interesting history.

"It's from a 62-year-old converted LST [Landing Ship, Tank] laid down in 1945," Steven wrote, "and may have been involved in some of the Pacific landings during World War II. You can see where the bow was added for the conversion, and it sounds like it's been pulling some heavy commercial fisheries duty for many decades since then. I caught a brief radio check in SITOR-A with the vessel to NMO, USCG Honolulu, in June—MMSI [Maritime Mobile Service Identity] and callsign only, but enough for an ID and, fortunately, a confirmation."

Steven included a scan of the QSL letter, signed by William Alexander, Chief Mate, which notes that the vessel is a 328-foot seafood processor owned by Trident Seafoods Corporation and carries a crew of 150. It works from mid-April to the first week of September, according to Alexander, and spends the rest of the year tied to Pier 25 in Tacoma, Washington.

I did some digging after receiving Steven's email, and discovered that this vessel was originally the *USS Dorchester*

June 30, 2007

Steve,

A SITOR call was made to HMO at 1046Z on the 16th of June 2007 from the M/V Alaska Packer. Our position at that time was 54-42.6N/165-06.1W (NW of Cape Sarichef, Unimak Island) in the Bering Sea. The Packer has a standard SEA GMDSS console, 2 additional HF radios, 5 VHF radios and 3 Satellite phones. Our MMSI # is 366808000 and STD-C is 436840820.

The Alaska Packer is a 328 foot Seafood Processor owned by Trident Seafoods Corporation. The vessel is a converted US Navy LST built in 1945. We carry a crew of 150. For many years the Packer has worked year round processing crab, herring and salmon. The Packer primarily works from mid April until the first week in September. We process Herring during May in Togiak Bay, King and Red salmon during June and July in Bristol Bay and finish up our season by processing Pink salmon in Prince William Sound. The Packer spends the rest of the year berthed at pier 25 in Tacoma Wa.

William Alexander, Chief mate

Photo C. Steve Jones received this QSL letter with photo of the Alaska Packer *after logging an HF SITOR contact between the vessel and* USCG Honolulu *(NMO).*

(APB-46), a Benewah-class barracks ship whose hull classification symbol was initially intended to be LST-1112. She was first redesignated as a General Stores Issue Ship (AKS-17), then as a Self-Propelled Barracks Ship (APB-46). Launched on April 12, 1945, and commissioned on June 15, 1945, the *Dorchester* sailed from New Orleans in August 1945, embarked troops at Pearl Harbor, then sailed to deliver cargo and receive more passengers at Eniwetok and Guam while making passage to Japan. During February and March 1946, she served duty as a barracks ship at Wakayama and Kobe, Japan. She was decommissioned at Vancouver, Washington, in October 1946, remaining in the reserve fleet until 1973. The following year, she was sold for conversion to commercial service, and converted to a seafood processing vessel, originally under the name *Pacific Pride*.

As a naval vessel, she was the second, and so far the last, USN vessel to be named for Dorchester County, Maryland, and Dorchester County, South Carolina. The first was a sailing vessel that served from 1917 to 1918. There was also a U.S. Army Transport named *Dorchester* that was sunk by a German U-Boat during WWII while en route from St. John's, Newfoundland, to Narsarsuaq, Greenland, killing 675 of the 904 men aboard.

According to Trident's website, *Alaska Packer* processes herring and salmon, and is one of seven processors operated by Trident as part of a fleet that also includes three factory trawlers, 11 trawl catchers, five crab catchers, three freighters, and 10 company owned and operated tenders. Thus, it is entirely fitting that we congratulate Steven for a "good catch" of a vessel that has undoubtedly been a part of many good catches for its current operators in the commercial fishing business!

Higher HF Frequencies Becoming Productive Again?

On the heels of last month's log submission by Steven of a SITOR contact on 22291.5 kHz, this month we heard from a new contributor, Bill Hassig of Mount Prospect, Illinois, who reported logging some 25-MHz broadcast pickup stations from Colorado and Texas. Since we're at the bottom of the sunspot cycle, it's been awhile since UTE monitors have submitted loggings for frequencies this high in the HF spectrum, so it's nice to see people getting loggings on some higher frequencies again. I take it as a good sign as we hopefully head into the start of the next sunspot cycle.

In any event, it appears that it may finally prove productive again to take the occasional dial spin through the higher frequencies. It turned out to be productive enough for Bill, since one of the broadcast pickup stations he logged, belonging to KSCS-FM 96.3 in Fort Worth (actually Arlington), Texas, shows a first-use date of May 23, 2007, in the FCC's Universal Licensing Database, which makes Bill one of the very first to log it from outside the ground wave—if not *the* first.

Another Emergency Lighting Idea

After reading the "Severe Weather" issue of *Pop'Comm* this past August, reader Bob Comeau, VE1ARN, of New Germany, Nova Scotia, checked in with another idea for emergency lighting during power outages after picking up an alternate lighting item a few weeks after reading the magazine.

It seems Bob picked up a camping lantern powered by a sealed lead-acid battery to illuminate 24 LEDs similar to those now being used in flashlights from several manufacturers. Bob says that the lantern comes with an AC "wall wart" charger and a 12-volt DC adaptor for charging the internal battery—but it doesn't stop there.

"If you end up in a situation where you can't get either AC or DC," Bob reports, "you just turn the lantern over, flip out the handle, and crank it up. One minute of cranking at 120 RPM will give you 30 minutes of light. Our local building center just had these on sale, one to a customer; I got a friend to get me a second one. Personally, I really like the hand crank idea, along with the LED lighting. Just another idea to add to your equipment list."

Many thanks and a tip of the hat to Bob for this tip, which brings up at least two excellent points. One is that LED lighting is much more efficient than conventional lighting, so your batteries last a lot longer, plus the LEDs aren't subject to the reduced efficiency at extreme temperatures that was noted with respect to fluorescent lighting in the August issue. The other is that equipment than can be powered with a hand crank can come in very handy, especially during extended power outages, when it's not always possible to recharge batteries, or for that matter, to obtain fuel for generators.

There are several lights on the market now, and some radios and other devices as well, that can be powered with a crank.

Mechanically powered devices like these definitely rate serious consideration, whether you're just beginning to assemble your emergency gear, or looking for something nifty to add to an already existing stash!

"Utility Communications Digest" Website Launched

Finally for this month, I've decided to go ahead and create a website on the Internet to support this column, and make things easier on myself, my editor, and the folks who maintain the *Pop'Comm* webpages. As this column is being written, the site is not quite ready for public consumption, but by the time this issue hits the newsstands, I'll have had a couple of additional months to work on it and there should be some worthwhile material for those of you with Internet access to make use of. The URL for the site will be http://utecomm-digest.kc2hmz.net.

Current plans for the website include a library page where additional frequency information, along with other details that are too lengthy to appear in the magazine due to production considerations, can be made available to readers. I also plan to have a news page where current monitoring events can be discussed in a more timely manner than production considerations allow for the column in the magazine. The site will not duplicate this column, but it will support and supplement it, so feel free to make use of the information and other items that will be available there. And, of course, as is the case with this column, your contributions are also encouraged and welcomed!

Reader Logs

With that we'll go directly—with no stopping, no passing "GO," and no collecting $200—to the great batch of logs that our readers have again contributed this month...and for which we say a big "thank you" to the following:

Glenn Valenta, Lakewood, CO (GV/CO); Allan Stern, Satellite Beach, FL (ALS); Steven Jones, Lexington, KY (SJ/KY); Mark Cleary, Charleston, SC (MC/SC); William Hassig, Mount Prospect, IL (WH/IL); Lupo Alberto, location withheld by request (LA); and your columnist, John Kasupski, Tonawanda, NY (JK/NY).

Glossary Of Utility Terms And Acronyms

AFB—Air Force Base
ALE—Automatic Link Establishment, a link control system that includes automatic scanning, selective calling, sounding, and channel selection, without human intervention using processor control.
AM—Amplitude Modulation
ANDVT—Advanced Narrowband Digital Voice Terminal, a secure voice mode used by the military.
ATC—Air Traffic Control
CAMSLANT—Communications Area Master Station Atlantic, the U.S. Coast Guard's primary HF radio station for the Atlantic region, located at Portsmouth, Virginia.
CAMSPAC—Communications Area Master Station Pacific, the U.S. Coast Guard's primary HF radio station for the Pacific region, located at Pt. Reyes, California.
COMMSTA—Communications Station, for example: COMMSTA Kodiak, a communications station of the U.S. Coast Guard, located at Kodiak, Alaska.
CGAS—Coast Guard Air Station
Cut Numbers—The use of letters in place of numbers when sending a long string of numbers, for brevity's sake. This is often done by "numbers" stations, such as sending one long dash instead of five normal dashes to indicate a zero, or the letter N instead of the number nine, etc.
CW—Continuous Wave (Morse code)
DE—The Morse code operating prosign DE, meaning "from," as in DE NMN, meaning from station NMN
D-Layer Absorption—A phenomenon where the sun's rays ionize the *D* layer of the atmosphere causing it to absorb, rather than propagate (reflect/bounce), radio signals at certain frequencies.
Duplex—A means of radio communication where a station can both transmit and receive at the same time.
EAM—Emergency Action Message, coded instructions commonly sent by U.S. military stations. Despite the name, they usually aren't emergency traffic at all.
EHF—Extremely High Frequency (30-300 GHz)
FAX—Facsimile, a transmission mode used to send maps, charts, and other non-textual material.
FEMA—Federal Emergency Management Agency, a part of the Department of Homeland Security.
FM—Frequency Modulation
Ham Station—A licensed station operating in the Amateur Radio Service under the control of an operator who is licensed to operate the station.
HF—High Frequency (3–30 MHz)
LINK-11—Also called TADIL-A for TActical DIgital Link, a secure digital data mode used by the military. Utilizes a 16-tone data modem to allow assets to share digital information, such as radar data.
M/V—Merchant Vessel
NAS—Naval Air Station
Propagation—The means by which radio signals get from one place to another; some forms are quite simple (such as line of sight) while others are much more complex (such as EME, or earth-moon-earth).
QRM—Man-made interference to radio signals
QRN—Natural interference to radio signals, such as the static crashes often heard due to thunderstorms
QSO—A contact between two or more stations
QSY—Change frequency.
QTH—Location
RTTY—Radio TeleTYpe
SELCAL—SELective CALling, a method for activating a radio or data terminal at one station without disturbing other stations that are monitoring the same frequency.
Simplex—A means of radio communication where a station may transmit or receive at any given time, but not do both at the same time.
SITOR—SImplex Teletype Over Radio, a transmission mode used to transmit text messages over radio. There are two SITOR modes: SITOR-A (also called AMTOR) uses Automatic Repeat Request (ARQ); SITOR-B uses Forward Error Correction (FEC).
SWL—Shortwave Listener, a person who enjoys listening to shortwave radio stations.
UHF—Ultra-High Frequency (300–3000 MHz)
USAF—United States Air Force
USB—Upper Sideband
USCG—United State Coast Guard
USMC—United States Marine Corps
USN—United States Navy
UTC—Coordinated Universal Time, formerly known as Greenwich Mean Time, and also commonly referred to as ZULU time and abbreviated as in 1200Z.
UTE—Utility Station
Utility Station—Stations transmitting material that is not intended for reception by the general public and is not originating from an amateur (ham) station.
VHF—Very High Frequency (30–300 MHz)
VOLMET—Station that transmits aeronautical weather information. Comes from a French term that literally means, "flying weather."

