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

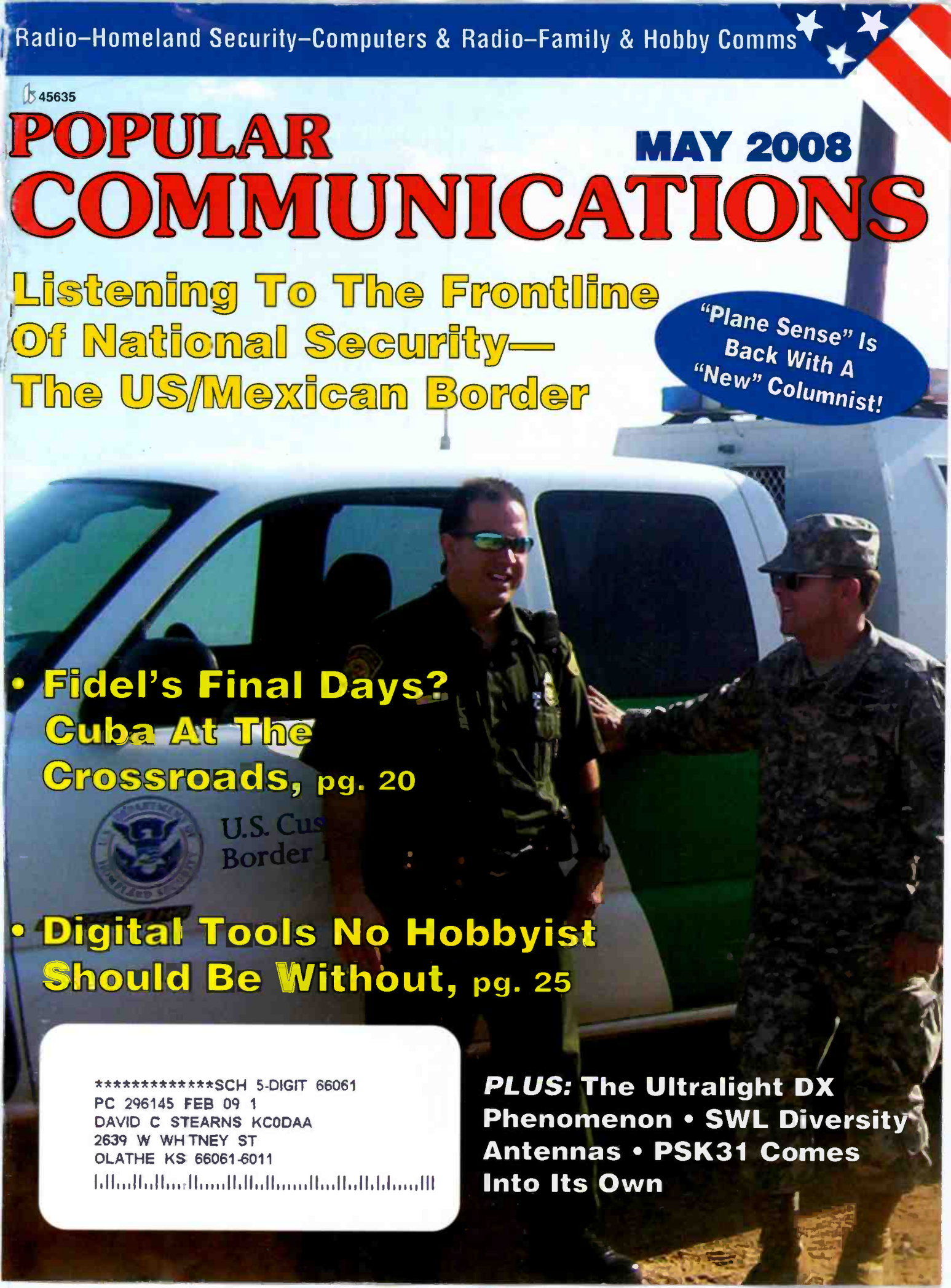
45635

POPULAR COMMUNICATIONS

MAY 2008

Listening To The Frontline Of National Security— The US/Mexican Border

"Plane Sense" Is Back With A "New" Columnist!



- Fidel's Final Days? Cuba At The Crossroads, pg. 20
- Digital Tools No Hobbyist Should Be Without, pg. 25

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*Cellular blocked

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Universal Radio — Quality equipment since 1942.

ICOM

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Universal Radio is pleased to offer the **Icom R75-12** receiver. With full coverage from 30 kHz to 60 MHz; all longwave, medium wave and shortwave frequencies are supported plus extended coverage to include the 6 meter amateur band. Some innovative features of the R75 include: FM Mode Detection (but not the FM broadcast band), Twin Passband Tuning, Two Level Preamp, 99 Alphanumeric Memories, four Scan Modes, Noise Blanker, Selectable AGC (FAST/SLOW/OFF), Clock-Timer, Squelch, Attenuator and backlit LCD display. Tuning may be selected at 1 Hz or 10 Hz steps plus there is a 1 MHz quick tuning step plus tuning Lock. The front-firing speaker provides solid, clear audio. The back panel has a Record Output jack and Tape Recorder Activation jack. The supplied 2.1 kHz SSB filter is suitable for utility, amateur, or broadcast SSB. However, two optional CW/SSB filter positions are available (one per I.F.). The formerly optional **UT-106 DSP board** is now included and factory installed! A great value.

Order #0012 **Call for price.**

R5

The **R5** covers 150 kHz to 1309.995 MHz (less cellular gaps) in: AM, FM Narrow and FM wide. 1200 memories store: frequency, mode, step size, duplex direction and offset, CTCSS tone, tone squelch and skip settings. Other features include: attenuator, LCD lamp, AM ferrite bar antenna, auto power off, CTCSS decode, weather function and battery save. A great value at under $200.00. **Call or visit website for price.**

R20

The **Icom R20** covers an incredible 150 kHz to 3304.999 MHz (less cellular) with 1250 alphanumeric memories, bandscope and SSB/CW. It has: two VFOs, dual watch, voice scan control, NB, large two line LCD and CTCSS/DTCS/DTMF. A built-in IC **audio recorder** can record up to 4 hours of reception! With charger, Li-ion battery, belt clip and strap. **Call for price.**

R8500

The **Icom R8500** is a full coverage wide band communications receiver that tunes from 100 kHz to 1999.99 MHz in AM, LSB, USB, CW, FM-N and FM-W modes. Available to government customers only. *#0663* **$1699.95**

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PCR1500 R1500

The **Icom PCR1500** wideband computer receiver connects externally to your PC via a USB cable. This provides compatibility with many computer models, even laptops. Incredible coverage is yours with reception from 10 kHz to 3300 MHz (less cellular gaps). Modes of reception include AM, FM-Wide, FM-Narrow, SSB and CW. (CW and SSB up to 1300 MHz only). The PCR1500 comes with an AC adapter, whip antenna, USB cable and Windows™ CD. *#1501* **$479.95**

The **Icom R1500** is similar to the above, but also includes a controller head for additional operation independent of a PC. *#1500* **$579.95**

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PCR2500 R2500

The **Icom PCR2500** wideband computer receiver uses a similar form-factor to the PCR1500, but has several enhancements, including two powerful features: ***dual watch*** (the radio can receive two signals simultaneously) and ***diversity reception*** (two antennas can be connected at the same time and employed to provide stable reception). The optional UT-118 Digital Unit provides D-STAR® digital voice reception and the optional UT-121 supports APCO25 digital voice decoding. The R2500 is shown above. *#2501* **$709.95**

The **Icom R2500** is similar to the PCR2500, but includes a controller head for additional operation independent of a PC. *#2500* **$879.95**

FREE ***ICOM Bonito CS 4.5 Software included!***
A $69.00 value included **FREE** with your R1500/R2500, PCR1500/2500 purchase for a limited time.

Special Note: Prices shown for the R1500/PCR1500 and R2500/PCR2500 reflect the $20 Icom limited time mail-in rebate.

The **Icom R9500** clearly raises the bar for professional receivers. Covering 5 kHz to 3335 MHz, this instrument represents the state-of-the-art in receiver technology! Visit the Universal website for complete details.

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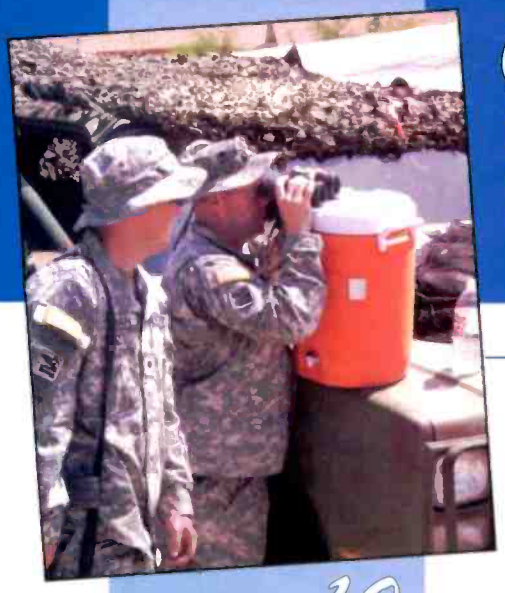

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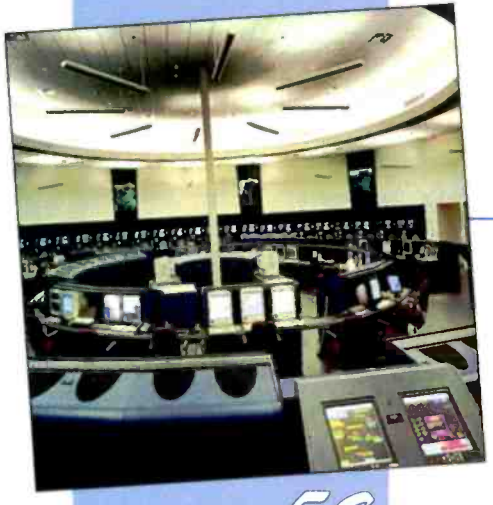

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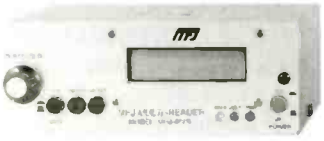
On The Cover

With the events of the past decade, securing our borders, especially the porous southern one, has taken on a new urgency. While communications are moving toward encryption, there's still plenty of action for the radio hobbyist to seek out. See "Monitoring Activity Along The U.S./Mexican Border," beginning on page 10, for more. (Cover photo by LTC Doug Mayne; pictured BG Gordon Toney, Washington Army National Guard, on right, with an unidentified Border Patrol agent)

Tap into secret Shortwave Signals

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

MFJ-462B **$199.95**



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. 18Wx2¼Hx1¼D 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 **$159.95**

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**

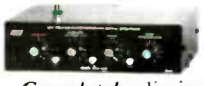
Tuned circuitry minimizes intermod, improves selectivity, reduces noise outside tuned band. Use as a preselector with external antenna. Covers 0.3-30 MHz. Tune, Band, Gain, On/Off/Bypass Controls. Detachable telescoping whip. 5x2x6 in. Use 9 volt battery, 9-18 VDC or 110 VAC with MFJ-1312, $15.95.

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 **$69.95**

Eliminate power line noise!



MFJ-1026 **$199.95**

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 **$119.95**

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 **$89.95**

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 **$119.95**

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

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MFJ-956 **$69.95**

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 **$119.95**

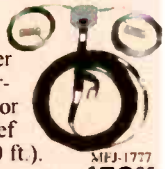
MFJ Shortwave Speaker

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 **$59.95** Ship Code A

MFJ Antenna Switches

MFJ-1704 **$74.95**

MFJ-1702C **$34.95**

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

The Good, The Bad, And The Not-Entirely-Obvious

Since Marconi, radio broadcasts have run the gamut from offering the comfort of a warm sweater to something a lot closer to the shock of cold steel—and sometimes it's been a little hard to tell the difference. So, with a nod to Spaghetti Westerns, here's a quick primer.