2252.0: BRAVO FOXTROT, HOTEL, and OSCAR in Link-11 coordination net, in USB at 0623Z. (MC/SC)

2899.0: Gander Radio working Continental 13, voice and SELCAL, in USB at 0411Z. (JK/NY)

3016.0: Shanwick MWARA, heard here, and passed a secondary frequency of 5598.0 (but not heard there), in USB at 0416Z. (JK/NY)

3167.0: HOTEL FOXTROT, MIKE, DELTA, and SIERRA in Link-11/16 coordination net, in USB at 0033Z. (MC/SC)

3167.0: JULIET, NOVEMBER, DELTA, and BRAVO FOX (USN assets), in TADIL coordination net, in USB at 0607Z. (JK/NY)

3330.0: CHU, Canada, time station, with EE/FF ID in USB at 2358Z. (JK/NY)

3413.0: Shannon VOLMET with aviation weather in USB at 0433Z. (JK/NY)

3476.0: Gander MWARA working various aircraft in USB at 0434Z. (JK/NY)

4079.5: Unid. temperature beacon sending "92F" in CW at 0346Z. (GV/CO)

4149.0: WBN7618 (Crowley Marine tug *EXPLORER*) position report to WPE JACKSONVILLE, in USB at 0501Z. (MC/SC)

4149.0: WBN3015 (the tug *ADVENTURER*) calling WPE (Crowley Marine, Jacksonville, FL), in USB at 0439Z. (JK/NY)

4316.0: NMN with USCG WX BC, Synth OM in USB at 0333Z. (JK/NY)

4369.0: WLO, Mobile, AL, maritime weather, synth female speech, in USB at 0313Z. (JK/NY)

4372.0: W4A clg T0G and FRANCHISE (U.S. Mil exercise tfc) in USB at 0142Z. (MC/SC)

4620.0: Link-11 data transmission at 0203Z. (MC/SC)

4772.0: Link-11 data transmission at 1602Z. (MC/SC)

5193.5: Unid. w/machine-sent 5L groups in CW at 0153Z. (SJ/KY)

5270.0: Italian Air Force PARTITO working SHARK 05 for status report; Unid. IAF station broadcasting intermittent Italian RAI2 TV audio in background (VOX active I presume!), in Italian USB at 1935Z. (LA)

5320.0: USCGC BELUGA (WPB 87325, Little Creek, VA) clg CAMSLANT in USB at 0135Z. (MC/SC)

5335.0: Link-11 data transmission at 0101Z. (MC/SC)

5378.0: FC4 (FEMA Region 4 WGY904, Thomasville, GA) clg SC4 (WGY934, Columbia, SC) in ALE USB monitored at 1250Z. (MC/SC)

5420.0: Unid. w/fast machine-sent 5L groups, "NR" and month letter plus time header, in CW at 0224Z. (SJ/KY)

5450.0: RAF VOLMET with WX for Kabaul in USB at 0126Z. (MC/SC)

5598.0: Santa Maria Radio working various aircraft in voice and SELCAL. Santa Maria passed secondary frequency of 3016.0, in USB at 0519Z. (GV/CO)

5616.0: Gander Radio working various aircraft in voice and SELCAL in USB at 0533Z. (GV/CO)

5696.0: CAMSLANT (USCG Portsmouth, VA) working RESCUE 2114 (USCH HU-25D, CGAS Miami) for flight following, in USB at 0530Z. (GV/CO)

5696.0: CAMSLANT wkg CG 2120 (HU-25A, CGAS Cape Cod) for flight following, in USB at 0145Z. (ALS)

5708.0: 572599 (KC-135R, 77 ARS/916 ARW) clg JNR (Puerto Rico HF-GCS) in ALE USB at 2056Z. (MC/SC)

5711.0: CAPE RADIO wkg FREEDOM STAR re: Space Shuttle STS-118 launch; QSYs to 9043 kHz, in USB at 1613Z. (ALS)

5717.0: HALIFAX MILITARY wkg RESCUE 313 (CC-130) with message relay for RCC, in USB at 0312Z. (MC/SC)

5732.0: 39C with TOI report to PANTHER in USB at 0458Z. (MC/SC)

6315.0: NMN, USCG Portsmouth, VA, idling SITOR w/CW marker at 0448Z. (JK/NY)

6501.0: NMN with PR info and ID in USB at 2328Z. (JK/NY)

6586.0: New York Radio working Continental 31, voice and SELCAL, in USB at 0436Z. (JK/NY)

6604.0: New York VOLMET with aviation WX in USB at 0144Z. (JK/NY)

6739.0: Andrews HF-GCS with 6-char. EAM 2BW67X, simulcast on at least 11175 and 15016, in USB at 0217Z; Andrews, 28-char EAM WYTANG, etc., simulcast on at least 15016, 13200, 11175, 8992, and 4724, in USB at 0250Z. (JK/NY)

6751.0: Cape Radio (Cape Canaveral AFS, FL) wkg *Freedom Star* (Space Shuttle Solid Rocket Booster Recovery Vessel) for STS-118 launch; radio check and long count. In USB at 1820Z; other SRB recovery vessel *Liberty Star* also heard here with Cape Radio later. (ALS)

6761.0: DECEE42 (KC-135R, 459 ARW) clg PEACH 24 (E-8 JSTARS) in USB at 2320Z. (MC/SC)

6761.0: REACH 712 calling/raising tanker to arrange AR rendezvous, missed tanker callsign due to QSB; in USB at 0157Z. (JK/NY)

6790.0: Link-11 data transmission at 0102Z. (MC/SC)

6806.0: AVS (CAP National HQ) clg 037RMRCAP (Rocky Mountain Region station) in ALE USB at 1816Z. (MC/SC)

6809.0: FC4 (FEMA Region 4 WGY904, Thomasville, GA) clg AL4 (WGY954, Montgomery, AL) in ALE USB monitored at 1234Z. (MC/SC)

6911.5: R00257 (CH-47D # 91-0257) clg R23614 (UH-60A # 81-23614) in ALE USB at 1255Z. (MC/SC)

6985.0: R24431 (UH-60A # 85-24431) clg T12 (12th Aviation Bn) in ALE USB at 1151Z. (MC/SC)

7459.5: LINK-11 (or similar TADIL) digital signal at 0428Z. (JK/NY)

7527.0: 38C wkg PANTHER reporting TOI (Target Of Interest) is 40-foot sloop with white packages visible below deck, in USB at 2330Z. (MC/SC)

7811.0: Armed Forces Radio Network, good signal but with strong long-path echo in USB at 0545Z. (GV/CO)

7887.0: M8a numbers station, in CW at 0621Z. (GV/CO)

8012.0: Middle East Region CAP station 043MERCAP sounding in ALE USB at 2125Z. (MC/SC)

8085.0: Unid. w/manually sent CW, poor "fist" sending slashes and VVV, in CW at 0607Z. (GV/CO)

8156.0: CORAL HARBOUR BASE (Royal Bahamas Defense Forces) directs C6WH to cancel tasking and proceed to assist RBDF personnel at 1347Z. (MC/SC)

8389.5: DHJW, *CAP VERDE*, 33,741-ton Germany-registered container ship w/request for equipment check to NMO, Honolulu in SITOR-A at 0526Z; H9GC, *AQUA BLUE*, 13,324-ton Panama-registered Ro-Ro cargo ship 750 mi SW of Juneau, AK, w/AMVER/PR in SITOR-A at 0603Z; 3FHB8, *AQUARIUS ACE*, 14,353-ton Panama-registered vehicles carrier w/AMVER/FR, MMSI and abbreviated ID "AQUA" for arrival at San Diego, CA, in SITOR-A at 0807Z; DSFT3, *HANJIN PITTSBURG*, 38,393-ton South Korea-registered bulk carrier 220 mi W of N California coast en route to bay area to arrive next day, w/AMVER/PR in SITOR-A at 0844Z. (SJ/KY)

8421.0: WLO, Mobile, AL, idling SITOR w/CW marker at 0347Z. (JK/NY)

8421.5: LZW (Varna Radio, Bulgaria) w/traffic list of vessel names without callsigns in SITOR-B at 0348Z, into news in Bulgarian, soccer scores, exchange rates against the dollar, then into idle CW/SITOR-A marker at 0400Z. (SJ/KY)

8294.0: Tug *ADVENTURER* WBN3015 clg WPE Jacksonville with No Joy monitored at 1710Z. (MC/SC)

8825.0: New York MWARA wrkg Avianca Flight 0100 in handoff and move to new flight level, voice and SELCAL, has problems getting Oceanic clearance, in USB at 0340Z. (GV/CO)

8843.0: San Francisco Radio working United 63 with status report, switches primary freq to 5564.0 with this one as secondary, in USB at 0345Z. (GV/CO)

8912.0: Unid. (probable U.S. DHS assets) in ANDVT and ALE at 2301Z. (JK/NY)

8918.0: New York Radio working United 61, voice and SELCAL, in USB at 0331Z. (GV/CO)

8933.0: AVIANCA 073 wkg New York Radio ATC w/ETA for positions PINDO, ISEBA and OPKOL, in USB at 0138Z. (SJ/KY)

8960.5: Unid. fishermen in QSO, southern accented EE, one mentions that he is watching the classic movie *Silverado*, in USB at 0342Z. (GV/CO)

8971.0: FIDDLE clg RED TALON 71 (P-3C) followed by ANDVT at 1706Z. (MC/SC)

8983.0: NMN, USCG CAMSLANT, Chesapeake, VA to aircraft CG2129 and CG2142 to set radio guard frequencies, 8 MHz primary, 5 MHz secondary, in USB at 2108Z; CG2112 to NMN (USCG CAMSLANT) with "flight operations normal" and POSREP 50 mi NE of Boston, MA, en route to Cape Cod, in USB at 2112Z; CG1719 w/same, 5 mi SW of Tampa, FL, in USB at 2120Z. (SJ/KY)

8983.0: RESCUE 1501 (USCG HC-130H, CGAS Elizabeth City, NJ) establishing radio guard with CAMSLANT (USCG Portsmouth,

VA), advises they have no ALE and request to stay on 8983, in USB at 0203Z; CAMSPAC (USCG Pt. Reyes, CA) working RESCUE 1706 (USCG HC130H7, CGAS Barbers Point, CA) in USB at 0323Z. (GV/CO)

8992.0: REACH 5988 (HC-130P) p/p via Andrews HF-GCS for WX at Lajes AB. Heard in USB at 2215Z. (MC/SC)

8992.0: Andrews HF-GCS with 20 (not the usual 18) character EAM XZXLVY etc., simulcast on 6739 and 4724, in USB monitored at 0525Z. (JK/NY)

8992.0: AKELA-11 (Probable USAF MC-130) w/PP via Andrews to METRO for landing WX at Kirtland AFB, NM in USB at 0456Z. (GV/CO)

8998.0: Link-11 data transmission at 0212Z. (MC/SC)

9001.6: ANDVT followed by Z6F wkg B4Q. QSY VHF Chl 81A at 0342Z. (MC/SC)

9007.0: CHALICE FOXTROT (E-3 AWACS) p/p via TRENTON MILITARY to Seymour Johnson Meteo for WX. Heard in USB at 2323Z. (MC/SC)

9010.0: Link-11 data transmission at 1602Z. (MC/SC)

9043.0: Cape Radio (Cape Canaveral AFS, FL) establishing contact with *Freedom Star* (Space Shuttle Solid Rocket Booster Retrieval Ship) for STS-118 launch before switching to 6751.0; in USB at 1818Z. (ALS).

9123.5: Unid. station w/machine-sent 5L groups in CW at 2346Z. (SJ/KY)

9130.0: E10 numbers station with EZI callup then into messages, in USB monitored at 0336Z. (GV/CO)

10051.0: Gander VOLMET with ID and signoff after aviation WX BC, in USB 2130Z. (JK/NY)

10895.0: Link-11 data transmission at 1602Z. (MC/SC)

10993.6: Unid. (probable U.S. DHS assets) in ANDVT at 2120Z. (JK/NY)

11090.0: KVM70 (USCG Honolulu, HI) with WEFAX at 0331Z. (GV/CO)

11175.0: JE 15C (P-3C) p/p via Puerto Rico HF-GCS to FIDDLE (TSC Jacksonville). Identifies as TRIDENT 22 reporting ops normal. Not on station yet. Trying to contact on HF. Troubleshooting UHF. In USB at 1405Z. (MC/SC)

11175.0: UHAUL-90 (C-5A Galaxy, USAFR 433AW, Lackland AFB, TX), phone patches via McClellan HF-GCS to Barksdale Metro for Lackland WX; then to HILLCOUNTRY to advise command post of ETA, training incomplete due to hydraulic problems, in USB at 0344Z. (GV/CO)

11226.0: REACH 5139 (C-17A, 452 AMW) p/p via HF-GCS, in USB heard at 0129Z. (MC/SC)

11232.0: Trenton Military working phone patch to a commercial number in 605 area code for a station not heard here, in USB at 0035Z. (JK/NY)

11232.0: CANFORCE "Trenton Military" wkg unknown aircraft for phone patch to Lajes Metro, number called was incorrect, thus no response, in USB at 1952Z. (ALS)

11232.0: CHALICE GOLF (E-3 AWACS) p/p via TRENTON MILITARY to RAYMOND 24 regarding SATCOM problem at 1647Z; CG 1501 (HC-130, CGAS Elizabeth City) position report to TRENTON MILITARY, probable International Ice Patrol activity, in USB at 1434Z; ATLAS 38 (CC-130) wkg TRENTON MILITARY advising they are out for training in Lake Winnipeg region. Heard in USB at 1419Z. (MC/SC)

11244.0: COMPRESS (or callsign sounding like it; US Mil "Nightwatch Net" activity), with EAMs in USB monitored at 0325Z. (GV/CO)

11494.0: 93A position report to PANTHER in USB at 1648Z. (MC/SC)

11740.0: Link-11 data transmission at 1602Z. (MC/SC)

12120.0: Unid. Cuban ENIGMA station on over regular encrypted RTTY, female w/brief Spanish numbers followed by Packet-like scratching sound, in AM mode at 1756Z. (SJ/KY)

12214.0: M8a numbers station in CW at 0303Z. (GV/CO)

12369.0: Unid. 2 OM/EE in QSO re: YL bringing parts and equipment, in USB at 0301Z. (GV/CO)

12422.0: Unid. numbers station w/5N groups, sent full numbers except long "T" as a cut zero, in CW at 2125Z. (SJ/KY)

12490.0: ELCI9, *BRAUNSCHWEIG*, 14,620-ton Liberia-registered vehicles carrier 100 mi E of Daytona Beach, FL and sailing SSW, w/AMVER/PR in SITOR-A at 1636Z; C6KD4, *CHIQUITA SCANDINAVIA*, 13,930-ton Bermuda-registered refrigerated cargo ship 1,200 mi E of Savannah, GA, w/BBXX format WX OBS in SITOR-A at 1818Z; VRVX3, *JOYOUS LAND*, 69,283-ton Hong Kong-registered bulk carrier w/MMSI and abbreviated ID "JYLD" in SITOR-A at 2022Z. (SJ/KY)

12581.0: WLO, Mobile, AL, idling SITOR for several minutes then CW channel marker, in SITOR/CW at 0252Z. (GV/CO)

12581.46: WLO (Shipcom Radio, Mobile, AL) w/piracy bulletins to unid. vessel on 12479.0 kHz re attacks off Nigeria, Malaysia, Indonesia, Somalia, also info on the "Inventus" Unmanned Aerial Vehicle and "Secure-Ship" 9,000-volt "electrifying fence" surrounding ships as tools against piracy, slightly off-frequency for some reason, in SITOR-A at 2332Z. (SJ/KY)

12823.5: CTP, NATO, Lisbon, Portugal w/modified ITA2 marker: "NAWS NAWS DE CTP CTP CTP SHIP SHORE NOT AVAILABLE UFN" in 75 baud/850 Hz RTTY at 2311Z. (SJ/KY)

13927.0: USAF MARS Operator AFA6PF, Los Angeles, wkg REACH 928 (over Virginia) for phone patch to DSN number for Niagara Falls, NY USAFR/ANG Base Ops; announces they are one hour out; in USB at 1652Z. (ALS).

13927.0: DOOM 92 (B-52H, Barksdale AFB) via USAF MARS operator for phone patch to DSN number for Barksdale Ops, reports aft gear stuck down, have run all checklists with no solution, will fly direct Lancer, direct Barksdale, and orbit; in USB at 1558Z; heard again later w/patch via USAF MARS Operator AFA3AD, Wisconsin to Barksdale 96BS Red Ops, in USB at 1649Z; USAF MARS Operator AFA6PF, Los Angeles wkg HERKY 74 (C-130) for phone patch in USB at 1607Z; AFA6PF wkg GATOR 07 but handing the contact off to AFA3AD, in USB at 1619Z; 13927.0: AFA3AD wkg GATOR 07 (T-43A, Randolph AFB) for phone patch to GATOR OPS for arrival WX, in USB at 1642Z. (ALS)

13927.0: USAF MARS AFA1WP (Boston, MA) wkg DIXIE 44 (KC-135R, ALANG, Birmingham IAP) for phone patch to DSN number for CORNERSTONE (Tinker AFB) re: status of FIREBIRD 01, is told FIREBIRD 01 has been forced to cancel due to a natural disaster downrange; confirms no other receivers coming from Tinker, in USB at 1551Z; AFA1WP wkg PISTON 52 (KC-135R, Selfridge 927ARW) for phone patch to DSN number for PISTON CONTROL (Selfridge ANGB), reports RTB; ETA 1700Z; in USB at 1618Z. (ALS)

13927.0: USAF MARS AFA4DD (Texas) with JEST 20 (Altus AFB 97AMW KC-135 over West Texas); unable to copy each other; will attempt phone patch later; in USB at 1622Z; USAF MARS AFA1EN (Shelbyville IN) wkg TIGER 41 for M&W phone patch to a commercial number in Colorado, in USB at 1558Z; AFA1EN wkg GITMO 500 (Guantanamo, Cuba-based UC-12B) for phone patch; reports inbound with 3 PAX, in USB at 1750Z. (ALS)

13927.0: USAF MARS Operator AGA2PA (Patrick AFB) wkg HERKY 74 (C-130 over Lake Huron) for phone patch to DSN number for ABSTAIN (Minn-St. Paul MN-ANG 934AW CP); ETA 1900Z; requests Customs, fuel on arrival; in USB at 1657Z; USAF MARS AFA1QW wkg ROGUE 09 (B-52H over Texas), for phone patch to DSN number for Barksdale AFB 11BS Ops; reports lost AR due to malfunction, in USB heardat 1706Z. (ALS)

16621.0: Two unid. stations in simplex fast handset keyed CW traffic, using 259GHMNOST for partial cut numbers, in CW at 0028Z. (SJ/KY)

16641.0: Unid. station w/CW traffic, mostly numbers repeated, in CW heard at 2135Z. (SJ/KY)

16696.5: VRBR8, *SAGA DISCOVERY*, 46,618-ton Hong Kong-registered general cargo ship 60 mi SE of Santo Domingo, Dominican Republic, en route to Castellon on Spain's Mediterranean coast to arrive in 12 days, w/AMVER/PR in SITOR-A heard at 1618Z. (SJ/KY)

25910.0: Broadcast pickup for WBAP, Dallas/Fort Worth, TX, 90-100 Hz tone on distorted tinny audio, ABC news, traffic report, local news about escaped convict and Dallas County Sheriff being sued, in NFM at 1400Z. (WH/IL)

25950.0: Broadcast pickup for KOA, Denver, CO, talk, ads for Denver area businesses, in NFM at 1000Z, heard again with much stronger signal at 1400Z. (WH/IL)

25990.0: Broadcast pickup for KSCS, Fort Worth, TX, tinny distorted audio with 90-100 Hz tone in audio, ads and country/western music in NFM monitored at 1400Z. (WH/IL) ■

by Kent Britain, WA5VJB

Family Radio Service Yagis

In many areas of the country, the Family Radio Service (FRS) has taken over more and more of the emergency services originally handled by REACT and CB Channel 9. And, of course, several manufacturers offer good, inexpensive devices to meet the growing need (**Photo A**).

A 6-inch rubber antenna may meet the original FCC specifications, but the range is very limited. There are legal issues involved in modifying the antenna on the FRS transmitter, but there are no restrictions on building big antennas, like the Yagi in **Photo B**, for scanners or ham rigs that also tune 465 MHz. This allows you to monitor FRS radios from four to 10 times farther away than that 6-inch rubber antenna is going to let you hear.

This is a family of easy-to-build Yagi antennas for monitoring the FRS service. They're simple and inexpensive and are great for weekend and portable activities. The two-element Yagi will cover about a 180-degree arc and, if mounted at a modest height, will give good coverage. The four-, six-, and eight-element Yagi antennas each cover a narrower arc, but with more gain and more range. These Yagis also work well as 460-MHz scanner antennas, all for just a few bucks.

Photo A. Good things always did come in small packages, like these FRS walkie talkies.

Construction

I'm not a fan of using plastic water pipe for the element boom, and it tends to melt when you solder the coax to the driven element. But if you solder the coax first then attach the driven element to the boom, plastic pipe can be used. Personally I like to use wood for the boom. It's cheap, easy to drill, strong, and if you protect the wood, it can last for years and years. Spar Varnish seems to be the best to use, but wood sealers, spray paint, and even house paint have all been used with good long-term results. At this frequency, 1/2 x 3/4-inch wood works well, as does 3/4-inch square.

The elements can be any metal about 1/8th inch or about 3 mm in diameter. Hobby tubing, #10 and #12 bare copper wire, ground rod wire, electric fence wire, and welding rod have all been used to

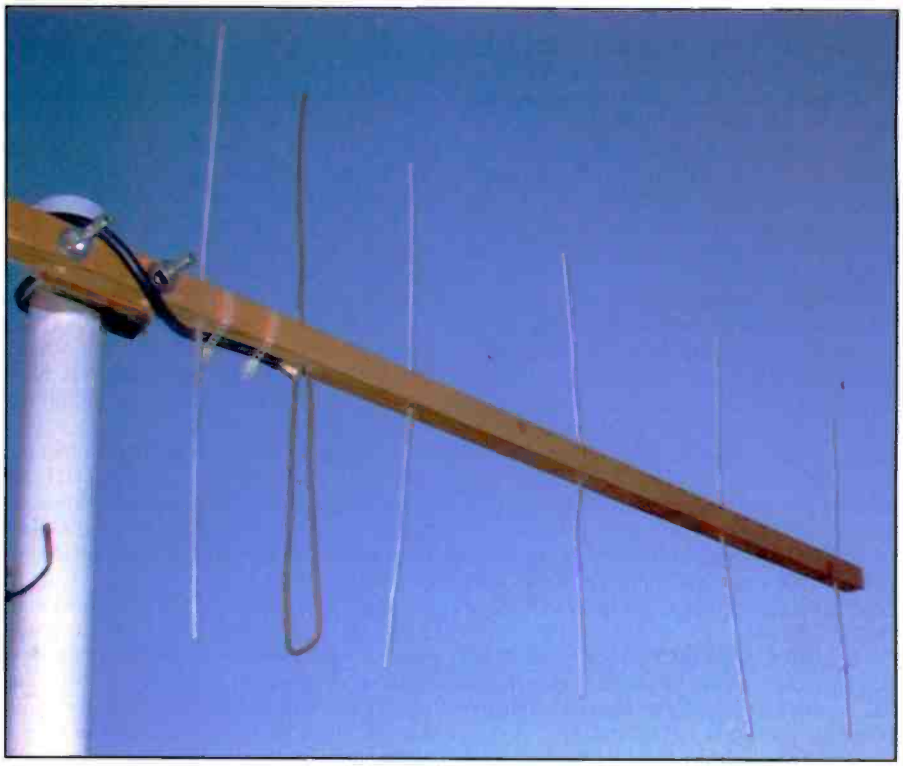


Photo B. A simple Yagi for 465-MHz FRS frequencies.

Photo C. Note the extra holes I've drilled so the U-bolt can be vertical or horizontal.

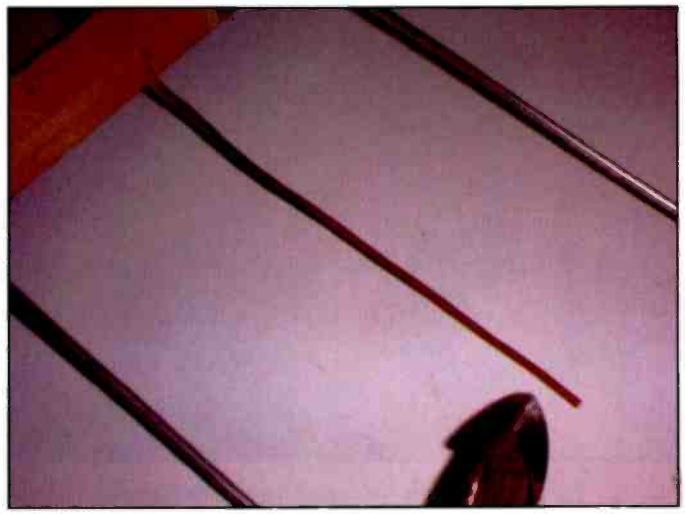


Photo D. Trimming the driven element for the best SWR.

make elements. For the driven element I suggest bare copper wire or one of the bronze welding rods; they're much easier to work with when you're soldering on the coax connections.

After the elements are in place a drop of Super Glue or RTV-type silicone glue will keep them there.

In **Photo C** you can see where I have U-bolt holes drilled both ways so I can mount the antenna vertically or horizontally. I really don't know if vertical or horizontal will work best when listening for FRS radios. Most people seem to hold the radios sideways when they use them; few hold the radios with the antennas perfectly vertical.

The driven element in the **Figure** is used on all versions of the FRS Yagi. If you can measure SWR at 465 MHz, then you can time the free end of the driven element for best SWR, as in **Photo D**. Just remember that old carpenter's joke: "I've cut it off twice and it's still too short!" Just build the FRS Yagi to the dimensions and the SWR should be well under 2 to 1. The width of the loop in the driven element is .5 inches, but this is not a critical dimension.

Coax

You can use almost any 50-Ohm coax—RG-58, RG-8X, RG8, or even RG213 or 214. Of course, the larger coax will have less loss. The coax is simply soldered directly to the driven element. The coax shield goes to the long top section of the driven element, and the coax center conductor goes near the bottom tip of the J element, as shown in **Photo E**.

If you plan to mount the antenna outdoors for long periods of time, I suggest some RTV silicone or lots of paint over the exposed coax braid to help keep water out of the coax.

Let's Meet Our Antennas...

First off, we have a two-element Yagi version. For this, just make the reflector 12.5 inches long, and mount the driven element shown in our **Figure 3** inches in front of the reflector. Gain is about 5 dBi, and the beam when mounted vertically is about 180 degrees wide. This is good for monitoring a wide area.

If you want to build the two-element Yagi, use the dimensions given for the reflector and the driven element for the four-element version; just leave off the two directors.

Next we have the four-element Yagi version. Mounting these antennas off their ends prevents other metal objects from detuning them (nearby metal objects

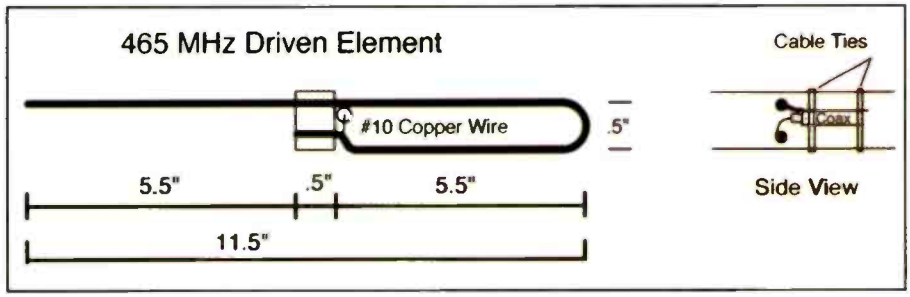


Figure. The driven element for all four versions.