The Good: Just about 75 years ago as I write this, on March 12, 1933, to be exact, Franklin Delano Roosevelt broadcast his first Fireside Chat, beginning with the words "Good Evening Friends..." The topic was "On the Bank Crisis" and he urged his listeners to have faith in the banks. In the decades since, U.S. presidents have continued to broadcast a weekly radio address on topics of importance to the nation. Streaming audio of these talks by our current president can be found at www.whitehouse.gov/news/radio/, or you can check the programming schedule of your local news-format radio stations to listen to them "fireside." (I'd suggest that another "bank confidence" pep-talk might be in order...).

The Bad: Reaching nearly as far back in time as Roosevelt's soothing messages, the breathy taunts of Nazi Germany's "Axis Betty" had a very different intention. But "Betty" was just one of a veritable rogues' gallery of disembodied, menacing (and often female) voices that used predictions of agonizing death, among other undesirable outcomes, to achieve politcal ends.

The Not-Entirely-Obvious: For about the past 50 years, many other voices have been using radio waves in their various attempts to control hearts and minds concerning a poor nation about the size of Pennsylvania. In what may well be the waning days of one of the last bastions of doctrinal Communism—Cuba—we truly have a chance to capture a moment in history through radio. In this issue, Gerry Dexter examines the stations that call out from both sides of the field of ideological battle. See his "*Si* Cuba, Castro *No*!," starting on page 20, to learn what's in the broadcasting arsenal of the *propagandistas*.

Undoubtedly, one of the loudest voices (at least it's easily logged) belongs to Radio Marti, launched 25 years ago by President Ronald Reagan. Its stated mission was to provide "a contrast to Cuban media and provide its listeners with an uncensored view of current events"—in another words, to convince Cuban listeners to oust that perennial thorn in the side of the United States: Fidel Castro.

Radio Marti is still at it—it even carries a Spanish language version of the President's weekly radio address from the United States! But is the 15 million dollars per year the United States spends on Radio Marti worth it? Well, that's not entirely obvious. But time may tell, and maybe very soon. Don't miss this moment in history as it unfolds.

Issue Notes

Now, among the missing: "Homeland Security." Rich Arland has had to deal with more than the usual amount of "stuff that needs attending to" and I decided to go easy on him the past couple of months. But not to worry, he's still busily fitting out his mobile EmComm "Turtle" and will be back next month with more security "On the Go."

Among the returnees: "Plane Sense." In a bit of editorial sleight of hand, Tom Swisher passed his "Military Radio Monitoring" column to the capable hands of Mark Meece with the last issue. This month, Tom serves up his usual rich fare with his first submission about civilian aviation. Drop him a line to let him know what interests you about listening to the skies.

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

POPULAR COMMUNICATIONS

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A publication of

CQ Communications, Inc.
25 Newbridge Road
Hicksville, NY 11801-2953 USA

Popular Communications (ISSN-0733-3315) is published monthly by CQ Communications, Inc., 25 Newbridge Road, Hicksville, NY 11801. Telephone (516) 681-2922. FAX (516) 681-2926. Web Site:<http://www.popular-communications.com/> Periodical Postage Paid at Hicksville, NY and additional offices. Subscription prices (payable in U.S. dollars): Domestic—one year $32.95, two years $58.95, three years $85.95. Canada/Mexico—one year $42.95, two years $78.95, three years $115.95. Foreign Air Post—one year $52.95, two years $98.95, three years $145.95.

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Improving your Cellular Signal

by D. Prabakaran

News, Trends, And Short Takes

BBCWS Closes Remaining Shortwave Transmissions To Europe

The BBC World Service (BBCWS) announced on its website that the remaining BBCWS shortwave transmissions to Europe would close as of February 18, 2008. The BBC said the change was in line with listener trends in radio. Increasing numbers of people around the world are choosing to listen to radio on a range of other platforms, including FM, satellite, and on line, with fewer listening on shortwave. This is particularly the case in Europe, where the majority of shortwave transmissions ceased in March 2007. The current closures affect the remaining transmissions heard in southern Europe. Frequencies for western Russia remain, however, and listeners in southeastern Europe may be able to pick up frequencies for the Middle East when atmospheric conditions permit. BBC DRM digital shortwave transmissions to Europe will continue for the time being.

Special Swiss Radio Station To Operate For Euro 2008

A special radio station will operate in June aimed at uniting football fans from all the countries participating in the Euro 2008 tournament. Radio 11 will run only during the competition, offering a diverse mix of music from the 16 nations and tips for supporters on where to go and what to do while in Switzerland. The station's "Rhythm of Football" motto hopes to set the tone among fans attending the European championship, co-hosted by Switzerland and Austria from June 7 to 29.

Radio 11 will be broadcast mainly in English, French, and German, but also in other languages on match days. The music selection will also reflect whichever countries are playing on particular days. The music content was be available online as of the middle of February, but the radio frequencies beginning in June in the host cities of Zurich, Bern, Basel, and Geneva are not yet decided.

Radio Sweden To End German Service

Radio Sweden has confirmed that its German service, which has been on the air for 69 years, would close at the end of March. Within international broadcasting, some languages, including German, have had a breakthrough on the Web and through podcasting, but the number of listeners, especially on shortwave, has dropped dramatically in recent years. This development figured in Swedish Radio management's decision of to suspend German broadcasts on shortwave and mediumwave. However, SR International will retain German for a basic service of news on the Web and as a Monday to Friday podcast.

Germany To Abandon Investment In DAB

Germany has decided not to invest more money in Digital Audio Broadcasting (DAB). After 10 years, DAB has not gained sufficient popularity in Germany, with just 200,000 DAB receivers sold in a country with a population of 83 million. The Kommission zur Ermittlung des Finanzbedarfs der Rundfunkanstalten (KEF), which decides financial policy regarding broadcasting in Germany, has decided that any further investment in DAB would be wasted.

U.S. Allots $699 Million For International Broadcasting

The U.S. budget for fiscal year 2009 allots nearly $7 million for international broadcasting into countries like North Korea. The budget for the State Department requests $699 million for the Broadcasting Board of Governors to "provide accurate and objective news and information about the United States." The broadcasts will be made through television, radio, and the Internet "throughout the Middle East and to people living under tyranny in North Korea, Burma, Iran and Cuba," according to the budget summary. The 2009 fiscal year begins on October 1.

New SW Station For Venezuela's Antena Internacional

A new shortwave transmitting station is under construction for the International Service of Radio Nacional de Venezuela, Antena Internacional. The new installation will include a 50-kW transmitter to be operated on the 60-meter tropical band and five 100-kW shortwave transmitters to be operated with several antenna arrays. Located in the State of Guárico, the antenna systems will include several high gain curtain arrays and also quadrant type omnidirectional antennas for short- and medium-range coverage. The new transmitters are of the pulse step modulation type and are very efficient. The Radio Nacional de Venezuela engineering department is in charge of the project and the first transmitter may be on the air soon. The new facility will be one of the most modern installations in the Americas, and its antenna systems were designed with coverage of the Americas as the prime target area, but it may be heard around the world when propagation conditions are good.

Decision Extends HCJB's Shortwave Broadcasts

HCJB Global Voice in Ecuador has been granted an extension to continue using its shortwave radio antennas that are scheduled for dismantling and removal from the mission's international transmission site near Pifo, a town 18 miles east of Quito. The extension postpones, for at least six months, removals that the station agreed to two years earlier with the Quito Airport Corporation (CORPAQ) to make way for a new international airport. Once the new facility is completed, some of the shortwave station's antenna towers could obstruct the approach of landing planes.

The mission agreed that 30 towers would be removed by December 2007. The first phase of dismantling, begun in early 2006, saw 18 towers lowered. HCJB Global's engineering staff was poised to remove 12 more towers in the second phase, but was informed that CORPAQ granted the mission's request for continued use of those 12 towers, along with 18 others that will not impede approaching aircraft. This means HCJB can continue with test transmissions of digital shortwave signals to Europe and other countries while opening the way to digital shortwave broadcasting to Brazil. ■

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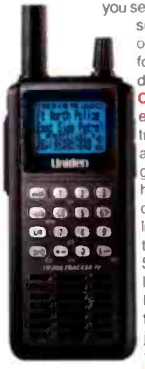
Frequency Coverage:

25.0000-512.0000 MHz., 764.0000-775.9875 MHz., 794.0000-823.9875 MHz., 849.0125-868.8765 MHz., 894.0125-956.000 MHz., 1240.0000 MHz.-1300.0000 MHz.

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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Bearcat Sportcat 230 alpha display handheld sports scanner	$184.95
Bearcat 278CLT 100 channel AM/FM/SAME WX alert scanner	$129.95
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Bearcat® BC246T Trunk Tracker III

Suggested list price $399.95/**CEI price $214.95**

Compact professional handheld TrunkTracker III scanner featuring Close Call and Dynamically Allocated Channel Memory (up to 2,500 channels), SAME Weather Alert, CTCSS/DCS, Alpha Tagging. Size: 2.72" Wide x 1.26" Deep x 4.6" High

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

Survey Shows Natural Disasters Rank As Communicators' Top Concern

Sixty-five percent of 200 public safety officials and first responders cited the ability to respond to natural disasters as their top concern in a nationwide survey conducted jointly by the Association of Public-Safety Communications Officials and Motorola. It dwarfed other concerns, which included "drug related crimes" (11 percent), "non-drug related crimes" (10 percent), and "terrorist attacks" (7 percent).

The survey also revealed that regarding "interest in new technology," 47 percent of those surveyed have interest in "satellite tracking technology," followed by "automatic license plate recognition" (41 percent), and "facial recognition technology" (37 percent).

In the area designated "importance of communications technology," the survey found that "the importance of technology specific to communication is underscored by the officials' funding priorities. Given a hypothetical funding increase for their departments, public safety officials on average would spend more of the money on communication technology [than] on additional training, and nearly as much as on additional personnel." "Additional first responders" ranked greatest with 29 percent, followed by "communications technology" (27 percent), "first responder training" (25 percent), and "computer equipment" (18 percent).

"While better communications was the popular choice (19 percent) as the greatest benefit of advanced technology, it was also seen as the area in greatest need of improvement, cited by 30 percent of respondents," officials said. "Our whole police department is dependent on wireless communications with laptops. We wouldn't be able to operate if it wasn't for that," said Mike Helms, Director of Sports Services and Police Technology for West Melbourne, Florida.

APCO and Motorola reported that the "survey included fire and police personnel, EMTs and government officials in urban, suburban, and rural areas, providing a snapshot of needs for a cross-section of America."

The APCO website can be visited at www.apcointl.org/.

FCC Questions California Radio Amateur's Character

A California radio amateur has been issued a Hearing Designation Order by the FCC "to determine if his application for renewal of his amateur radio license should be granted."

William F. Crowell, W6WBJ, of Diamond Springs, is alleged to have "apparently willfully and repeatedly engaged in and continues to engage in unlawful Commission-related activities, including, but not limited to, intentionally causing interference and/or interruption, transmitting music and one-way communications, and using indecent language on amateur frequencies." Crowell previously held the callsign N6AYJ.

"Based on the information before us, we believe that Crowell's apparent past and continuing course of misconduct raises a substantial and material question of fact as to whether he possesses the requisite character qualifications to be and remain a Commission licensee," an FCC document stated. "Accordingly, we hereby designate his application for hearing." Crowell initially filed his renewal application February 28, 2007.