Four-Element

	Reflector	Driven Element	Director 1	Director 2
Length	12.5	Figure	11.2	10.0
Position	0	4.7	7.5	9.5

Six-Element

	Ref	DE	D1	D2	D3	D4
Length	12.5	Fig1	11.5	11.0	11.0	10.0
Position	0	2.5	5.5	10.5	16.5	22.75

Eight-Element

	Ref	DE	D1	D2	D3	D4	D5	D6
Length	12.5	Fig1	11.5	11.0	11.0	11.0	11.0	10.0
Position	0	2.5	5.5	10.5	16.5	22.75	28.5	33.5

Photo E. Attaching the coax to the driven element.

can reduce the gain of a Yagi and distort its beam pattern). Again use the same driven element from the **Figure**. All dimensions are in inches. All positions for the elements start from the reflector, the longest element, as the zero point. (See "Four-Element" box.)

For our last two FRS Yagis we have the six-element version, shown in **Photo B**, and the even longer eight-element version. While I've built wood boom UHF antennas out to 20 elements, an eight-element is about the max length you can easily end mount. You can expect almost 11 dBi of gain from the six-element Yagi and just over 12 dBi out of the eight-element Yagi. The dimensions for the first five elements are the same for both versions. Again, all dimensions are in inches. (See "Six-Element" and "Eight-Element"boxes.)

Portable Use

One backpacker I'm aware of has been using a similar Cheap Yagi on the ham bands. He just kind of wads up the elements and sticks it in his pack. When he reaches a high spot he straightens out the elements. It doesn't look pretty, but a few bends in the elements does not affect performance. He says these antennas are good for about 10 "waddings" before he needs to build another one.

Emergency Power

I recently worked with a group reviewing many of the problems with emergency power systems after Katrina slammed into New Orleans. One of the simple tricks was "daisy chaining" uninterruptible power supplies (UPSs) like the ones in **Photo F**. The first UPS powers all their systems and the second UPS takes over for the most critical systems after the first one is used up.

Or, if you need to keep a system running longer, then two small UPSs in series may be less expensive than a really big one. There are certainly a lot of ways to configure these back-up power supplies—think of this technique as a tool in your emergency tool kit.

Another major problem discovered in the wake of Katrina involved the walkie-talkies used by the various city services. The distributor had only provided AC chargers with the talkies, and after a day or so most had gone dead. Many of the repeaters had emergency power, but all the talkies were dead.

Now, we all know that a 12-VDC cigarette lighter cord, like the one in **Photo G**, costs about $5 to make. Yet dealers have

Photo F. There are handy uninterruptible power supply tricks for emergency power.

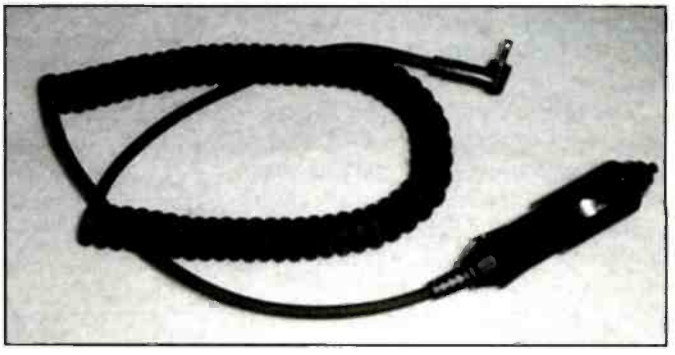


Photo G. $150 for a DC power cord?

been known to charge cities as much as $150 for that DC power cord. If you're in any way involved in the purchase of radios for your community, see about getting the DC power cords bundled into the deal. For a $2,000 multiband commercial talkie, you would think they could throw in a $5 power cord so the police and firemen can charge the talkies in their cars.

What Do You Want To Read About?

As always, I welcome your antenna questions and comments—you provide some of the best ideas for projects for this column. You can email me at wa5vjb@cq-vhf.com, or for other antenna articles you can visit www.wa5vjb.com, where I have several antenna projects in the "Reference" section.

Now, go get some antennas in the air before the weather gets too cold. ■

by Tomas Hood, NW7US, pc-prop-man@hfradio.org

The Ionosonde

Readers of this column have read about the ionosphere and how a range of radio frequencies can be reflected by the ionosphere in such a way that we can communicate by radio over distances beyond line-of-sight. The ionospheric density and energy level are both affected by energy from the sun, and they change throughout the day and season, and from year to year.

Scientists and propagation observers measure the ionosphere by using special radio equipment called an "ionosonde." An ionosonde is also known as a chirp sounder, because chirps, or radar emissions, are used to examine the ionosphere. This is accomplished by a shortwave transceiver that can quickly tune through the whole shortwave range, sending and listening on each frequency. Special antennas are used because the transmitting antenna must have the correct matching impedance between the transmitter and the antenna array, and the receiving antennas have to be directional and able to hear signals on each of the frequencies in the sweep made by the transmitter.

The ionosonde transceiver steps through a series of frequencies from low to high. As it transmits on each frequency between 1 and 20 MHz, the transceiver sends a rapid pulse straight up into the ionosphere. Between these pulses, the ionosonde listens for an echo of the transmitted pulse. The time it takes between the sending of a pulse and the returned echo is analyzed to determine ionospheric characteristics.

The Ionogram And Its Interpretation

Each echo is plotted by frequency and time on a graph called an "ionogram" (**Figure 1**). When echoes are no longer returned, the ionogram illustrates the highest frequency on which an echo was returned and shows the return time as a distance from the ionospheric layer from which the echo was returned.

These plotted measurements, typically made every 15 minutes, allow the ionosonde to map out the various layers of the ionosphere (the *E*-, *D*-, F_1-, F_2-, and F_3-region mappings). Each ionospheric region shows up as an approximately smooth curve, separated from each other by an asymptote at the critical frequency of that layer. According to the entry on Wikipedia (http://en.wikipedia.org/wiki/Asymptote),

> ...an asymptote is a straight line or curve *A* to which another curve *B* (the one being studied) approaches closer and closer as one moves along it. As one moves along *B*, the distance between it and the asymptote *A* tends to become smaller and smaller overall, and eventually never becomes longer than any specified distance. A curve may or may not touch or cross its asymptote. In fact, the curve may intersect the asymptote an infinite number of times, but its maximal deviation from the asymptote keeps getting smaller.

On the ionogram, the upwardly curving sections at the beginning of each region are due to the transmitted wave being slowed by, but not reflected from, underlying ionization. This is caused by the underlying ionization that has a plasma frequency close to, but not equaling, the transmitted frequency.

For frequencies approaching the level of maximum plasma frequency in the ionospheric region, the virtual height tends to approach infinity because the pulse must travel a finite distance at a speed that is effectively zero. The frequencies at which this occurs are called the "critical frequencies." The critical frequency of each ionospheric region is scaled from the asymptote, and the virtual height of each region is scaled from the lowest point on each curve (**Figure 2**).

The notation for the critical frequency of the F_2 layer is "foF2," and "foF1" indicates the critical frequency of the F_1 layer at the location of the ionosonde. From these frequencies, the maximum usable frequency (MUF) of a given radio transmission path through that geographical point can be extrapolated. The MUF

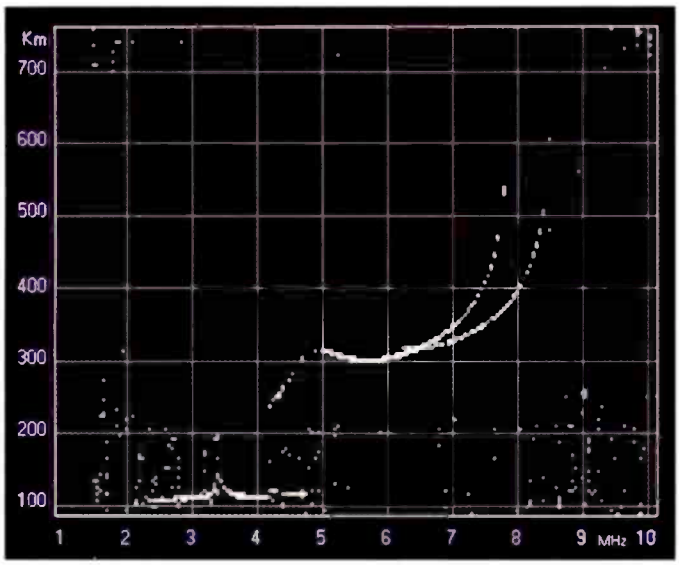


Figure 1. A sample ionogram recorded at the Rome Observatory. Source: Istituto Nazionale di Geofisica e Vulcanologia (INGV)

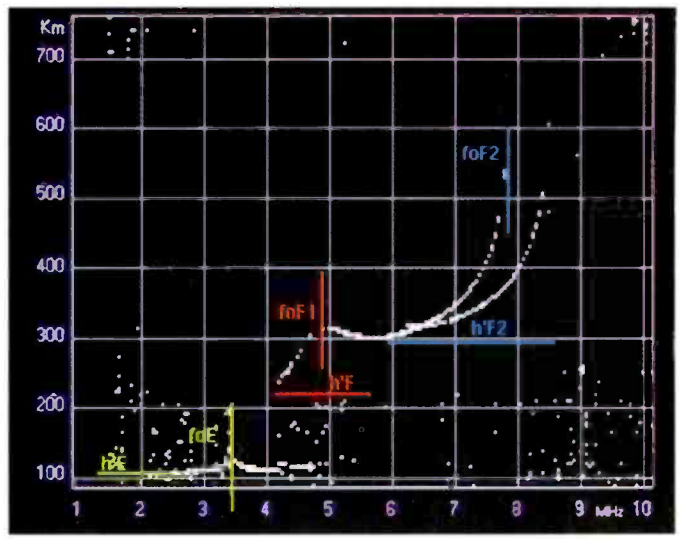


Figure 2. An interpretation of the ionogram recorded at the Rome Observatory. See text. Source: Istituto Nazionale di Geofisica e Vulcanologia (INGV)

The Ap Index And Understanding Propagation Terminology

The Ap index, or Planetary A index, is a 24-hour averaging of the Planetary K index. The Planetary K index is an averaging of worldwide readings of Earth's geomagnetic field. High indices (Kp > 5 or Ap > 20) mean stormy conditions with an active geomagnetic field. The more active, the more unstable propagation is, with possible periods of total propagation fade-out. Especially around the higher latitudes andat the polar regions, where the geomagnetic field is weak, propagation may disappear completely. Extreme high indices may result in aurora propagation, with strongly degraded long-distance propagation at all latitudes. Low indices result in relatively good propagation, especially noticeable around the higher latitudes, when transpolar paths may open up. Maximum K-index is 9, and the A-index can exceed well over 100 during very severe storm conditions, with no maximum.

Classification of A indices is as follows:

A0–A7 = quiet	A30–A49 = minor storm
A8–A15 = unsettled	A50–A99 = major storm
A16–A29 = active	A100–A400 = severe storm

Solar Flux Index (SFI): This flux number is obtained from the amount of radiation on the 10.7-cm band (2800 MHz). It is closely related to the amount of ultraviolet radiation, which is needed to create the ionosphere. Solar Flux readings are more descriptive of daily conditions than the Sunspot Number. The higher the Solar Flux (and, therefore, the higher the Sunspot Number), the stronger the ionosphere becomes, supporting refraction of higher frequencies.

Ionosphere: A collection of ionized particles and electrons in the uppermost portion of the Earth's atmosphere, which is formed by the interaction of the solar wind with the very thin air particles that have escaped Earth's gravity. These ions are responsible for the reflection or bending of radio waves occurring between certain critical frequencies, with these critical frequencies varying with the degree of ionization. As a result, radio waves having frequencies higher than the Lowest Usable Frequency (LUF) but lower than the Maximum Usable Frequency (MUF) are propagated over long distances.

Smoothed Sunspot Number (SSN): Sunspots are magnetic regions on the sun with magnetic field strengths thousands of times stronger than the Earth's magnetic field. Sunspots appear as dark spots on the surface of the sun. Temperatures in the dark centers of sunspots drop to about 3700° K (compared to 5700° K for the surrounding photosphere). This difference in temperatures makes the spots appear darker than elsewhere. Sunspots typically last for several days, although very large ones may last for several weeks. They are seen to rotate around the sun, since they are on the surface, and the sun rotates fully every 27.5 days.

Sunspots usually occur in a group, with two sets of spots. One set will have positive, or north, magnetic field while the other set will have negative, or south, magnetic field. The field is strongest in the darker parts of the sunspots (called the "umbra"). The field is weaker and more horizontal in the lighter part (the "penumbra").

Galileo made the first European observations of sunspots in 1610. The Chinese and many other early civilizations have records of sunspots. Daily observations were started at the Zurich Observatory in 1749; continuous observations were begun in 1849.