"Violations of the Communications Act and/or the Commission's Rules are predictive of licensee behavior and directly relevant to the Commission's regulatory activities," the FCC said.

Crowell was informed through the HDO that "no person shall willfully or maliciously interfere with or cause interference to any radio communications of licensed stations" and that FCC rules specifically prohibit "transmission of music, obscene or indecent words, and one-way communications on amateur frequencies."

"Since 2000, Crowell has been warned to refrain from intentionally interfering with and/or otherwise interrupting radio communications, transmitting one-way communications and music and using indecent language on the air," according to Commission documents. "Notwithstanding these warnings, the evidence before us indicates that Crowell has and continues to engage in such activities in flagrant and intentional disregard of the Act and the Commission's Rules. We find that Crowell's apparent past and continuing course of conduct raises questions as to whether he possesses the requisite character qualifications to remain a Commission licensee.

"Crowell's history of FCC-related transgressions and apparent contempt for the Commission's regulatory authority are patently inconsistent with his responsibilities as a licensee and belie any suggestion that he can be relied upon to comply with the Commission's rules and policies in the future. Consequently, we will commence a hearing proceeding before an administrative law judge to provide Crowell with an opportunity to demonstrate whether his above-captioned application should be granted," the HDO said.

FCC Changes "Lockbox Bank" For Callsign Payments

The FCC announced in mid-February that U.S. Bank has replaced Mellon Bank as the lockbox bank for all FCC programs, with the exception of auction-related payments, according to a report in the American Radio Relay League's *ARRL Letter*.

"Applicants who manually file FCC paper applications via mail—usually for new vanity call signs or for renewal of vanity call signs—will need to send payments to U.S. Bank," the *Letter* said. Amateurs filing paper applications for new Vanity Callsign Applications "need to submit FCC Payment Form 159 and the FCC Regulatory Fee, along with the FCC Form 605 and FCC Form 605 Schedule D. After completing

all required forms, mail them along with the payment to the address of the Commission's new lockbox bank: Federal Communications Commission, PO Box 979097, St. Louis, MO 63197-9000."

The published report continued: "When submitting fees, payments or applications to the lockbox bank, filers should specifically reference the Government Lockbox number—979097—on the 159 payment form. U.S. Bank will accept hand-delivered filings or courier deliveries at their office located at U.S. Bank, ATTN: FCC Government Lockbox Number 979097, SL-MO-C2-GL, 1005 Convention Plaza, St. Louis, MO 63101."

The *Letter* also wrote that "the FCC strongly encourages the use of their electronic filing and payment options. Electronic payments can be submitted through their secure website: www.fcc.gov/fees/feefiler.html.

Additional information can be found on the FCC's website: www.fcc.gov/fees /lockbox.html.

Texas Radio Operator Warned To Stay Off Repeaters

Travis L. Maltese, AD5CT, of Edna, Texas, received a Warning Notice from the FCC to stop operating on W5DSC and K5SOI, repeaters licensed in Victoria, Texas.

"The trustees of the W5DSC and K5SOI repeaters have requested in writing that you refrain from use of the repeaters," the Warning Notice said. "The letters were issued as a result of your failure to follow operational rules set forth by the licensee/control operators of the repeater systems for their users. You were previously requested verbally to refrain from using the system, but have apparently ignored both verbal and written requests."

The Commission told Maltese he was expected to "abide by the requests to stay off the W5DSC and K5SOI systems and any other such requests by repeater licensees, control operators or trustees. If you use these repeaters again after receipt of this letter, we will initiate enforcement action against your license, which may include revocation, monetary forfeiture (fine) or a modification proceeding to restrict the frequencies on which you may operate AD5CT."

Fines for such infractions range from $7,500 to $10,000. ■

OUR READERS SPEAK OUT

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.

Timing...

Dear Editor:

One of my buddies and I were recently talking. We're both hams, and he is a retired cop from Connecticut and I am currently employed by a law enforcement agency in suburban New York.

The subject of illegal immigration came up and we were discussing the problem at the U.S./Mexican border. Politicians and homeland security/border patrol officials all claim they don't have enough manpower to observe and secure our country's southern border...well, why not use ARES in conjunction with Border Patrol? All they would have to do is observe and report, and all that's needed are eyes and a 2-meter HT.

Why not? ARES wants to be used in a time of emergency. Well, isn't securing our border an emergency? Plus, they would make credible witnesses in court cases that might come up from time to time. In actuality, ARES members are professional observers and reporters.

A large untapped resource of volunteer professionals. Have them patrol the border and then radio in anything to a Border Patrol liaison who could then dispatch a response team. The local clubs could get involved, too, as well as CERT teams. Seems like a great way to expand the amateur radio credo of "public service," and it would be a lot more productive than sitting around and waiting for the next hurricane or wild fire to hit!

I wonder how feasible this idea is and if it could ever work.

Ed Muro, K2EPM
Long Island, NY

Editor's Note: Ed Muro, K2EPM, as keen-eyed readers may have realized, is a contributor to Pop'Comm. *The timing was nonetheless coincidental—no "coaching" was involved in getting this letter into this issue, with its feature on monitoring the southern border. Another example of great minds thinking alike...but then again, a lot of minds are thinking about border security these days. While he may have ruffled a feather or two, I'm sure Ed (and I!) would like to hear your thoughts on his suggestion. You send them in—I'll send them along.*

Making Room On The Soapbox

Dear Editor:

I realize that your magazine caters mainly to amateurs but you could at least have a small section devoted to 11 meters. There are probably more people operating on 27 MHz, as well as FRS frequencies, than on amateur ones. I am for the time being not on the radio at all because of the lack of good skip conditions and other reasons.

Eleven meters was a poor choice for the American and Canadian governments to establish a set of frequencies for local communications, but it is a great place to pick up operators worldwide with little capital outlay. And, I believe it is the main reason that amateur operators have maintained a snobbish attitude for so long. Agreed, many operators, especially those operating in the AM mode, should have their equipment taken away, but when I and others like myself were on the air, we were strictly operating in the SSB mode, and conducted ourselves not unlike our amateur cousins.

There were many good operators worldwide operating in the so-called "Freeband," and just by monitoring those frequencies, you couldn't tell them apart from their amateur brethren. Listening in on those frequencies and hearing the number of contacts from all over the globe, I believe the governments are wasting their time harassing the "locals" in an attempt to quiet down that part of the band. Those frequencies will remain active forever, and there is little the American and Canadian governments can do to shut down operators in other countries. Thank you.

Robert Anstee
Montreal, Canada

Monitoring Activity Along The U.S./Mexican Border

There's Heightened Concern About International Boundaries, Especially On Our Southern One—And You Can Listen In

by Mitch Gill, NA7US

A view of the southern border near a Tecate beer factory. Note that the first fence is barbed wire with a solid wall behind it. It's no-man's land in between.

For a country the size of the United States, the task of effectively monitoring the borders has always been formidable, but it has taken on a new urgency as terrorism and illegal immigration have become a top priority for our nation. Because of that, the activity level along the borders, especially the one shared with Mexico, has escalated as U.S. Bureau of Customs and Border Protection (CBP) officers and agents attempt to prevent illegal aliens, drug smugglers, and terrorists from crossing into the United States.

Communications, naturally, plays a huge role in their efforts to keep us safe. For the hobbyist, this means an even greater chance to catch some of the action. Patience and perseverance are key here, because the CBP, like most agencies, is moving toward secure communications. But don't worry, there are still ample opportunities to listen in on frequencies that are non-secure. We'll present some frequencies to listen to, but first let's look at a little history.

Borders Tighten

When our nation began, there was no concern about controlling the borders, and people freely flowed in and out from Canada and Mexico. In terms of immigration, at least, international boundaries barely existed.

That openness changed dramatically in 1882 with the Chinese Exclusion Act. At that time in our history, many people believed that the legal immigration of inexpensive Chinese labor was taking jobs away from Americans. In response, Congress decided to limit immigration, reducing it to a fraction of what it had been. This led to immigrants crossing into the country illegally, creating the need for border security.

It was not until 1904, however, when inspectors, usually referred to as "mounted guards," began patrolling the border from Texas to California. With only about 75 inspectors, this effort's effectiveness was limited. In March 1915, Congress officially authorized the inspectors. Their primary job was to stem the flow of illegal Chinese immigrants, but they were also tasked with stopping all illegal aliens, as well as drugs, from reaching our borders. At times the military and the Texas Rangers were called in to assist. Their efforts were somewhat more effective.

On May 28, 1924, the Border Patrol was founded under the Department of Labor. Its mission was to prevent illegal entries into the United States along the Mexican border. In 1925 that mission expanded to include patrolling our coastline, and the Border Patrol increased to 450 officers.

Between 1932 and the end of WWII the service burgeoned to about 1,400 agents, who watched the Mexican and Canadian

Mitch Gill has over 30 years experience in communications and is on active duty with the Washington Army National Guard.

land borders as well as the coasts. During the war, agents provided even tighter control of the borders, assisting the U.S. Coast Guard in searching for saboteurs and also manning alien detention camps. Around that time, aircraft became an important tool of the monitoring operations, as did radio communications.

By the late 1950s private aircraft were being used to smuggle in illegal aliens, and with the assistance of other federal agencies, the Border Patrol began monitoring flights into the country in an effort to stem the tide. During the Kennedy administration, aircraft hijackings entered the news, and the President ordered the Border Patrol to provide agents to fly with domestic flights as a preventative measure.

The 1980s and 1990s saw a huge surge in illegal immigration. To meet the challenge, the Border Patrol quickly increased its manpower and began implementing more modern technology, including night vision goggles, upgraded computers, seismic sensors, and more effective radio equipment. Radio repeaters were placed on high hills to increase the range of handheld radios from five to 10 miles up to 100 miles.

In 1993, in an effort to gain more control of the border, operation "Hold the Line" was initiated in El Paso, Texas. Thanks in part to the new technological tools, Hold the Line was so successful that a similar measure, called "Gatekeeper," was put in place on the San Diego border, where half the illegal entries were occurring. Within a few years illegal immigration was reduced by 75 percent in many areas and a national strategic plan was formed. As the borders became more controllable, agents were able to concentrate more on anti-smuggling and search and rescue efforts, such as BORSTAR (Border Patrol Search, Trauma, and Rescue).

9/11 To The Present

The events of 9/11 were burned into the memories of the current generation the same way those of December 7, 1941, were for our parents and grandparents. The world changed on that September day and the mission of the Border Patrol changed along with it. The nation became aware of the very great danger presented by terrorism, and Border Patrol agents are now on constant watch for potential terrorists crossing into the country. The agency, along with many others, was placed under the direction of the newly formed Department of Homeland Security.

In addition to terrorism, there's a greater concern today about illegal immigration, as reflected by the number of news reports regarding activity on the Mexican border. The public is becoming increasingly aware of the problem on more than just an economic dimension as it learns about the fates of many who wander into the desert to die of dehydration, of the slave trade of children and adults, drug smuggling, and terrorism.

A Typical Day On The Southern Border

A workday can be chaotic—and dangerous—along the U.S./Mexican border, as the events described below illustrate. These stories were relayed to me by two soldiers from the 81st Brigade, Washington Army National Guard, who did not want to be identified because they still patrol a treacherous stretch in Arizona.

As the supervisor in charge of the Border Patrol agents starts his vehicle, he is immediately besieged with urgent radio traffic. Two agents are in hot pursuit of a vehicle that was spotted by the Army National Guard as it crashed through the barbed wire fence after crossing the river from Mexico. The vehicle has to be rammed to get it to stop, and two teenage boys jump out and run back toward the border.

With the agents now pursuing on foot, the teenagers leap over the small barbed wire fence, wade across the river and sit on edge of the bank staring at the agents; they know the agents can do nothing now that they're back on Mexican soil. The mules, as such drug runners are called, are safe from the agents—for the moment—but the drug warlords who hired them will require their services again.

The agents return to the vehicle to find over 100 kilograms of Marijuana, wrapped in cellophane, with a value of $250,000. It isn't one of the large loads they seized in the last week, but it's big enough.

In pursuit on the border...just a typical workday.

In a more remote area of the border, an UAV (unmanned aerial vehicle) sends live pictures of a dozen or more illegal aliens cutting through the barbed wire fence. Agents are sent, but by the time they arrive no one is to be found. Some repair the fence while others search the hills in the hope of finding the fugitives before they got lost in the desert. In this stretch, there are no towns for many miles.

South of Yuma, Arizona, agents drive along the barbed wire fence and wall separating the border. As they inspect a homemade ladder used to climb the wall, they're pelted with rocks from the Mexican side.

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On March 1, 2003, the Department of Homeland Security transferred certain functions from the Immigration and Naturalization Service (Department of Justice), including the Border Patrol, the United States Customs Service (Department of Treasury), and the Animal and Plant Health Inspection Services (Department of Agriculture), to the CBP and the Bureau of Immigration and Customs Enforcement (ICE). This brought together over 30,000 employees, including 17,000 inspectors. It's now headed by the Commissioner of Customs, who reports to the Under Secretary for Border and Transportation Security.

National Guard spotters on watch for illegal activity on the border.

Today, the CBP has close to 15,000 agent. With its even more advanced technology and increased Border Patrol presence, the number of apprehensions has been reduced by 20 percent—presumably because of the associated decrease in number of attempts. Operation Jump Start, which is supported by the National Guard, has provided apprehension and seizure assistance to frontline agents, allowing over 400 Border Patrol agents to return to primary law enforcement activities. Most important, several terrorists have been stopped and arrested as they attempted to cross our border. On the negative side, violence against agents has risen by about 31 percent compared to 2006.

Communications You Can Listen In On

The Border Patrol works with several other agencies, and in the past communications were difficult at best as each agency had its own frequencies and

Border canal, Agua Prieta, Sonora, Mexico, through night vision goggles.

Suggested Frequencies For Border Activity

Ham radio repeaters
(all are FM unless otherwise indicated)

Sierra Vista, Arizona
- 147.360
- 224.960
- 449.825

El Paso, Texas and New Mexico
- 146.880

San Diego, CA
- 145.280
- 146.265
- 447.320

GMRS

All locations
- 462.550 and up every 25 kc to 467.725

CAP Air to Ground
- 123.100 AM

All border locations
- 123.450 AM

Border Patrol

El Cajon, CA BORSTAR
- 167.263

San Ysidro, CA
- 168.825

Chula Vista, CA
- 173.975

El Paso, TX
- 162.825
- 163.725
- 164.115

Arizona Border
- 162-174*

Tuscon, AZ
- 163.725
- 168.975

*Frequencies change often, so keep scanning

Brigadier General Gordon Toney, Washington Army National Guard, being briefed by an unidentified Border Patrol agent on the Arizona border.

equipment and did not necessarily have the ability to operate with the others. Since 9/11 the government has called for functional interoperability between all agencies.

In addition to effective intercommunications, the government is requiring the encryption of communications. This is critical as drug smugglers and other law-breakers are monitoring the radio frequencies used by agents.

Complete interoperability and encryption are both still a few years away, but they are in the works. But don't be discouraged: for hobbyists there are still opportunities to hear open communications on the border.

There's a variety of traffic to listen to. In addition to the Border Patrol activities on the agency's frequencies, there are militias that use ham radio, CB, and GMRS. The Civil Air Patrol is sometimes involved as well. And even though the Border Patrol uses trunking systems and encryption, there are times when you will hear them "in the open" (see "Suggested Frequencies For Border Activity").

The Border Continues To Tighten

As part of the Secure Border Initiative (SBI), the government is moving forward on building a 28-mile "virtual fence" that will use radars, surveillance cameras, wireless computer networking, and upgraded communications equipment to better secure the southern border. The Boeing Company is building the fence, which will be extended along areas of the Arizona border and sections of Texas.

A critical component of SBI is SBInet, a rapid deployable and adaptable program that combines information from ground-based and tower-mounted sensors, thermal imagery, remote cameras and radar. This system will give Border Patrol agents the ability to detect, identify, classify, and respond to potential illegal aliens in their attempts to cross into the United States.

Fixed and mobile communications will also be upgraded. These will provide agents and officers with real-time awareness of any situation along the "virtual fence." The communications system will also provide interoperability between federal, state, local, and international law enforcement agencies, relieving a major problem that arises agencies have different radios and different frequencies. The system will allow all agencies to remain on their own frequencies, use their own radios, and, at the same time, talk to each other.

Hearing Possible History In The Making

You never know when you may be witness to something that turns out to be a major event in history. I clearly remember listening in on one of the military frequencies to a clandestine station in Poland, which was describing how people were being run over by tanks as striking workers tried to gain their country's freedom from Soviet control. Shortwave listeners copied the information being relayed and passed it to the news media. Only a handful of people heard those messages prior to the news broadcasts. And, of course, monitors of amateur radio frequencies and shortwave listeners heard ham operators in New York City describe, in real time, their horror as the towers fell.

Listening to the activity along the border might turn into your own "you were there" moment. You could be one of the very few listening to the apprehension of a major drug lord or terrorist. Be vigilant and keep your ears to the speaker: you may hear history in the making. ■

Sergeant William M. Ford operating a model 1914 EE63 Service Buzzer during the Pancho Villa Campaign in Mexico in 1916. Ford was the southernmost Signalman during the campaign. The buzzer, built by Western Electric, was strictly a portable instrument issued to troops in the field for use with all kinds of communications. (Photo courtesy of the Fort Huachuca Museum, donated by William M. Ford)

Revolution, Radio, And Border Guards Of Long Ago

During The Mexican Revolution, Radio Interceptors Helped Protect Our National Interests

by R.B. Sturtevant, AD7IL

Back in 1911 a fellow named Porfirio Diaz was worried about his job performance reports. He'd held his job, Dictator of Mexico, since 1876. Well, actually he'd run for president twice and been beaten twice, then he just took over. He'd done a lot of good for the country by building roads, railroads, and telegraph systems. He'd also saved a lot of time and money by doing away with the expenses and tedium of elections and a judicial system.

He had avoided political opposition by repressive use of the military and secret agents who divided the people into smaller and smaller political groups. But people were getting tired of all this oppressive government, and some muttered that Porfirio might want to retire. Porfirio knew that one of the ceremonies for retiring heads of the Mexican government often involved a stone wall and a 21 gun salute, fired just south of the collarbone. Porfirio, instead, decided to take a trip out of the country, work on his memoirs, and continue breathing.

The power vacuum created when Porfirio left was filled soon enough by Francisco Madero, a reformer with wide political support. Madero took over the Presidency in 1911 but almost immediately had a falling out with most of his major supporters. He was assassinated in 1912. So much for wide political support.

This new power vacuum left Mexico torn between four major groups. One was headed by Emiliano Zapata, who favored land reform; one by General Victoriano Huerta, a professional military officer who favored a military dictatorship; another by Venustiano Carranza, a strong Constitutionalist; and the last by Pancho Villa, who had the northern bandit vote locked up. Soon, more groups formed or broke off, leaving Mexico with quite a civil war on its hands.

Turmoil On The Border

Meanwhile, in Europe, Kaiser Wilhelm was planning some military adventures of his own. He'd "helped out" with things in

R.B. Sturtevant, AD7IL, *Pop'Comm*'s "Trivia" supplier, is a lifelong radio history buff.

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[1]Note that certain frequencies are unavailable. [2]5W output

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Latin America, sending "advisors," money, and weapons to assist Spain in the Spanish American War and saw no reason Germany should stop. Kaiser Bill had some plans of his own and wanted America occupied while he played takeover in Europe. So a large number of German "Reserve Officers" were dispatched to Mexico to attach themselves to the different revolutionary groups. Each group was separately wooed as the "Hope of the New Mexico" and promised funds, weapons, and advisors.

The Germans' aim was to create unrest on America's southern border to keep the country out of European affairs. Border incidents were staged to show the Americanos just how vulnerable they were. American interests in Mexico were threatened or seized, Pancho Villa raided Columbus, New Mexico, in March 1915, and five American soldiers were killed in Nogales by Mexican troops in 1918.

The Germans didn't really care who ran things in Mexico as long as the Americans were kept busy. In 1915, the guy who was running things, more or less, in Mexico was Carranza.

Carranza represented the educated and politically powerful interests who wanted a strong Constitution. He also wanted Mexico to have a place on the world stage. He was listening coyly to what the Germans were saying while making his own plans. It was to Carranza that the famous Zimmerman Telegram was sent offering German assistance in a Mexican invasion of the United States. It was also to the Carranza government that Germany's powerful transmitters aimed coded diplomatic traffic. Mexico, lacking such powerful transmitters, sent back messages that were picked up by U-boats in the Gulf of Mexico for retransmission.

The United States Responds And A Service Is Born

Such incidents could not go unanswered and General Pershing was sent on his famous Punitive Expedition into Mexico in July 1916. When he went, he took with him an "Information Department," the Army's first effort toward a military intelligence unit. Despite setbacks and the failure to capture Pancho Villa, an early stated goal, the Mexican Punitive Expedition was at the time deemed a success, with Secretary of War Newton Baker praising the efforts as "a means of controlling lawless aggregations of bandits and preventing attacks by them across the international frontier."

By the time General Pershing's troops returned to the United States in February 1917, border duty for the Army had changed. It was no longer an endless routine of patrolling the border to keep arms from filtering into Mexico; monitoring radio traffic between Mexico and Germany was now an important component. The Army's fledgling Intelligence Service began actively listening to Mexico a top priority.

Signal Corps personnel manned listening posts for low-level enemy telephone and telegraph communications using induction coils that made actually cutting the wires unnecessary. Signalmen also began radio intelligence intercept work as well. Initially, a string of 14 radio tractors were deployed along the Mexican border, which gradually evolved into numerous fixed stations along the border to monitor Mexican radio traffic. These border stations were capable of direction finding as well as straight intercept work. A large fixed station was also established in Houlton, Maine, to monitor German diplomatic traffic.

"Like most early Signal Corps personnel, many of the operators were hams who had joined especially for radio duty."

The Radio Intelligence Service was born in these radio tractors along the border. RIS listened in on traffic to and from U-boats in the Gulf of Mexico and Mexican government stations, like Chapultepec near Mexico City, as well as Mexican military nets. All traffic was coded and sent by CW so the operators never knew exactly what they were picking up.

The rig they used was a standard military Trench Radio crystal receiver with a spark gap transmitter for contacting other stations, such as those located at El Paso and Fort Huachuca. The basic field set for these stations included an 80-foot dipole on two eight-foot bamboo poles. The Trench set came in a 9x9x13-inch wooden box and was accompanied by an 8x3-foot copper grounding mat, key, and earphones. Each station had field strength and audibility meters. When a station was picked up, using a directional antenna, both meters were read and the loudest and weakest signals were recorded. The antenna was turned by a handle that came through the roof of a truck, and the readings were taken from a scale on the inside of the roof. The message itself was usually read from the dipole antenna.

To improve signal eception, an Armstrong regenerative circuit was often used. Sometimes supplied by the Army and sometimes built by the intercept operators themselves, this simple circuit consisted of two coils.

In time the outside dipole antenna evolved into a 72-foot umbrella antenna mast with 12 wires 85 feet long attached to it. Eight insulated counterpoise wires made the other connections. The radios were powered by a 1/4-kW, 500-cycle 110-volt generator and were operated 24 hours a day, staying in constant contact with their headquarters.