The Sunspot Number is calculated by first counting the number of sunspot groups and then the number of individual sunspots. The Sunspot Number is then given by the sum of the number of individual sunspots and 10 times the number of groups. Since most sunspot groups have, on average, about 10 spots, this formula for counting sunspots gives reliable numbers even when the observing conditions are less than ideal and small spots are hard to see. Monthly averages (updated monthly) of the Sunspot Numbers show that the number of sunspots visible on the sun wax and wane with an approximate 11-year cycle.

For more information, see http://prop.hfradio.org.

describes the maximum radio frequency on which a radio signal may be propagated by ionospheric reflection at the point where the ionosonde measured the critical frequencies. The MUF is the upper frequency limit that can be used for transmission between two points at a specified time, with the location of the ionosonde being at midpoint of a single "hop" or reflection off the ionosphere.

An ionogram can show a number of phenomena, including the various *F* layers, *D*-layer absorption, and sporadic-*E* (*Es*) occurrences. *Es* refers to the propagation of radio waves by reflections off patchy and very dense "clouds" in the *E* layer. These clouds can sometimes reflect radio frequencies as high as the low VHF radio spectrum. Despite their intensity, these highly ionized patches do not extend over a large height range, and so do not exhibit an asymptote at the critical frequency. They are plotted on the ionogram as a narrow horizontal line at around 100 kilometers. One problem that may occur during a sounding is "blanketing." Blanketing prevents any echoes from reaching higher ionospheric layers when an intense *Es* layer blocks the ionosonde chirps.

When turbulence occurs in the ionosphere, perhaps due to geomagnetic storms, the stratified nature of the ionosphere gives way to a more complex structure. When this happens, the chirps may not be echoed. This shows up on the ionogram as gaps in the curve. These gaps are called "Lacuna." The position of these gaps on an ionogram shows the height at which the turbulence is occurring.

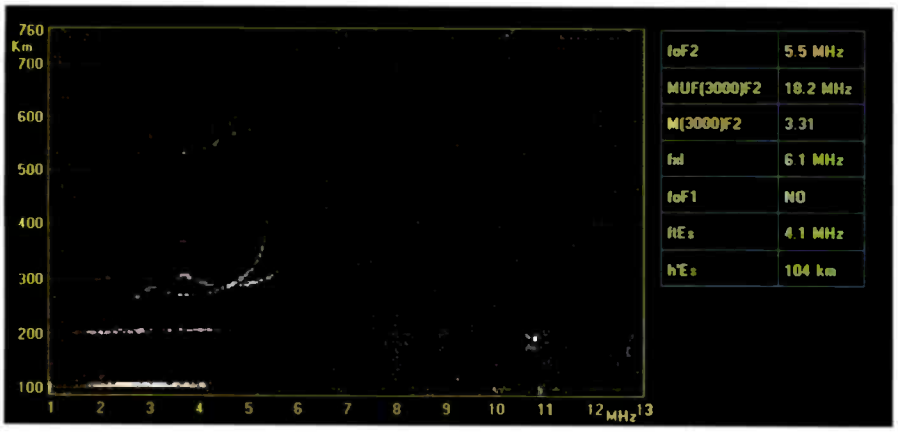


Figure 3. An example of the real-time ionogram recorded at the Rome Observatory at 41.8 North, 12.5 East. The ionospheric characteristics given as output were automatically scaled by Autoscala program. The AIS-INGV/Autoscala system was developed at INGV, Rome, Italy; see http://ionos.ingv.it/Roma/latest.html. Source: Istituto Nazionale di Geofisica e Vulcanologia (INGV)

An Example Of An Ionosonde

Figure 3 is an example of a real-time ionogram recorded at the Rome Observatory. Notice the two strong curves between about 250 and 400 kilometers. There's a faint curve at 500 to 600 kilo-

Optimum Working Frequencies (MHz) - For November 2007 - Flux = 80, Created by NW7US

UTC TO/FROM US WEST COAST	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CARIBBEAN	18	14	12	11	10	10	10	9	9	9	9	9	9	9	15	18	19	20	21	21	21	21	21	20
NORTHERN SOUTH AMERICA	25	23	18	15	14	14	13	13	12	12	12	12	12	11	19	23	26	27	28	29	29	29	28	27
CENTRAL SOUTH AMERICA	25	22	16	15	14	14	13	13	12	12	12	12	12	12	20	24	26	27	28	29	29	29	28	27
SOUTHERN SOUTH AMERICA	27	25	21	16	15	14	14	13	13	12	12	12	12	12	16	23	25	26	27	28	29	29	29	28
WESTERN EUROPE	8	8	8	8	8	8	8	8	8	8	8	8	8	8	9	13	14	14	13	12	9	9	9	9
EASTERN EUROPE	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	10	12	11	9	9	9	9	8	8
EASTERN NORTH AMERICA	20	17	13	12	12	11	11	11	10	10	10	10	10	10	17	20	21	22	23	23	23	23	22	21
CENTRAL NORTH AMERICA	12	11	9	7	7	6	6	6	6	6	6	5	5	5	5	10	11	12	12	13	13	13	13	12
WESTERN NORTH AMERICA	6	6	5	4	3	3	3	3	3	3	3	3	2	2	2	4	5	6	6	7	7	7	7	7
SOUTHERN NORTH AMERICA	20	18	15	12	11	11	10	10	10	9	9	9	9	9	12	17	19	20	21	22	22	22	21	21
HAWAII	19	18	17	16	14	10	10	9	9	9	8	8	8	8	8	8	8	14	16	18	18	19	19	19
NORTHERN AFRICA	9	9	8	8	8	8	8	8	8	8	8	8	8	8	11	14	15	16	16	12	10	10	9	9
CENTRAL AFRICA	11	10	10	9	9	9	8	8	8	8	8	8	8	8	10	13	14	15	15	13	12	12	11	11
SOUTH AFRICA	18	14	12	11	11	11	10	10	10	10	10	10	9	9	16	19	20	21	21	22	22	21	20	19
MIDDLE EAST	8	8	8	8	8	9	8	8	8	8	8	8	8	8	8	11	13	11	10	10	9	9	9	9
JAPAN	17	17	16	15	13	10	10	9	9	9	9	8	8	8	8	8	8	8	8	8	8	14	16	17
CENTRAL ASIA	17	17	16	15	13	10	10	9	9	9	9	8	8	8	8	8	8	10	10	10	10	10	16	17
INDIA	8	13	12	9	9	9	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
THAILAND	17	16	16	14	12	10	9	9	9	9	8	8	8	8	8	8	8	11	11	11	10	10	10	14
AUSTRALIA	25	26	26	24	21	15	15	14	13	13	13	12	12	12	12	12	12	15	15	14	17	19	21	23
CHINA	15	16	15	14	12	10	9	9	9	9	8	8	8	8	8	8	8	8	8	8	8	8	8	13
SOUTH PACIFIC	27	28	26	24	20	15	15	14	13	13	13	12	12	12	12	12	15	15	17	20	22	24	25	26

UTC TO/FROM US MIDWEST	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CARIBBEAN	19	14	13	12	12	11	11	11	10	10	10	10	10	18	21	23	24	25	25	25	25	24	23	22
NORTHERN SOUTH AMERICA	22	19	16	15	14	13	12	12	12	11	11	11	11	18	21	24	25	26	27	27	27	27	26	24
CENTRAL SOUTH AMERICA	23	17	16	15	14	14	13	13	12	12	12	12	12	22	24	25	27	28	28	29	29	29	28	26
SOUTHERN SOUTH AMERICA	26	22	18	17	16	15	14	14	13	13	12	12	12	18	22	24	25	26	27	28	29	29	29	28
WESTERN EUROPE	9	8	8	8	8	8	8	8	8	8	8	8	8	13	15	16	15	15	14	13	11	9	9	9
EASTERN EUROPE	8	8	8	8	8	8	8	8	8	8	8	8	8	10	12	12	11	11	10	9	8	8	8	8
EASTERN NORTH AMERICA	13	10	9	9	8	8	8	8	7	7	7	7	7	12	14	15	16	17	17	17	17	17	16	15
CENTRAL NORTH AMERICA	7	6	4	4	4	3	3	3	3	3	3	3	3	3	5	6	7	7	8	8	8	8	7	7
WESTERN NORTH AMERICA	12	11	9	7	7	6	6	6	6	6	6	6	5	5	5	10	11	12	13	13	13	13	13	12
SOUTHERN NORTH AMERICA	13	12	8	8	8	7	7	7	7	7	6	6	6	6	12	13	14	15	15	16	16	15	15	14
HAWAII	21	20	18	15	12	11	11	10	10	10	9	9	9	9	9	9	13	18	20	21	22	22	22	22
NORTHERN AFRICA	10	10	9	9	9	9	8	8	8	8	8	8	8	10	14	16	17	18	18	18	17	13	12	12	11
CENTRAL AFRICA	10	10	9	9	9	9	8	8	8	8	8	8	10	14	16	17	17	18	18	13	12	12	11	11
SOUTH AFRICA	18	15	14	14	13	13	12	12	12	12	12	12	18	23	25	27	28	28	28	28	28	26	23	21
MIDDLE EAST	8	8	8	8	8	8	8	8	8	8	8	8	8	13	15	16	16	13	10	10	9	9	9	9
JAPAN	16	15	14	10	10	9	9	9	9	8	8	8	8	8	8	8	8	8	8	8	8	13	15	17
CENTRAL ASIA	16	15	13	10	10	9	9	9	9	8	8	8	8	8	8	9	11	10	10	10	10	10	14	17
INDIA	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
THAILAND	15	14	12	10	9	9	9	9	8	8	8	8	8	8	8	11	11	11	11	10	10	10	10	10
AUSTRALIA	25	26	23	19	15	14	14	13	13	12	12	12	12	12	12	17	16	15	15	14	17	20	22	23
CHINA	14	14	12	10	9	9	9	9	8	8	8	8	8	8	8	9	9	8	8	8	8	8	8	11
SOUTH PACIFIC	28	26	23	17	15	14	14	13	13	13	12	12	12	12	12	16	15	15	18	21	23	24	26	27

UTC TO/FROM US EAST COAST	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CARIBBEAN	14	12	11	10	10	9	9	9	9	8	8	8	13	17	18	19	20	20	21	20	20	19	19	17
NORTHERN SOUTH AMERICA	20	17	16	15	14	13	12	11	11	11	10	10	14	18	20	22	23	24	25	25	24	24	23	22
CENTRAL SOUTH AMERICA	21	19	18	17	16	15	14	13	13	13	12	15	20	22	24	26	27	28	28	29	29	28	27	25
SOUTHERN SOUTH AMERICA	24	21	19	18	17	16	15	14	14	13	13	12	19	21	23	24	26	27	27	28	29	29	29	27
WESTERN EUROPE	8	8	8	8	8	8	8	7	7	8	7	12	14	16	16	16	16	16	15	14	12	9	9	9
EASTERN EUROPE	8	8	8	8	8	8	8	8	8	8	8	10	14	14	14	14	13	13	12	9	9	9	8	8
EASTERN NORTH AMERICA	5	4	4	4	4	3	3	3	3	3	3	3	5	7	7	8	8	8	8	8	8	8	7	7
CENTRAL NORTH AMERICA	14	10	9	9	9	8	8	8	8	8	8	7	7	12	15	16	17	18	18	18	18	17	17	16
WESTERN NORTH AMERICA	20	17	13	12	12	11	11	11	10	10	10	10	10	10	17	20	22	23	23	23	23	23	22	21
SOUTHERN NORTH AMERICA	15	11	10	10	9	9	9	8	8	8	8	8	8	14	16	18	19	19	20	20	19	19	18	17
HAWAII	21	18	13	12	12	11	11	11	10	10	10	10	10	10	10	10	15	20	22	24	24	24	23	22
NORTHERN AFRICA	11	11	10	10	10	10	10	10	10	10	10	17	20	22	23	23	23	22	21	18	13	12	12	11
CENTRAL AFRICA	11	11	11	10	10	10	10	10	10	10	10	18	20	22	23	23	23	22	19	14	14	13	12	12
SOUTH AFRICA	16	15	14	14	13	13	12	12	12	12	12	21	25	27	28	28	29	29	29	28	26	23	17	
MIDDLE EAST	10	9	9	9	9	8	8	8	8	8	8	13	16	17	18	18	19	18	13	12	12	11	11	10
JAPAN	14	10	10	9	9	9	9	8	8	8	8	8	8	9	9	8	8	8	8	8	8	11	15	15
CENTRAL ASIA	13	10	10	9	9	9	8	8	8	8	8	8	8	12	11	11	11	10	10	10	10	10	10	15
INDIA	8	8	8	8	8	8	8	8	8	8	8	8	11	14	15	14	10	10	9	9	9	9	8	8
THAILAND	10	10	9	9	9	9	8	8	8	8	8	8	9	13	12	12	11	11	11	10	10	10	10	10
AUSTRALIA	25	22	16	15	14	13	13	13	12	12	12	12	12	12	19	17	16	15	15	15	18	20	22	24
CHINA	10	10	9	9	9	9	8	8	8	8	8	8	8	9	9	9	9	8	8	8	8	8	8	8
SOUTH PACIFIC	25	22	17	16	15	15	14	13	13	13	12	12	12	18	17	16	16	17	20	22	24	26	27	27

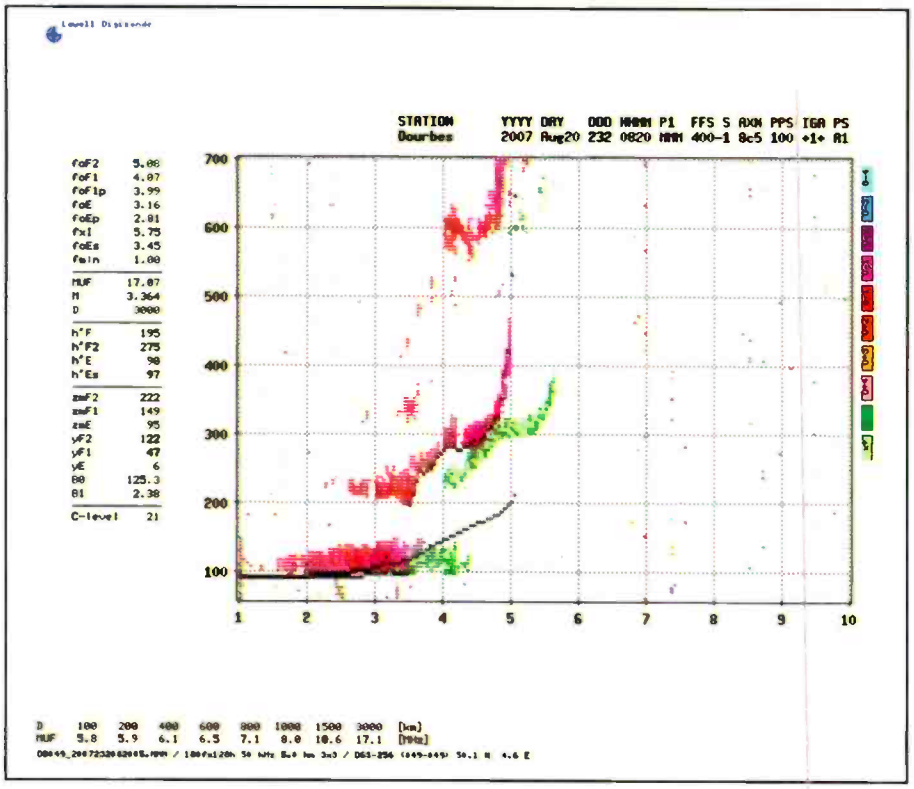


Figure 4. An ionogram using the "digisonde" on August 20, 2007, at Dourbes, Belgium; see http://digisonde.oma.be/. The digisonde is an advanced ionosonde created by MIT's Lowell Center for Atmospheric Research. Source: Royal Meteorological Institute of Belgium/UML-CAR (University of Massachusetts Lowell Center for Atmospheric Research; see http://ulcar.uml.edu)

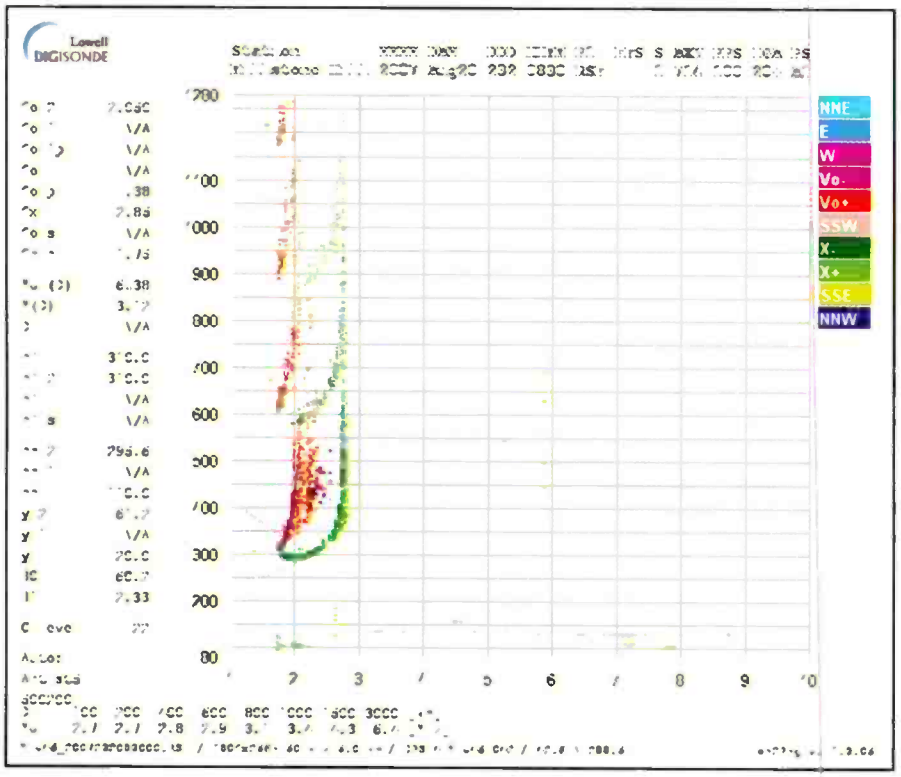


Figure 5. An ionogram using the "digisonde" at Millstone Hill, Massachusetts (http://digisonde.haystack.edu/ and http://www.haystack.mit.edu/). Source: UMLCAR (University of Massachusetts Lowell Center for Atmospheric Research; see http://ulcar.uml.edu)

meters, as well. From these curves, the critical frequency of the F_2 layer is determined to be 5.5 MHz. The straight plot at 104 kilometers is an *Es* plot, with a top frequency of 4.1 MHz. The MUF for a 3000-kilometer hop is calculated to be 18.2 MHz.

The Chilton Ionosonde

There are many ionosondes around the world. One that provides useful ionograms is the Digital Portable Sounder (DPS) at Chilton, England. This ionosonde was originally designed as a research instrument. It's a very flexible system capable of recording quality data obtained from a pulse of just 300 watts. The transmitter antenna consists of a "crossed delta"—two orthogonal triangles with a vertical apex at a height of 27 meters and with a base 50 meters across. The receiver is a phased array of four crossed loop antennas five feet in diameter. Three of the aerials are positioned on the vertices of an equilateral triangle with 60-meter sides. The fourth is in the center of the triangle.

Because the receive antennas form an array, it's possible to infer much more information from the return echo. The DPS can determine the polarization, Doppler shift, and direction of arrival of each echo in a sounding, as well as the frequency and virtual height of the chirp. **(See Figures 4 and 5.)**

By using the many ionograms published on the Internet, a savvy radio hobbyist can assess the ever-changing propagation conditions over various regions of the world, in near-real time. Next month, we'll look at using these ionograms in NVIS (Near Vertical Incidence Skywave) propagation operation.

HF Propagation

Paths on 31 through 19 meters are becoming ever more reliable between North America and Europe in the morning and between North America and Asia during the late afternoon hours. The strongest openings occur for a few hours after sunrise and during the sunset hours. Thirty-one and 25 meters will often remain open into many areas late into the night and will open early in the morning, especially when part of the propagation path moves through sunlit regions. Twenty-two and 19 may still offer nighttime paths, though these will become less reliable later in November.

Nineteen, 22, and 25 meters compete with 16 for the good daytime DX during November. They will open for DX just before sunrise and should remain open from all directions throughout the day, with a peak in the afternoon. Nighttime conditions will favor openings from the south and tropical areas. Since the Southern Hemisphere has long daylight hours, DX paths on these bands from stations in the south will be common.

The all-season bands, 31 and 25 meters, are crowded and signals are usually very strong and steady. Twenty-five meters is expected to be an excellent band for medium distance (500 to 1,500 miles) reception during the daylight hours. Longer-distance reception (from 2,000 to 3,000 miles) should be possible for an hour or two after local sunrise and again during the late afternoon and early evening. Heavy congestion will occur here since many international and domestic broadcasters make use of 25 meters.

Thirty-one meters, the backbone of worldwide shortwave broadcasting, will provide medium-distance daytime reception ranging between 400 and 1,200 miles. During November, reception up to 2,500 miles is possible during the hours of darkness and until two to three hours after local sunrise. Thirty-one meters, too, is highly congested, making reception of weak exotic signals a bit more of a challenge.

Thirteen and 16 meters will be open during a fair number of days through November when flux levels remain above 100. Paths from Europe and the South Pacific as well as from Asia, at least during days of higher solar flux levels, are common, especially on 16 meters. Look for best conditions from Europe and the northeast before noon and from the rest of the world during the afternoon hours. Reception from the South Pacific, Australia, New Zealand, and the Far East should be possible well into the early evening. At this stage in the solar cycle, the 10.7-centimeter flux levels are too low to sustain band openings at these frequencies for long, if at all.

Seventy-five through 120 meters are coming alive, though. Signals below 120 meters are improving, too. Throughout November, expect an improvement in nighttime DX conditions on these bands. Since the night is longer, and there is the seasonal decrease in static "noise" levels, expect good long-range DX on the low bands, starting with signals from closer locations right after sunset, and then extending to areas farther away as the night develops. Europe should be possible in the late evening. DX paths will move farther west through the night. By morning openings from Asia should be common.

VHF Conditions: Meteor Showers

One of the largest yearly meteor showers occurs during November. Appearing to radiate out of the constellation of Leo on the night of November 19, the Leonids are known to create intense meteor bursts. Since the source of the Leonids, the Tempel-Tuttle comet, passed closest to the sun in February of 1998, the years following were expected to produce very strong displays. The greatest display since 1998 was the peak of 3,700 per hour in 1999.

Every year since has been significantly less spectacular, but a few forecasters think that we still might have a meteor storm with an hourly rate of thousands sometime in the next several years. Last year was not spectacular, but this year might be. If this year is more typical of the last few, however, we'll see a rate of several hundred per hour. The large, spectacular visuals might only be 10 to 20 per hour, but when we're talking about meteor scatter radio propagation, we count any meteor-formed plasma clouds that will support VHF radio signals.

The best time to work meteor scatter off the Leonids is around 11:30 p.m., local time, in the Northern Hemisphere. The shower should increase in rate the closer you get to midnight, and then move toward pre-dawn.

Working Meteor Scatter

Meteors are particles (debris from a passing comet) ranging in size from a speck of dust to a small pebble, and some move slowly while some move fast. When you view a meteor, you typically see a streak that persists for a little while after the meteor vanishes. This "streak" is called the "train" and is basically a trail of glowing plasma left in the wake of the meteor. They enter Earth's atmosphere traveling at speeds of over 158,000 miles per hour. Besides being fast, the Leonids usually contain a large number of very bright meteors. The trains of these bright meteors can last from several seconds to several minutes. It's typical for these trains to be created in the *E* layer of the ionosphere.

More RSGB Books on p.48 of this issue!

Meteor scatter propagation is a mode where radio signals are refracted off these trains of ionized plasma. Because the level of these plasma trains is in the *E* layer of the ionosphere, the range of a meteor scatter contact is between 500 and 1,300 miles. The frequencies that are best refracted are between 30 and 100 MHz. However, with the development of new software and techniques, frequencies up to 440 MHz have been used to make successful radio contacts off these meteor trains.

Lower VHF frequencies are more stable, and last longer, off these ionized trains. A 6-meter contact may last from a second to well over a minute. The lower the frequency, the longer the specific "opening" made by a single meteor train. Conversely, a meteor's ionized train that supports a 60-second-long refraction on 6 meters might only support a one-second refraction of a 2-meter signal. Special high-speed digital modulation modes—like high-speed CW, in the neighborhood of hundreds of words per minute—are used on these higher frequencies to take advantage of the limited available time.

Current Cycle 23 Progress

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7-centimeter observed monthly mean solar flux of 71.6 for July 2007. The 12-month smoothed 10.7-centimeter flux centered on January 2007 is 76.0. The predicted smoothed 10.7-centimeter solar flux for November 2007 is 80, give or take about 17 points.

The Royal Observatory of Belgium reports that the monthly mean observed sunspot number for July 2007 is 10, down from June's 12. The lowest daily sunspot value recorded was zero (0), on July 20 through July 27. The highest daily sunspot count was 27 on July 14. The 12-month running smoothed sunspot number centered on January 2007 is 12. A smoothed sunspot count of 21, give or take about 12 points, is expected for November 2007.

The observed monthly mean planetary A-Index (Ap) for July 2007 is 7. The 12-month smoothed Ap index centered on January 2007 is 8.4. Expect the overall geomagnetic activity to vary greatly between quiet to active during most days in November.

I'd Like To Hear From You

You can join in with others in discussing space weather, propagation, and shortwave or VHF listening, at http://hfradio.org/forums/. Be sure to check out the latest conditions, as well as the educational resources about propagation, which I have put together for you at http://prop.hfradio.org/. I also provide a WAP/WML resource for wireless devices. If you want the latest propagation information like the solar flux, Ap reading, and so forth, check out http://wap.hfradio.org/, the wireless version of my propagation site.

Please don't hesitate to write and let me know about any interesting propagation that you have noticed. Do you have questions about propagation? I look forward to hearing from you. Till Next time, happy signal hunting! ■

by Kirk Kleinschmidt, NTØZ, kirk@cloudnet.com

QSL Cards: Still Going Strong!