Early Operators

Like most early Signal Corps personnel, many of the operators were hams who had joined especially for radio duty. While their names may now be lost to time, their stories are preserved and you can find many of them in the history section of the National Security Agency's website (www.nsa.gov).

For instance, one fellow spent off-duty hours checking in with friends and making new ones on what we hope was a spare set not needed for intercept duty. He was picking up stations in Dallas, Waco, and St. Louis. His on-duty receptions no doubt covered about the same distances, but I doubt he got any Mexican QSL cards!

With units like the 10th Cavalry and the 26th Infantry watching the border very closely, intercept duty must have been pretty dull. It did have its exciting moments though. One poor operator came on duty at 11 at night and was busily taking down code when he found a large rattlesnake under his feet. He picked up a nearby flashlight and pistol and started blasting away at the reptile—the previous operator had left him a surprise to help him stay awake!

The operators of the Radio Intelligence Service never knew exactly what the coded messages they were picking up said. They were told repeatedly, however, that their work was producing valuable intelligence vital to the nation's defense. I suppose that is all any soldier needs to know.

by R.B. Sturtevant, AD7IL

Radio Fun And Going Back In Time

Q. What were some of the best jobs for radio operators on ships at sea?

A. In the 1960s the primo job for a ham radio operator was being the guy who ran the Radio Shack on the *USS Hope*, the hospital ship that traveled all over the world teaching local medical professionals the latest and greatest in new techniques and procedures. Typically, local telephones from foreign countries were costly and undependable, and the ship's staff of around 140 could only contact home via amateur shortwave bands. When the ship's station hit the air there was always an answer. And the radio operator was paid the same as the doctors and nurses—food, housing, and transportation. Everyone aboard the *Hope* was a volunteer.

Q. Did Radio play any part in sinking the *Bismarck*?

A. The problem with finding one ship, even the largest ship afloat, in a large ocean is that there are so many places to hide. But radio direction finding was turning into a major effort in the search for Hitler's battleships, which were sent out to control shipping across the Atlantic. On May 1, 1941, the *Bismarck* put out to sea. She was found later that same month and attacked by the British Navy, but the battle ended with the Germans sinking the British battle cruiser *Hood* and damaging the battleship *Prince of Wales*. The question now was *could* the *Bismarck* be sunk?

Not seriously wounded during the engagement, the *Bismarck* did however suffer an oil leak and was losing fuel. Radio intercept work and code breaking soon told the British where their quarry was headed. On May 26 an obsolete *Swordfish* torpedo plane dropped a torpedo and crippled the *Bismarck* by destroying her rudders. The torpedo, really a near miss, caused the *Bismarck* to steam in a circle. The Germans soon ran out of ammunition and were sunk by repeated attacks by British air and naval forces.

While the planes, torpedoes, and gunnery involved sank the *Bismarck*, it was the skill of radio operators that found her and kept her in their sights until she could be sunk. The *Bismarck's* last message was also picked up by British intercept operators: it was, "Torpedo hit right aft. Ship unmanageable. We fight to the last shell. Long live the Fuhrer." The famed German vessel went under on May 27.

Q. What was it like to be a ham in the Soviet Union during the Cold War?

A. In 1965 an American ham working for the U.S. Information Agency visited the Soviet Union to help show off American consumer electronics. His particular job was to operate an American-style ham shack and talk to Soviet hams. He met about 2,000 hams and visited many of their shacks. He found that most of them were using military surplus receivers of fairly recent vintage, but that the transmitters, antennas, and keys were all homebrew. The transmitters could operate CW or phone, and many had SSB capability. Training was available widely but the exams were oral and not standardized across the country.

Apparently, the biggest problem Soviet hams faced was television interference. This was because Soviet TVs were built without high-pass filters. Unless a ham could prove that his rig was TVI-free he could not operate after 6 p.m. weekdays or after noon on Sunday until midnight, when the TV stations went off the air.

Q. When did radio start playing a role in the Vietnam War?

A. The importance of radio in that conflict goes back further than you might think. In 1945 the Japanese became aware that the French Foreign Intelligence was inserting teams to set up clandestine radio stations in French Indochina. This segment of the French government was loyal to DeGaulle, rather than to the pro-German Vichy government. They saw their mission as helping France retake her colonial empire. Eleven clandestine radio stations were set up to maintain contact with the "Free French" in Indochina during their fight with the Japanese.

After the Japanese surrender at the end of World War II radio was used widely to keep anti-Communists French troops in contact with their headquarters in Hanoi. Their chief adversary was the Viet Minh, led by Ho Chi Minh. Their main tactic was to send small groups of Europeans out with loyal Indochinese troops, closely controlled by radio, to fight the Viet Minh in open combat. This continued until the battle of Dien Bien Phu in November of 1953, when French military power was broken. In July of 1954 France signed a ceasefire with the Communists, but with anti-Communists units still spread out over all of Indochina, it took until April of 1956 before the last French troops were withdrawn from Vietnam.

Radio operators with those last troops were still picking up desperate calls from isolated troops still in the field begging for ammunition resupply, but answering these calls for help was judged too dangerous. Also a considerable number of pro-Communist officers and men deserted to the Viet Minh, refusing to come out of the jungle when ordered to do so by the French military.

And, of course, radio also played a prominent part in America's strategy in Vietnam from the very beginning. ■

SPURIOUS SIGNALS — Jason Togyer KB3CNM

Cuba *Si*, Castro *No*!

With The Fate Of The Caribbean Nation Uncertain, The Waning Days Of The Castro Regime May Be Your Last Chance To Log A Bit Of History

By Gerry L. Dexter

Might you be in the market for a circa-1950 automobile to show off at classic car rallies? If so, you could probably pick one up for a song from a Cuban cab driver, 'cause old Fords and Chevys are the limping motorized transport around decaying Havana.

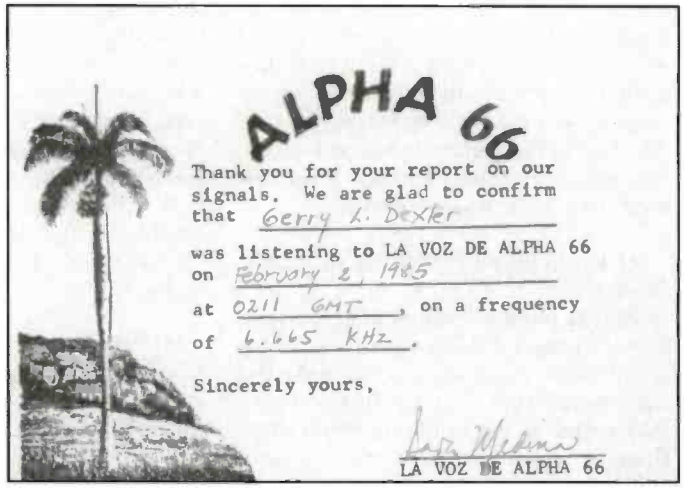
Although set to some fabulous music, daily life in Cuba is an unhappy challenge. If you're lucky enough to have a job you can't change it without government approval. The much-touted free medical system lacks everything but patients, which it can't treat anyway. Just about every facet of life in Cuba today could be described as old, decrepit, forlorn, bereft, desolate, and any of a half dozen other negatives you care to toss in. That applies even—or especially—to Fidel Castro.

Every week or so new rumors of his imminent departure to his reward take wing around Miami and other Cuban population centers in the U.S. So far (as of this writing), they've been false alarms. The 82-year old *Commandante*, has been trying to recapture his health for going on two years now and recently did the heretofore unthinkable: he stepped down as Cuba's "president" in favor of brother Raul. And smiles were seen all along Interstate 95. (Of course, by the time these words reach print, events may have already unfolded dramatically!)

As his declining health could no longer be ignored, a couple of years ago Castro turned most responsibilities over to his then-77-year old brother. Some find slight hope for the future in this, believing that Raul is more pragmatic and reasonable than his older brother. This view holds that Cuba might one day take up the China model; that is, retain an authoritarian regime but don a capitalist coat, as Beijing has done. Others say that Raul is just another murderer who will keep the guns loaded and the padlocks on. Other analysts suggest a military coup might be in the offing. Obviously, no one really knows for certain, and in the meantime the Miami exile community waits expectantly, and hopes for the best.

Radio In Cuba, Then...

Radio has certainly had its role in the unending campaign to oust, or at least subvert, the brothers Castro. During the Cuban revolution the Castro forces used a 120-watt amateur transmitter to get their Radio Rebelde on the air. Once the revolutionaries took power the radio station was made legitimate and today is the "other" Cuban shortwave broadcaster, after Radio Havana.



Diego Medina, operator of La Voz de Alpha 66, had run-ins with the law. He, or a relative, signed this QSL.

In the early 1960s, as part of the lead up to the Bay of Pigs invasion, we had the infamous CIA-run Radio Swan (later Americas) broadcasting to Cuba from Swan Island. It was later joined by Radio Libertad, "La Voz Anti-Communista de America"—also of suspect parentage—which was eventually found to be broadcasting from a highly secured installation near Caracas, Venezuela. (Today's Hugo Chavez regime probably wouldn't care to be reminded of that historical embarrassment.)

By the early 1980s there were several anti-Castro broadcasters of a more or less amateur nature operating sporadically in the lower part of 7 MHz. Radio Abdala, La Voz de Alpha 66, Radio Antorcha Martiana (Torch of Marti) and others would appear and disappear without any discernable pattern. The groups or individuals sponsoring these broadcasts had occasional run-ins with the local authorities and were not above resorting to violence when they believed it would advance their cause. Those were exciting times to be a shortwave clandestine chaser!

Sometime later came a larger outfit, Cuba Independiente y Democratica (CID), that operated La Voz del CID on several frequencies. This one really put out Fidel's cigar! The Cuban government didn't mess around with going through diplomatic channels. They complained directly to the FCC! Eventually

Gerry Dexter is a life-long SWL and *Pop'Comm's* "Global Information Guide" columnist.

our *federales* did get around to reacting and located, then shut down, two CID transmitters in the Miami area.

A few months later, though, CID was back on the air, apparently from unknown locations in the Caribbean and/or Central America. CID grew to support several program formats (or so-called "networks," including Radios Maximo Gomez, Frank Pais, and Antonio Guitereas), each tailored to a different segment of Cuban society. Later CID discontinued using its own transmitters and, for a while, rented time on private stations until donations dropped off and the broadcasts could no longer be funded.

Radio Impacto in Costa Rica aired a lot of anti-Castro programming, even though it was supposedly a commercial station. Many DXers had strong suspicions as to who was really calling the shots for this broadcaster, believing the station had hidden ties to Washington D.C.

Perhaps the most curious of the clandestines aimed at Cuba was a station identifying as Radio Caiman (alligator), which had a regular schedule on 9.960. There was never any indication as to who or what organization was behind these broadcasts, no schedule, no address, never a clue as to where the transmitter

Anti-Castro radio station closed

BILL BRUBAKER and ANA VECIANA
Miami News Reporters

The Federal Communications Commission has raided and closed an illegal anti-Castro shortwave radio station that has been broadcasting to Cuba from Miami.

The station is one of at least three operations that have been transmitting anti-Castro broadcasts to Cuba, a reflection of the reported growing unrest on the island.

Unlicensed radio broadcasting from the United States is a violation of the Communications Act of 1934. Violators, if arrested and convicted, face up to one-year imprisonment and a $10,000 fine. It is not known where the two other stations are broadcasting from but commission officials say they are not licensed to broadcast from the United States.