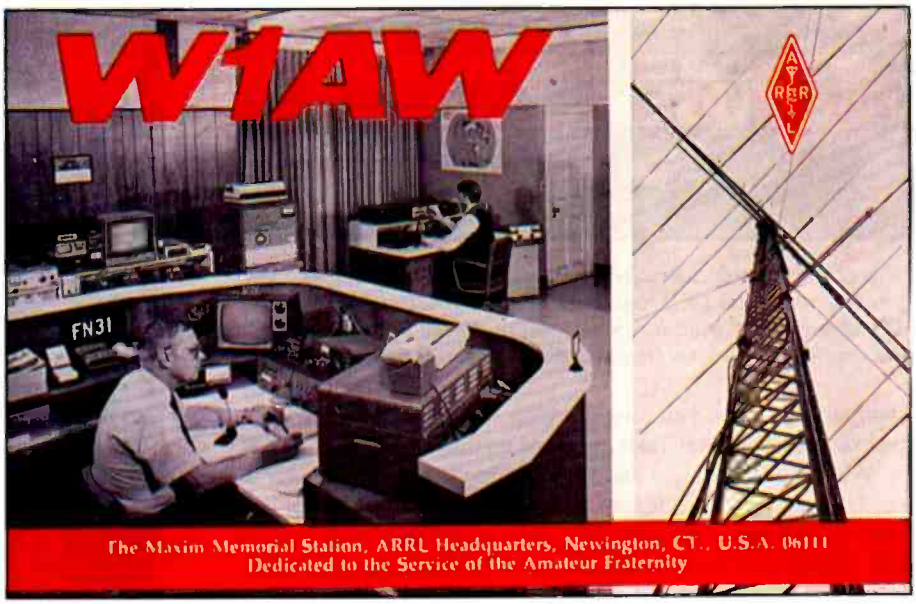
Now that I've turned 45 and have been a ham for 30 years, I can look back on our hobby with a perspective that I just couldn't muster a decade ago. I am just starting to understand how things transition—in grand fashion—from old to new. The biggest of the big pictures.

Now, even though most of the world's people believe in reincarnation, it doesn't matter whether you do or not. Personally, I believe in reincarnation, but I don't believe Morse code should be sent with a bug (unless the operator can send perfectly formed code with the infernal contraption) or that unattended HF digital mailboxes should be allowed to operate in the CW/data subbands...but those are discussions for another time.

Take a step back and think about the rapid sweep of technology and where it's going. Computers are still computers, but they're enormously faster and more functional than they were just 20 short years ago. Ham radio, too, is zooming ahead—sometimes into uncharted territory. Unlike sailing, for example, which is substantially similar today compared to what it was a hundred, or even 500, years ago, ham radio *isn't* the same. We don't use spark-gap transmitters and, a few enthusiasts aside, we don't run plate-modulated AM much, either. The regenerative receiver is mostly a novelty, as are magic-eye tubes (tuning indicators) and Nixie tubes (numeric displays).

We're now exploring digital radio, global data networks, global positioning systems, RFID tags tucked away in everything (and soon everybody), ubiquitous cell phone technology, and even virtualized amateur radio simulators that live on the Internet. If you think that these systems won't supplant what we now think of as amateur radio, ham radio's first century stands ready to prove you wrong!

In ham radio's 100-year history, things have changed dramatically. And in another hundred years we probably won't recognize what ham radio has become—if it even exists at all. It's likely that, in geologic time or from a "reincarnation perspective," ham radio will have come and gone in a finite, and rather small, window of technical evolution.



From my teens through my mid-'20s, ARRL HQ station W1AW was of mythical stature. I finally managed to work the iconic station in June 1988. Little did I know that in a few short months I'd be working at ARRL as an editor for QST! Although it's now all formal and high-tech, W1AW looked just like this—retro-tech and buzz cuts—when I arrived in Connecticut in '88. Thanks to this QSL card, it's a memory I'll never forget.

Think about that! With all the evidence we have to date, the phenomenon we call amateur radio will have been born, matured, evolved and likely "died," in a 150- to 250-year period. Period!

So, if you love what makes up amateur radio today, you'd better get busy enjoying it, because this is probably a rare evolutionary moment for radio as a whole—never before experienced in our species' long reign, and perhaps never to be experienced again before the planet gets whacked by a giant meteor or the sun goes supernova (and certainly not in the same way societally, governmentally, and technologically).

So even if I reincarnate a hundred years down the line, am fortunate enough to have an auspicious birth, and there are at least a few scattered trees to support suitably futuristic antennas, ham radio will likely have come and gone. Considering that, I'm hoping to stick around for a while in the here and now!

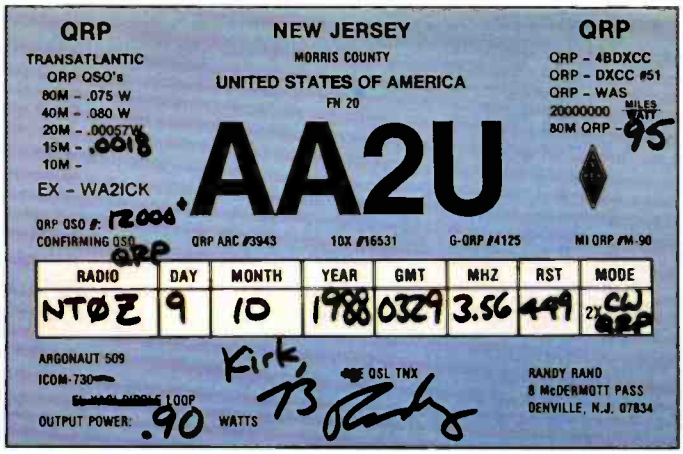
Because the present is *so* important for amateur radio, I'm upset that: 1. We don't have any decent ham satellites in orbit (like we used to 20 years ago. And by decent, I definitely don't mean low-orbiting FM and digital-mode "flying mailboxes"); 2. We're stuck using a handful of channels at 60 meters; 3. Deed restrictions and CC&Rs are having a huge negative effect on our hobby.

The satellites we can fix; 5 MHz is probably a wash; and CC&Rs have probably gone past the point of no return. See, things *are* changing right before our eyes...

And speaking of change, my long-winded rant leads right into this month's ostensible topic: QSL cards—the archaic kind that are still printed with ink and paper, and sent through a probably dying postal system that can trace its roots to the Pony Express!

QSL Cards Are Still Cool!

Even in today's "all-digital" world, the venerable printed QSL card is still used by most hams, and it is still considered to be "the final courtesy of a QSO," as it has been for generations. And despite the fact that there are several "electronic QSL card" services that are becoming viable—especially for DXers and contesters—a cold, sterile, generic "electronic" QSL card may not warm the recesses of your heart in the



This QSL card, coincidentally also from 1988, commemorates a low-power contact with QRP contest guru Randy, AA2U. If you worked a DX station with 1 watt, Randy had 'em in the log and QSLed with a 1/2 watt—no exceptions! He was definitely a guy QRPers loved to hate!

same way as when you lovingly view the cards in your collection in years to come! Take my word on that.

When I get nostalgic and start digging through the cards in my QSL collection (a few of which are reproduced here), I'm amazed at how—with a single glance at any particular card—I'm transported back to the moment of that particular QSO. Usually, I can recall even the fleeting details. I doubt an electronic QSL card or a mere database entry could ever do that.

So, until the polar ice caps melt (oops...that's already started), let's assume that we still want to mail tried-and-true QSL cards. Here's a bit about where to get them, how to fill them out, and how to send them!

The Usual Sources

Many QSL card printers advertise in *CQ*, *Pop'Comm*'s sister magazine, and *QST*. The larger companies have display ads, but their smaller counterparts hawk their wares in the classifieds. For purists and holdouts, that's fine, but that global change agent called the Internet (see previous soapbox) is also home to QSL card printers, big and small. Most have online catalogs and some even have automated online ordering.

Spend a buck or two and send away for companies' information kits and samples, or pop onto the Web and check out the online samples from the companies that offer them. Perusing QSL card samples, online or by hand, is fun and educational, but it can also make choosing a design more difficult, so be prepared.

Choosing a QSL card printer may be trickier than you think. Most commercial printers produce "stock" cards. That is, the only customized part is your name, callsign, and other personal information. The design of the card may be used by hundreds, even thousands, of other hams!

If that's not a problem for you, you're in luck. Most beginning hams start this way. Stock cards are inexpensive, and you're sure to end up with a QSL card that contains all the necessary information, which is something that may not happen if you "go it alone."

Whether you choose a standard card, a photographic card, or a one-of-a-kind masterpiece, make sure you don't buy too many right off the bat. Beginning hams have a habit of upgrading! And although the discount on 3,000 cards may seem attractive, buy with caution!

From June of 1978. 9G1MB was the first Africa station I worked on SSB and, to this day, the only station I've ever worked in Ghana. Too bad, too, because Gordon, the operator there, accidentally wrote my callsign as WDØBAA (I was WDØBDA back then). I was never able to get a corrected card. When I look at it, even today, it brings back delicately bittersweet memories.

To reduce costs, consider putting together a group order with your friends or fellow ham club members. Or limit your cards to plain white stock and black ink. Starting out with a plain vanilla QSL card is perfectly acceptable.

For a list of links to online QSL card printers and commercial QSL print shops, point your Web browser to http://ac6v.com/qslcards.htm. Some of my favorites include www.quikcards.biz, www.w4mpy.com (for quantities of 250 and up), and www.cheapqsls.com.

Print Your Own

So far we've talked about having a mainstream print shop produce your cards. If you're a do-it-yourselfer, feel free to produce your own. You can print master copies from your desktop publishing system and have cards printed at a local "quick printer," or you can even print your own cards from a suitable inkjet or laser printer. Several QSL card design programs are available for downloading from the Web. For an interesting list, check out ac6v's link (above), and scroll down to the section on QSL design software. You can also use standard PC desktop publishing programs, such as MS Publisher and Adobe PhotoShop.

If you're wondering where you can purchase card stock that's designed just for printing your own QSL cards, point your browser to www.hamstuff.com/QslKitPage/qslkit.html. W7NN's "QSL Kit" is just what the doctor ordered, and it won't

break your piggy bank, either! Wal-Mart is even more affordable. The big-box retailer sells a 500-count package of brilliant white card stock for about $6. That's enough for more than 1,000 QSL cards.

Another online source for QSL cards, eyeball cards, and other printed stuff is Vista Print (www.vistaprint.com). Known mostly for free business cards, Vista Print frequently puts its design-them-yourself postcards in its freebie section. If your timing is right you can snag 100 custom-designed QSL cards for less than $8 (includes shipping and a small fee to process your custom design). The kicker is that VP's postcards are 4.25 x 5.5 inches instead of the standard QSL dimensions of 3.5 x 5.5 inches. You can use them as is, or design your cards with the intention of trimming the bottom edge. Whatever works.

Info You Must Include!

Here's the information that should appear on whatever card you choose: callsign, name, mailing address, and your country. You may also want to include your county to please the many county-hunting hams you'll encounter on the air. And you may want to include your grid square designation if you're active on VHF/UHF.

The blanks where you fill in QSO information should be large enough to easily write in the other op's callsign, date, year, time (in UTC), band, mode, and signal report. Most hams also include a "PSE QSL TNX" line; circle either PSE or TNX to indicate whether you're requesting a card or responding to a received card.

Feel free to include other personal data, too, but don't get too carried away. Junky, cluttered QSL cards complicate matters. Clean, straightforward designs work best. Be sensible about the artwork and forget about stuff that may be offensive or humorous. Something that's funny in sunny California may not play in Peoria—much less Persia! Think twice about graphic themes that are overly political, religious, or "visually stimulating."

Do yourself and your QSL recipients one last favor and make sure all QSO information is on the *front* side of your QSL card. Remember: the easier you make the QSL card process, the greater your chance of getting a card in return.

By the way, there are two ways to fill out a QSL card: perfect and wrong. Be careful, be accurate, and be neat. If you make a mistake, toss the card into the trash and start over. Marked-over or altered cards—even if they were corrected in good faith—do not count for awards programs. And what if you're that op's only North Dakota contact?

Snail Mail

Want to improve your QSL return rate? Remember that hams in rare states (and rare places) are often inundated with QSL card requests. Make sure yours is sent with a self-addressed, stamped envelope. Being patient also helps, especially with cards sent overseas or via the ARRL Outgoing QSL Service.

In case you haven't used it yet, the "Service" is an excellent, cost-effective way to send QSL cards to DX operators. Instead of going through the tedious and expensive process of sending QSL cards directly to overseas operators, you can simply sort your "outgoing" cards and send them to the ARRL Outgoing QSL Service for $10 per pound (or 10 cards for $1.50). Within a week or so of arrival, the Service forwards your cards to hundreds of other similar bureaus in most foreign countries. This route, while inexpensive, does take time (two months to two years), but it's quite popular among hams the world over.