A commission official said U.S. marshals, accompanied by commission agents, seized thousands of dollars worth of high-power amateur equipment early yesterday at a Miami location they would not disclose.

Officials said no arrests were made. They would not disclose which of the three known anti-Castro stations had been closed. They would only say that they are investigating all three.

Spokesmen for two of the stations — *La Voz de Alpha 66* (The Voice of Alpha 66) and Radio Abdala — said after the raid that they are still operating. Officials at the third — *Radio Libertad* (Radio Freedom), which claims to transmit from Cuban soil — could not be reached for comment.

"Our station has not been closed down and, as far as I know, it won't be," said Andres Nasario Sargen, leader of Alpha 66.

The mysterious radio stations all broadcast on irregular schedules in the 40-meter shortwave band, between 7,000 and 7,100 kHz, reserved exclusively for ham radio operators.

The commission in Washington, D.C., and U.S. attorney's office in Miami revealed yesterday that they had been monitoring the undisclosed station for several months. They apparently discovered the location of its transmitter using highly sensitive radio direction-finding equipment.

"During the past several months, a radio station operating on amateur frequencies has been observed transmitting broadcasts of a political nature in the Spanish language aimed at Cuba," read a commission, U.S. attorney's office statement. "The transmissions have been the subject of interference complaints from radio amateurs in the United States and neighboring countries."

Radio Abdala has been transmitting for the past eight years, according to a station spokesman. The Voice of Alpha 66 has been on the air for about a month. Radio Freedom has been broadcasting for more than a year.

The stations play protest of patriotic songs, interview militant exile leaders, and broadcast editorials and news.

"We have several reports of the disgust felt by the Cuban people for a regime which has not given them anything it promised," said Nasario Sargen of Alpha 66. "We think now is the best time to transmit to these people, to encourage them to take up arms and fight for their liberty. They hunger for our message."

In a Voice of Alpha 66 broadcast monitored this week by The Miami News, Dr. Diego Medina, press secretary of the organization, said in an editorial:

"The exiles who have have traveled to Cuba recently have returned horrified at what they have seen, horrified not only at the poverty but also at the sharp distinction between the classes."

He went on to say, "This totalitarian government may seem interminable, especially for those who suffer, but we must not forget that other despots have been overthrown."

The Alpha 66 station, with a power of 2,000 watts, broadcasts at 7050 kHz at 8 p.m. Mondays, Wednesdays and Fridays. Nasario Sargen said several members of the organization tape the 30- to 40-minute programs at the organization's office at 1530 NW 36 St. and send it to the undisclosed transmitting site.

Nasario Sargen refused to say where the Alpha 66 was transmiting from for "security reasons."

Enrique Encinosa, spokesman for Abdala, also refused to comment on the transmission site of Radio Abdala, which broadcasts six nights a week on 7080 kHz. He said they have four different locations from which they transmit.

"If you are broadcasting from within the United States, you must have an FCC license," Encinosa said. "However, Abdala is not disclosing from where it's transmitting and it is not necessarily in the United States."

Abdala is also considering increasing its broadcasting time, Encinosa said.

The three stations have been heard as far away as Wisconsin, according to a veteran shortwave listener in that state.

Unlike Radio Freedom, the Alpha 66 and Abdala stations do not claim to be transmitting within Cuba. Radio Freedom, which broadcasts Sunday mornings and sporadically during the week on 7090 kHz, tells its listeners it is transmitting from La Sierra Maestra Mountains in the province of Oriente in Cuba, where Fidel Castro began his revolution more than 20 years ago.

News about anti-Castro Cuban broadcasters sometimes makes the Miami press.

LA VOZ DEL CID

Cuba Independiente y Democrática

CERTIFICADO DE SINTONIA

A SR. GERRY DEXTER

QUIEN NOS SINTONIZO EL DIA 10-4-86

DE LAS 03.36 GMT. A LAS 03.43 EMISORA: "LA VOZ DEL CID"

EN LA BANDA DE ____ MTS. FRECUENCIA 9940 KHZ

One of the more widely heard anti-Castro broadcasters had FCC "experiences" and eventually moved its transmitters out of the United States.

was. Obviously there were no QSLs, either! All we knew was that it was always there, always strong, always precisely timed, and very professionally done. Not your typical Latin clandestine. The Caiman mystery remains as a "cold case file." As far as we know the FCC never went after this station and, oddly, Castro never seemed to make much of it (unlike his reactions to La Voz del CID and Radio Marti).

...And Radio Now

So, enough history for the time being. What about *now*! Well, the radio war rages on. And most of it is quite hearable on your Hammerscratcher 413-C or whatever you're using. Here's a look at what's on and where and when to tune. Be advised, though, that shortwave broadcast schedules change in mid-fall and late winter. Even allowing for those two variables, remember that frequency changes and schedule adjustments are often made in-season and usually with little or no warning. So if you don't find something as it's listed here, check your usual Web sources for updated information (that would be the HFCC and EiBi listings as well as the *World Radio TV Handbook's* online updates).

And let's also preface all this by pointing out that WRMI-Radio Miami International is a significant player in this radio war. Many of the independently produced programs pushing their own ideas on freedom, "human rights," and all sorts of other wonderfulness are aired over WRMI. The station has had a seat at this table virtually since it went on the air.

El Presidente in his earlier days.

These anti-Castro programs come and go as the enthusiasm of the sponsoring group waxes and wanes and/or the money runs out. In short, you can expect new names to show up now and then, or you'll find that the scheduled times are occasionally shortened if money gets tight. The broadcasters using WRMI are indicated. All of the programs aimed at Cuba are aired on WRMI's 9955 frequency and, with one exception, are in Spanish. Cuba also attempts to jam WRMI's broadcasts and those of Radio Marti and Radio Republica, with varying results. That's the bubbling-like sound you'll often hear under or on top of these programs and stations.

If a separate address for reception reports isn't mentioned you can usually get a QSL response from WRMI itself, although—for obvious reasons—what comes back in your mail will be a standard form letter or card with the program name indicated, rather than something designed by the individual broadcaster. The address for WRMI is 175 Fountainebleau, Suite 1N4, Miami, FL 33172. Email reports should go to info@WRMI.net.

Continuar...

Centro de Deredos Humanos y Brigade 2506 (Center for Human Rights and Democracy)—This program (on WRMI) is designed to provide an open mic for Cuban dissidents, families of prisoners of conscience, and indepen-

Most of today's anti-Castro programmers are broadcast from WRMI's studios in this Miami office building.

dent journalists to speak their minds and to denounce the many injustices on the island. It's run by veterans of Brigade 2506, the group that fought at the Bay of Pigs. This show airs on Saturdays from 2300 to 2330 on 9955. Address: 1821 SW 9th St., Miami, 33135. They've recently added an English broadcast, probably the first ever by an anti-Castro broadcaster. It's scheduled for Sundays at 1500 on 7385.

Conversando entre Cubanos—Produced by the Association of ex Political Prisoners of Cuba, this one is on WRMI on Saturday from 0000 to 0030 and Sunday at 0130 to 0200. This group, like virtually *all* the others, could probably have its program content switched with any other group's and you might not be able to tell the difference! They all want an end to the dictatorship and to replace it with democracy, human rights, freedom, and such. Letters for this broadcast go to: P.O. Box 520563, Miami, 33152.

Cuba Virtual—A vehicle used by various anti-regime groups to facilitate greater cooperation among them. The program's goal is to offer a chance for constructive debate and encourage entrepreneurship when changes come to the government. It airs on Saturdays from 0200 to 0300. Use WRMI's address.

La Voz de la Coordinadora de Ex-Presos Politicos Cubanos—This is a program produced by former political prisoners in Cuba. They compile information about those currently confined and how they are being treated through information collected from friends and relatives who have somehow been allowed visits. The group also works to free as many prisoners as they can by generating publicity and telling the story of individual prisoners, as well as conducting public campaigns on behalf of those being held. They claim to have had a hand in freeing over 3,000 people so far. The program airs on WRMI on Saturdays from 2330 to 2345 and on Sundays at 2200 to 2215. Contact them through WRMI.

La Voz del Escambray—Named after the mountain range that served as Castro's base during the campaign to overthrow Batista, this program tries to provide inside information to Cubans, especially those who actively oppose the government. The program airs Saturdays from 2230 to 2300 and, additionally, at 0200 to 0230 on local 670 mediumwave in Miami. Use WRMI's address.

La Voz del M.R.R. (Movimiento de Recuperacion Revolucionario)—Cuba defines this organization as a "terrorist" group. It appears not to be active on the broadcasting front at the moment (it's not on WRMI's current schedule). But the group has been around for a long time and even had broadcasts as far back as the original WRNO-New Orleans in the 1960s. The '07 *World Radio TV Handbook* had it active Monday through Friday from 1700 to 1730. So, based on its history, there's good reason to expect a return. Others, such as Foro Militar de Cuba and Junta Patriotica Cubana, have been active in the past, then gone off the air only to return a season or so later. Probably a money thing again.

Radio Cuba Libre—This program is produced by a variety of organizations making up the Municipalities of Cubans in Exile. Actually it's a "block" program that apparently can be used by any of the 126 municipalities (equivalent to a U.S county). The group works to try to reinstate and rebuild the values and ideals that were prevalent prior to Castro's takeover. This airs Monday to Friday from 0200 to 0930 and Saturdays from 1100 to 1300. The address is 4610 NW 7th St., Miami 33126.

Radio La Nueva Nacion—Produced by the Partido Nacionalista Democratica de Cuba (Democratic Nationalist Party of Cuba) which, they say, was born out of the lack of success their members had in getting their views adopted by other organizations in which they were formerly active. The organization promotes "harmony, sovereignty and peace with justice" (who could argue with that?). The program airs on Saturdays at 2200. This non-profit group also publishes a quarterly news bulletin and holds various seminars. It can be reached at 2520 SW 22nd St., Miami, 33145.

Radio Oriente Libre—Operated by the Provincial Assembly for Cuban Compatriots in the East, which presumably refers to the eastern part of the island. They don't say very much about themselves, and maybe you have to speak Spanish. This one is on Mondays at 2330 to 0030 over WRMI. The address is 15611 48th St. SW, Miami 33185.

Radio Marti—Now we tune away from WRMI for a moment and over to Radio Marti, the U.S. government's entry in this game (technically it's the Office of Cuba Broadcasting). Radio Marti has been controversial since it began more than two decades ago (May 1985). Mismanagement, infighting among the various Cuban exiles employed by the station, and the usual questions over funding and whether the money was being effectively spent all raised their collective heads at one point or another. But they all turned out to be brief whirlwinds, which eventually spent themselves while the broadcasts went on.

The latest informed opinions seem to say that Marti is finally beginning to have some effect, at least on the radio side (the

Radio Republica seems to have the bucks not only to fund broadcasts on WRMI, but via sites in England, Canada, and Germany as well!

much more easily jammed TV Marti is another story). Considering its current budget is around $15 million a year, you're allowed to say "it's about time!" Radio Marti is a 24-hour-a-day operation and the schedule is a bit long to get into here. But it's easily logged, and chances are you've already heard it many times. If not, just check one of these frequencies: 5745, 5980, 6030, 7365, 9405, 9565, 9905, 11930, 13820, or 15330 (not all are simultaneously active). All frequencies are via Greenville or Delano (though Delano has likely been dropped, as BBG/IBB in its collective wisdom is, or was, all set to close it down or put in mothballs). Marti also uses 1180 mediumwave and is carried by WAQI-710 in Miami during certain hours, as well. The address for reports is 4201 NW 77th Ave., Miami 33166

Radio Republica—Sometimes the more easily a station can be heard the more mystery surrounds it, and Radio Republica is a prime example. Supposedly run by a hitherto unknown group called Directorio Democratica de Cuba (Cuban Democratic Directorate, or "board"), it suddenly appeared in August 2005. Inquiries to its address in Hialeah, Florida (P.O. Box 110235; zip 33011), have gone unanswered. The programming goes out over WRMI and is also aired via leased transmitter sites in Germany, the UK (Rampisham), and Canada. Here's its most recent schedule:

Monday–Friday, 0700–1200 5910 via Wertachtal
Mon–Fri, 1000–1200 6100 via Sackville
Mon–Fri, 0600–0800 6135 via Sackville
Mon–Sun, 0800–1000 6155 via Rampisham
Mon–Fri, 0900–1200 9735 via Sackville
Mon–Sun, 0500–0700 9955 via WRMI
Mon–Sun, 1500–2100 9955 via WRMI
Mon–Sun, 0200–0400 9955 via WRMI

Recently there have been reports of the station appearing on variable 5954. It's not known if this is something new, a replacement of one of the above, or simply a transmitter suffering wanderlust. It's also aired on local Miami area 670 and 1550 mediumwave.

The group is also active at various international freedom and human rights conferences and publishes a monthly Web-based newsletter called *La Republica*. There are suspicions that this rather extensive effort is receiving financial implants from sources that sport a 202 area code. In fact, a U.S. State Department statement on its website says "The U.S. is taking a positive approach through support to individual civil society leaders and democracy advocates," which well describes the situation with Cuba and its exiles (and one could read "financial support for opposition broadcasting" as part of that easily enough).

Trova Libre—This one has all the credentials needed to qualify as unusual. The program is hosted by one Michael Mendez, a musician, composer, and arranger who plays his own music (and maybe those of others). The songs focus on social content and appeals for various freedoms, often touching on the philosophy of Jose Marti himself. The program is on WRMI Saturdays at 2200 to 2230 and can be reached at the WRMI address.

The Twilight Of A Radio Era?

No one can know what will happen when Castro leaves the scene. If the exiles' dreams are fulfilled and Cuba achieves genuine freedom, you can count on one thing: immediately or eventually these programs and stations will be—*gone*! So if you want to add them to your log, perhaps pull in a few souvenir replies and get your chance to capture a bit of this chapter in clandestine and opposition broadcasting you should get busy right now. Good luck.

Adios! ■

The national Cuban Democratic Party is one of several organizations and anti-Castro groups using radio to get the word out.

Must-Have Software And Websites For The Radio Hobbyist's Computer

These Recommended Tools Will Help You Get Even More Out Of Listening In

by Dan Srebnick, K2DLS

Computers and radio work well together—or do they? Most of us have probably spent time trying to figure out why some piece of computer equipment in the shack is causing QRM to our favorite frequency. I've gone so far as to power off every computer in the house in order to bring the noise level down a couple of S units and pull out that rare DX station. I've used lots of ferrite chokes and even changed PC power supplies to eliminate RF hash caused by some switching power supplies in computers.

It can be annoying, to say the least, but I can't imagine not having a computer in the shack these days. There are just too many useful software programs and websites that enhance my listening pleasure. Computer noise suppression in the shack is a science unto itself, but we'll talk about that some other time. Today, we're going to talk about some of those programs and websites that support your hobby habit.

Figure 1. Want to know what propagation will be like on the higher frequencies? Easy, just visit www.spaceweather.com.

Tech Tools You Don't Want To Be Without

A lot of hams and SWLs bemoan the absence of sunspots, proclaiming the bands dead for the next couple of years. I'm not so certain I agree with the part about the bands being dead, but conditions certainly have been challenging on the shortwaves. What seems to be true, however, is that the activity moves lower in frequency the quieter the sun gets. While much has been written about the 11-year sunspot cycle and its effect on radio communication on HF, a picture is worth and thousand words and I have the picture, thanks to www.spaceweather.com (see **Figure 1**).

Dan Srebnick has been a DXer since 1968 and a ham since 2006. At age 13, he hosted a monthly report for a short time on HCJB's "DX Partyline."

Website: www.spaceweather.com

This is a terrific website. I look at it daily, mostly to see at a glance whether there's hope of decent propagation on the higher frequencies. In the left hand column, there is a vivid image of the sun, showing any sunspots, or the lack thereof, with the current sunspot number. There's a good explanation of how the sunspot number is derived that you can access by clicking on the link under the current number. Readers contribute photos of interesting occurrences, such as unique auroral conditions visible at their locations. Other useful information presented on the site includes dates of upcoming meteor showers, in case you'd like to work some meteor scatter using the weak signal software from WSJT.

Software: VOACAP and VOAProp

One great program that will help you figure out what you can hear and when is VOAProp (www.g4ilo.com/voaprop.html). VOAProp was written by Julian Moss, G4ILO, and has often come up in

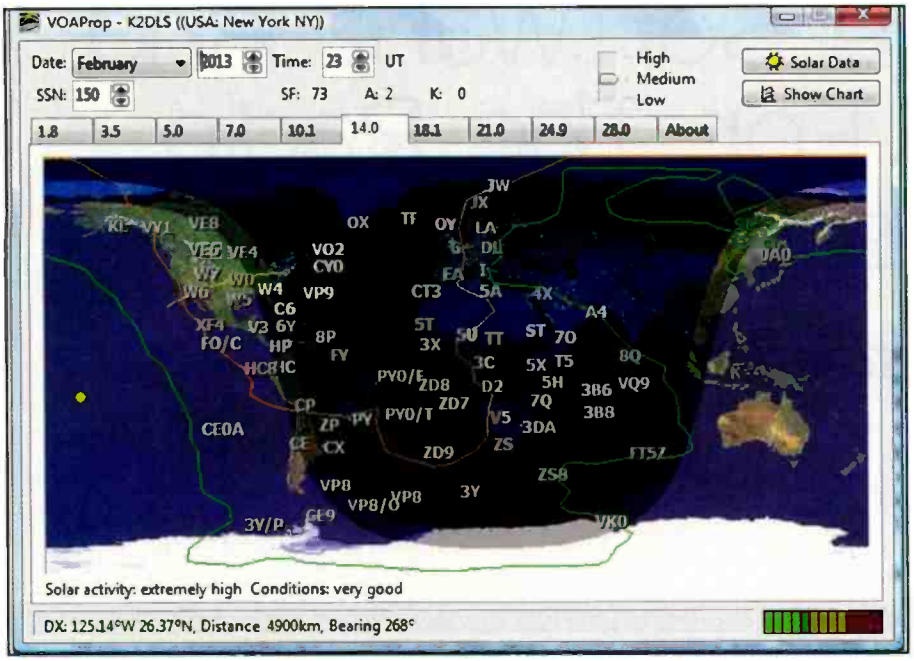


Figure 2. VOAProp lets you peer into the future. Here's a glimpse of the expected solar activity in about five years from now.

the pages of *Pop'Comm*. It makes use of the VOACAP propagation prediction library, but puts a nice graphical interface on top of it. It has a mode for SWLs and one for hams, with the main difference being the transmitter power levels and bands for each community of users. The GUI (graphical user interface) also clearly shows the grayline at any given time, revealing opportunities for extraordinary DX conditions. The software runs under both Windows and Linux, and ran just fine under Vista. The required VOACAP program can also be downloaded by the VOAProp installation program. If this sounds a little complicated, it really isn't and the end result is well worth it.

Real DX chasers swear by grayline propagation. Just the other night, I faintly could hear a VK6 station in Western Australia on 80 meters, just after local sunset here in Central New Jersey. It didn't immediately make sense to me that I could hear Australia on 80 meters around local sunset. However, one look at the grayline in VOAProp told me that both my area and the fringe of Western Australia were under the grayline at just that moment, making such propagation possible, and even likely.

To get started with VOAProp, right click on the map. Decide whether you want to run in Amateur or Shortwave mode and enter your home location. Click the button labeled Solar Update and you're ready to go. You can then select the tab of the band you're interested in and will get an idea of where propagation is good, possible, or impossible at any given point in time.

A few of the guys had fun with VOAProp the other night while we were talking on a local 70cm amateur FM simplex frequency. We advanced the sunspot number up to about 150, a typical number for a sunspot peak. We then ran through the bands and times of day, and dreamed about what is to come at the next sunspot peak. Refer to **Figure 2** for a look at what awaits us in about five years.

Website: www.dxinfocentre.com

I really like dxinfocentre.com, which is an outstanding website from Will Hepburn, focusing on station lists and propagation information for VHF DXers. I first found this website a few winters back when I was spending time listening to the longwave non-directional beacons. Once I had copied the Morse identifier of the beacon, I needed a place to look up which beacon I had logged. Hepburn has just the list, along with a great listing of longwave broadcast stations. The experience of identifying the CW markers of these navigational beacons, typically sending slow-speed CW, led me to believe that, in my late forties, I could actually learn to copy Morse code. It was a struggle, but I did learn enough to pass a 5-wpm code test for my General class license while they were still being offered.

For TV, FM broadcast, and other VHF DXers, Hepburn's site also has excellent propagation prediction maps that show expected tropospheric enhancements over the coming days. I've been using this information for a couple of years and it's proved to be quite accurate over time. The map in **Figure 3** shows a nice tropospheric enhancement over New Jersey and the surrounding area. This bodes well for FM and TV DXers, as well as for VHF and UHF ham operators.

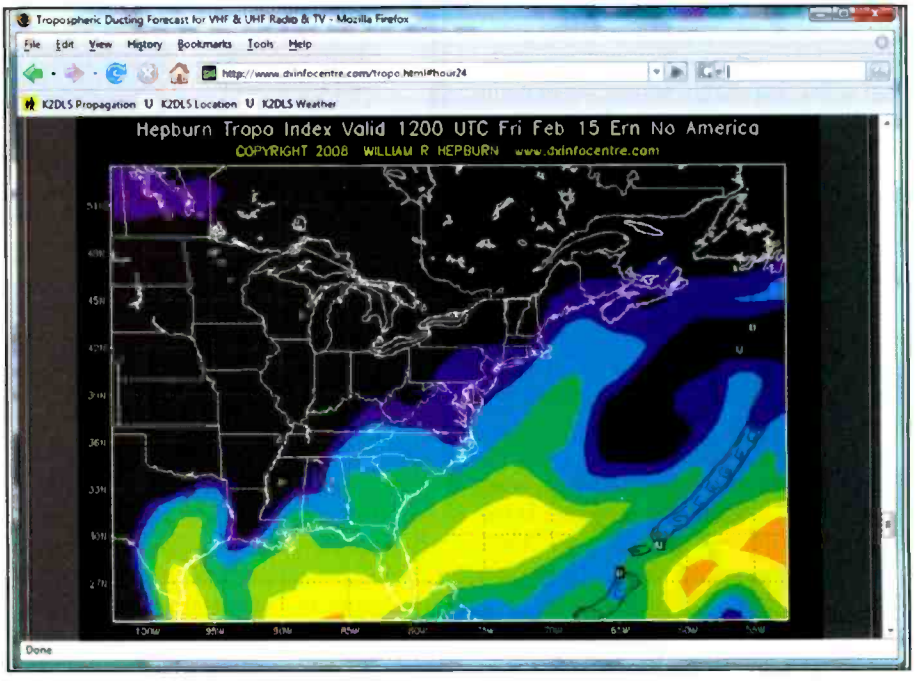


Figure 3. A map of tropospheric enhancement over New Jersey and surrounding area as provided by www.dxinfocentre.com.