To use the Outgoing Service, U.S. hams must be ARRL members, but the services of its counterpart—the Incoming QSL Bureaus—are available to members and nonmembers alike. Separate Incoming Bureaus are maintained for each callsign district in the United States and Canada. Cards arrive from overseas and are sorted by the first letter of the callsign suffix.

To get your cards, you simply send a few 5 x 7 1/2-inch SASEs to your bureau, which will forward cards to you every month or two, depending on your QSL card volume.

The bureau system exchanges millions of QSL cards each year to hams almost everywhere. If you haven't yet, it's time you "QSL via the buro." For complete information on how to use the Bureau system, point your Web browser to www.arrl.org/qsl/qslout.html and www.arrl.org/qsl/qslin.html.

Pick A Card, Any Card...

So, like your mother taught you, be courteous. Pick out a supplier and a design—or do it yourself—and get your QSL cards out to all your contacts. And do it today, just in case I'm wrong about reincarnation. ■

by R.B. Sturtevant, AD7IL

Radio Fun And Going Back In Time

Q. Who paid for and sent the first commercial radio telegrams?

A. In June 1898 Lord Kelvin was visiting Marconi's Alum Bay station on the Isle of Wight, off the southern coast of England. During his visit Kelvin sent telegrams to four other leading scientists working in the field of wireless research to demonstrate that wireless telegraph was available for commercial use. Marconi sent the messages to a shore station on the British mainland where they were put onto the British Postal Telegraph's wire system. Kelvin paid Marconi a shilling apiece to make it a commercial transaction.

The first overseas commercial telegram went out the next day when the Italian Ambassador to England sent a long telegram from the same station to the court of the King of Italy.

Q. You've mentioned the British took most of April 1982 getting their Task Force to the Falkland Islands before the actual fighting got started on May 1. Did radio play any part in this build up?

A. Yes it did. Both sides, of course, were putting out press releases and media information to justify their particular point of view. But you probably would expect that.

Something that you might not expect was that, as soon as the British Task Force came in range, an unidentified "pirate" station came on the air in the Falklands. If you're old enough, you'll remember that the Brits ruled the Rock 'n' Roll World in the 80s. The British pirate station was booming out the latest and greatest from the Rock scene. The audience of the pirate station, naturally, was the young draftees that made up most of the Argentine military forces in and around the Falkland Islands. Being south of the equator, the Falklands in April are in the middle of winter. The average ill-equipped, ill-trained, and ill-fed Argentine soldier, like most draftees away from home and at the end of the Earth, wasn't a real happy camper.

Argentine radio from home was putting out some pretty staid and conservative formatting that was approved of by the government. The British pirate station was light-years ahead and took the young audience away very quickly. In between the hits were lines like "Eduardo, your Mother is praying for you," "Tomas, your girlfriend misses you!", "Juan, your wife says the children are sick." There is no evidence that Eduardo, Tomas, or Juan threw their rifles away, but the British did win back the Falkland Islands in 46 days of combat or 74 days total.

Q. During World War II the British "turned" all the Nazi spies sent from Germany to give information to Hitler. Did America do any of this?

A. During the Second World War the FBI had the job of finding and stopping Nazi agents in South America. Their diligence had already cleaned up the American spy scene and most German agents were working from South America. One agent, known as ND98, had been a business owner in Hamburg in 1941. He had been summoned to German Intelligence offices and informed that he was going to Uruguay to establish a shortwave transmitter to serve the communications needs of a Nazi spy network; his other options were rather grim.

As soon as the German agent reached Montevideo he assured himself that he was not being followed; then he approached the FBI and told them his story. The ring of spies he was supposed to service was quickly and quietly broken up. ND98 then told Germany that he had to get out of town in a hurry and was going to America where he could work more freely. In February 1942 he made contact with Hamburg and started passing on high-grade intelligence to German Intelligence, supplied by J. Edgar Hoover & Company.

One of the "highly reliable sources" revealed to ND98 in January 1944 that the Americans were planning a massive landing in the Kuril Islands northeast of the main island of Hokkaido. This, of course, would be a supply base for an invasion of the main Islands of Japan.

The Germans informed their Japanese allies who immediately responded by reinforcing the cold, desolate, cloud-covered and lightly populated islands with a major military force to meet the American threat. The threat never materialized, and those massive reinforcements were not available when the Americans hit the central Pacific atoll of Kwajalein in the Marshall Islands in February of 1944.

Q. Radio started to gain popularity in the late 1920s and '30s. How did this impact American life?

A. Many movie theaters found that in order to have any audience on certain nights it was necessary to stop the movie being shown and run the radio through the theater's sound system during certain especially favorite programs. "Amos and Andy" and "Fibber McGee & Molly" were two of these "show stoppers." ■

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back several years and continuing at least until earlier this year. In its Hearing Designation Order, the Commission said it found that "Castle's continuing course of conduct raises questions as to whether he possesses the requisite character qualifications to remain a Commission licensee."

Because of Castle's "limited eye sight," the FCC complied with his request to send "a disc containing audio files of all the documents released in his proceeding to date," the *ARRL Letter* reported.

Castle's daughter, Donna J. Dill, sent the presiding judge a fax stating, among other things, that her father "'is not able to travel or hire an attorney...He tells me that he has sent his statement and this is all he is able to do as his eye sight is limited and health poor."

It was concluded through Castle's and Dill's submissions to the FCC that Castle did not intend to appear as directed, and "even assuming that these documents can somehow be construed as 'pleadings,' as defined in Section 1.204 of the Commission's Rules, they are procedurally deficient and may not, therefore, be considered," the *ARRL Letter* reported.

The FCC ordered that Castle's application to renew his amateur radio license be dismissed with prejudice. ■

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by Bill Price, N3AVY

A Zig Zag To An HPJIE

Many of you are probably asking yourselves, "How can I land a high paying job in electronics?" (hereinafter referred to as an HPJIE). Okay, maybe one or two of you are asking yourselves that, or you've at least thought of it in the last few weeks.

There are several paths to that end, to landing an HPJIE. My way was a rather indirect route, which I would not recommend to many people, unless they are presently selling appliances—make that vacuum cleaners—and are looking to better their lot in life. If that's not you, I'd recommend you talk to Joe Maurus, our friend in Pumpkin Center, Louisiana, who seems to have gone about it the right way—and gets to be a public servant/first responder at the same time.

It's true: I once did sell vacuum cleaners. Not door-to-door (how I thank my lucky stars) but wholesale, to stores that would then sell them to you, the consumers. It didn't take long to realize that vacuum cleaners sucked. I was looking to improve my lot in life, but had not yet met Joe (in fact, I'd never even *heard* of Pumpkin Center, Louisiana, back then), but I did have a friend who worked for a television transmitter manufacturer who suggested that I might do nicely selling those instead of vacuum cleaners. While I did have a ham license and experience as a Coast Guard radioman, I knew diddly about television transmitters and told him I couldn't possibly sell something I was so unfamiliar with. "You'll learn them in no time," he assured me.

Within a few days, I was introduced as "the new sales engineer." I always thought that title was fine if I didn't have to live up to it, having three credits in English and a ham license. My friend told me not to worry about it, that I'd know more than most of the people I was talking to.

Within a few days, I was shown how to predict coverage of a television transmitter, given antenna gain, pattern, height, terrain, and "effective radiated power," a magical number of watts available to those who subscribed to the *Television Factbook*. This information and some ratings figures for the various stations told me what counties they were doing poorly in, and then it was up to me to find whether it was terrain that caused their problems, or the programs they carried. I had no solution for programming.

The first products I sold were television *translators*, which received the main station's signal and rebroadcast it on another channel into a valley or shadowed area where it did not reach. Not many translators were sold in Kansas and Nebraska, but the Rockies yielded some great markets—or so I thought.

"So," I asked my boss, "Who do I sell these translators to? The TV stations?"

"Well," he said, "They're not likely to spend much money on these little isolated valleys in the Rockies because there are not a lot of households in any particular valley, and it would take a lot of households to make a translator profitable for a station."

"So, are there translator 'co-ops?'" I asked.

"Well, there are translator clubs," he said, "and there are some people who put up illegal translators because they are so remote that no one will ever find out about them."

"Will they buy our translators?" I asked.

"No, they don't have any money."

"Oh."

Over time, I did sell a few translators. I got to travel extensively through the western states, met some very nice people, and learned some hard lessons in economics.

The next products I tried to sell were transmitters for the MDS (multipoint distribution service) market. MDS—ah, yes—the service of the future. One channel, line of sight, microwave frequency, fairly weak transmitter. Required costly downconverters at each receive site. Pirates were selling downconverters before we even sold the transmitters to pay-TV operators. I think there might be one or two MDS operators still in business, however their situation is unique. Everyone applied for every city, all the license applications were mutually exclusive, very few stations were ever built, fewer still were ever operated, not many transmitters were sold for MDS.

On to low-power TV. The FCC got this idea that lots of local people could get licenses for low-power TV stations, and then build them, and then lots of little TV stations would serve a lot of local needs. Then everyone in the world applied for every town with more than 20 people in it, tying up the licensing procedure until sometime in the next century. A few of them were built. I think I sold one of them.

So far, this was not a very HPJIE.

Then there was ITFS (instructional television fixed service). It was virtually MDS but four channels instead of one, and allocated to anyone in the educational business. A few of them were sold. No one ever got rich selling ITFS transmitters.

I did get several trips to Las Vegas and other exciting venues for the broadcasters' conventions, talked myself hoarse on the convention floor, and got to shake hands with Willard Scott and Rosie Grier two of the nicest public figures I've ever met.

Finally, there was MMDS. Yes, everyone's dream. Multichannel MDS. Except that it was yet another pipe dream. Generallly, it never happened. I gave up, moved to New England, and became a real estate appraiser. Shortly after that, the bottom dropped out of the real estate market there and I took an LPJIE (you figure it out), and that was where I met Norm.

For several years I explained to consumers that there was no magic in the metal used to build amateur radio antennas, that a rod or piece of tubing of the proper length could not be electrically faulty compared to another identical piece, and that a three-element beam mounted three feet above a tin roof was indeed likely to radiate pretty much straight up in the air. I was fortunate in this job to have the most wonderful engineer nearby—a man who could make me smart with two scribbles on a pad and a one sentence explanation. I'd give him kudos here, but he tries to maintain a modicum of privacy. Thanks, Joe.

One day I ended up talking to an ITFS customer I'd worked with years prior, and he asked if I'd like to be an engineer for him. I said, "there goes that word again," and he knew what I meant. He asked if I could keep his equipment running; I said I'd try. Been doing that now for almost 14 years. I've almost figured out how this stuff works—and the company pays for my screwdrivers.

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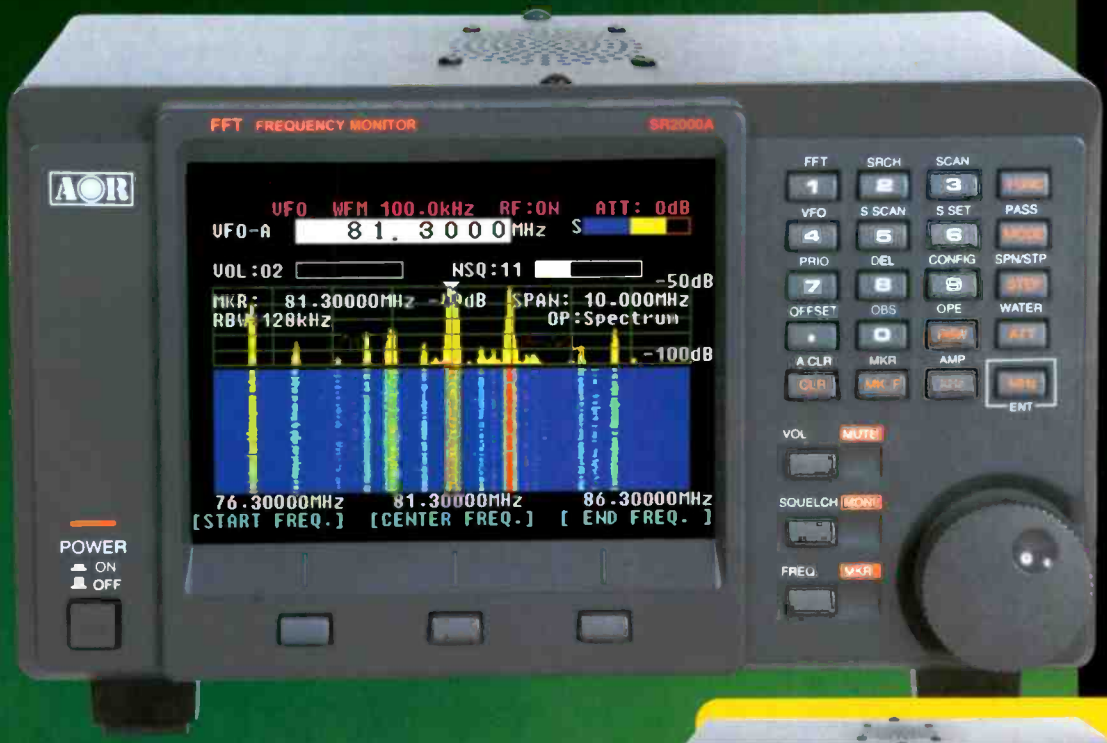

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