Software: WSJT

WSJT, which stands for Weak Signal by K1JT (http://physics.princeton.edu/pulsar/K1JT/Download.htm), is an enormously popular piece of software for the ham. It enables weak signal communications, and while it was primarily used on VHF at first, some HF ops are experimenting with it as well. Version 6 supports four operating modes:

FSK441—fast mode for meteor scatter
JT6M—optimized for 6-meter use
JT65—for EME (moonbounce) and tropospheric scatter
CW—structured for EME work

The software runs on Windows and Linux, as well as FreeBSD (the "other" free Linux operating system, an outgrowth of the Unix development done at the University of California at Berkeley). I ran my copy under Vista with no trouble. This software tool, used with an amateur transceiver and a sound card, helps you bounce signals off the remnants of meteors. The protocols specify the timeslots when each of the two stations get to transmit.

I tested out FSK441 recently. With FSK441, each station gets a 30-second slot

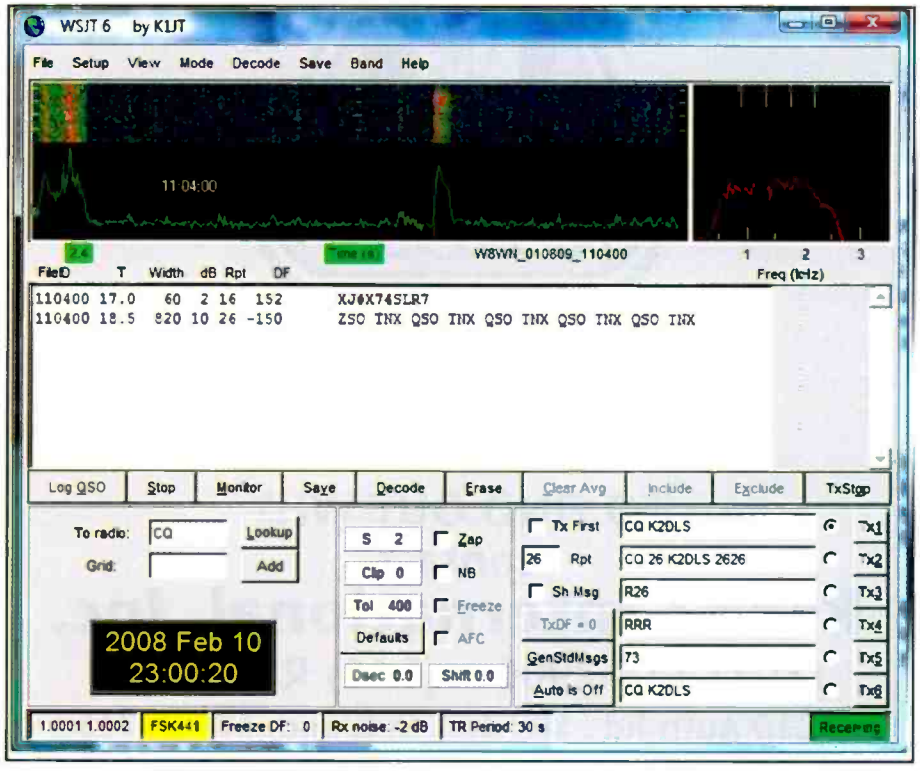


Figure 4. The popular WSJT software facilitates weak signal communications for VHF and, now, HF operators.

to send a brief message. It's important both stations synchronize their PC clocks to a reputable network time source, such as time.nist.gov. The QSOs themselves tend to be terse, minimalist exchanges, such as callsign and Maidenhead grid locater or signal report. Typical frequencies to monitor include 50.260 MHz in the 6-meter band and 144.140 MHz in the 2-meter band. Many of the WSJT QSOs are scheduled in advance. One site I've found that facilitates "skeds" is pingjockey.net. There's a real-time chat feature here so you don't need to schedule far in advance.

FSK441 signals look strange to the uninitiated, and the operating habits involved may seem odd as well (see **Figure 4**). For example, if you see a station send CQ K2DLS D5, the D5 means that they will be listening down 5 kHz from the calling frequency. A U10 means "listening up 10 kHz." The convention is that the westernmost station gets to transmit on the top of the minute and the easternmost station transmits at the bottom (:30 seconds) of the minute.

WSJT operating modes are "sound card digital modes." This means that the tones which make up the digital signal are computer generated by a sound card. They are then fed into an audio input on your transceiver. I use an incredibly interesting device called "SignaLink USB" from Tigertronics. Instead of audio patch cords between the computer and the radio, this external USB sound card is customized for digital communication modes and connects to my Kenwood TS-2000 with a single cable which goes to the accessory jack. I also use this little device to encode and decode RTTY, PSK31, and even CW.

Software: Ham Radio Deluxe And DM780

In addition to WSJT, I use the DM780 module of the Ham Radio Deluxe software suite. HRD (http://hrd.hamradio.ch) has got to be the kitchen sink of radio control and logging software for the radio amateur. It also has some nice features for the SWL. And while donations are accepted, it's completely free to use without any nag screens or limitations. This package runs only under Windows. I run the latest Beta version under Vista.

It logs, it controls the radio, it has an SWL station database, it performs rudimentary logbook analysis for DXCC, has DX cluster connectivity, it can remotely control a different radio over the Internet, and it's free. HRD runs only under Windows. I use it as my main radio control program with Windows Vista. Radio control is limited to popular amateur transceivers; however message boards refer to a promised Drake R8B interface for SWLs "one day."

The DX cluster feature is a nice one. Hams and SWLs will "spot" a station to the cluster. The user picks the band to monitor, and when a good spot comes up you click on it and the radio will tune to its frequency. Another nice feature is the satellite tracking. Pick the satellite you want to work from a menu and the program will display the time of the next pass over your area as well as vary the transmit and receive frequencies appropriately to compensate for the Doppler effect. There is also a button marked "SW DATA" which displays data from the now-defunct ILG database. Inter Office Communications (IOC), a provider of free Web data services (www.ioc.com), has come out with a replacement file for the ILG database, but it's not entirely compatible with the format previously used by ILG and does not display correctly in Ham Radio Deluxe.

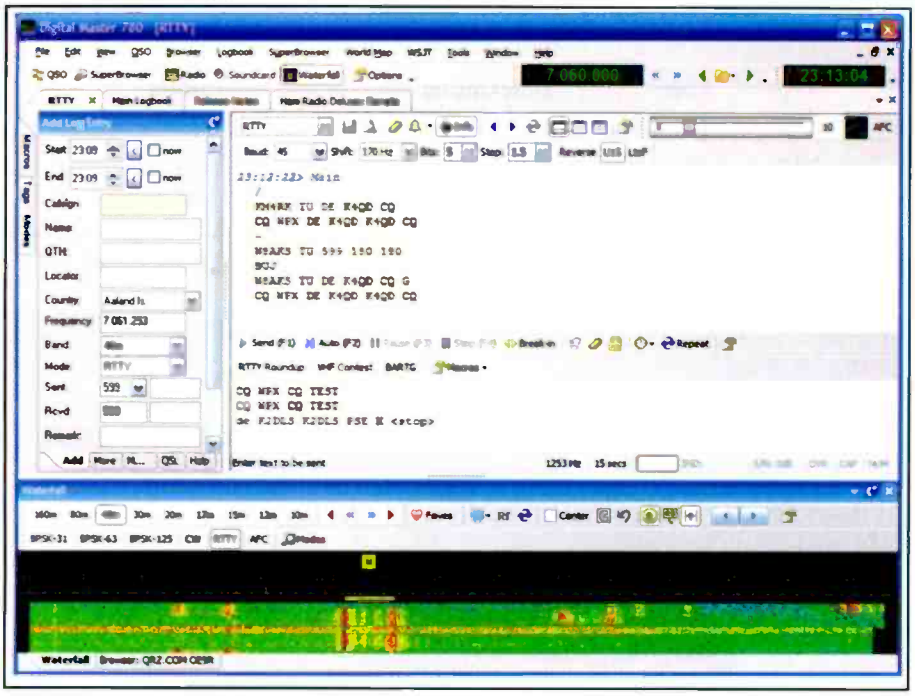


Figure 5. DM780 will encode and decode BPSK31, BPSK63, BPSK125, CW, RTTY, and Olivia, and is the icing on the digital cake.

I've used the HRD macro feature to automate some functions on my Kenwood TS-2000 transceiver. When I turn on the radio, I like to set the volume and squelch on the main and subbands to my preferred settings. If you look at the screenshot, you'll see a button labeled "Set Vol." It's at the bottom of the next to rightmost column. That button runs a macro that I defined. HRD is completely configurable, and if you don't like one of the stock screens for your radio, you can rearrange the controls almost any way that suits you.

DM780 is the icing on the digital cake. This program will encode and decode BPSK31, BPSK63, BPSK125, CW, RTTY, and Olivia. It uses a waterfall display on the bottom on the screen. You typically tune your radio to USB and can point and click at the signal you want to decode. It also has an integrated logbook, which links to qrz.com and will populate the logbook fields with information about the received station with one click. There's a powerful macro capability that can be used to script the common parts of QSOs. You can even insert variable information from the log entry, such as signal report. I have multiple macro setups for PSK31, RTTY, and various contests I've participated in. The macro setup is completely menu driven.

This weekend was the annual CQ WPX RTTY contest, and DM780 performed well. I was only a casual participant, but found that features like auto incrementing of QSO serial numbers, typically used in many DX contests, along with easy-to-program macros, made operating a pleasure.

The upper frame of the DM780 screenshot (see **Figure 5**) shows the text of the received signal. K4QD is calling CQ and was apparently called by W8AKS, whom I did not receive. K4QD exchanged a signal report—notice how everyone is a 59 during contests?—and contest serial number, and then said TU, which means "thank you" in RTTY speak. TEST is short for contest.

At the bottom of the frame is the "waterfall." The RTTY signal appears as two vertical bars, each 170 Hz away from the other—the bandwidth of a RTTY signal. To select the signal you want to decode, use the mouse pointer and click on the signal to frame it between the thin black lines. The text will appear in the DM780 window. Up to three signals can be monitored at once. At the left of the frame are the "Add Log Entry" windows. Clicking on a callsign in the received signal frame presents an opportunity to populate the log with the received callsign. The frequency is automatically captured via the Ham Radio Deluxe computer-aided tuning (CAT) interface.

Monmouth Beach, Borough of

Frequency	Input	License	Type	Tone	Description	Mode	Tag
154.43000		KAZ202	BM	151.4 PL	Fire Dispatch (District 33)	FM	
154.17500		KAZ202	BM	151.4 PL	Fire 2 Fireground	FM	
158.73000	156.07500	WPEA908	RM	151.4 PL	Police Local	FM	

Figure 6. This table of frequency information for a town in New Jersey is typical of the data provided by RadioReference.com.

Website: www.RadioReference.com

When I operate RTTY, I like to listen to the scanner. But the scanner is only as interesting as the systems and frequencies I have programmed in. This is where the Radio Reference site comes into play. This is another tool familiar to regular readers of *Pop'Comm*, and I have never seen a more comprehensive site listing nationwide frequency information for the scanner listener. The directory is organized by state and then county. There are listings for statewide systems, county-based systems, and those run by or licensed in local municipalities. There's good coverage of trunked systems as well, with plenty of talk group information. See **Figure 6** for a typical table of frequency information.

The site also features a radio wiki. If you have ever looked up something on wikipedia, then you know what a wiki is. If not, then the best way to describe it is as an online documentation and collaboration system. One example of what you can find in the wiki are photos and descriptions of many popular types of scanners, both production and out of production models. Another feature of the wiki covers popular radio modifications to increase functionality.

Message boards are another popular feature of RadioReference.com. There are sections on rail and space monitoring, military monitoring, and various regional discussions as well. Most of the features of this site are free; however, there are some advanced download functions (including the ability to download data into a format that can be accepted by some scanners) that require a paid subscription. I find the frequency data on this site to be quite reliable.

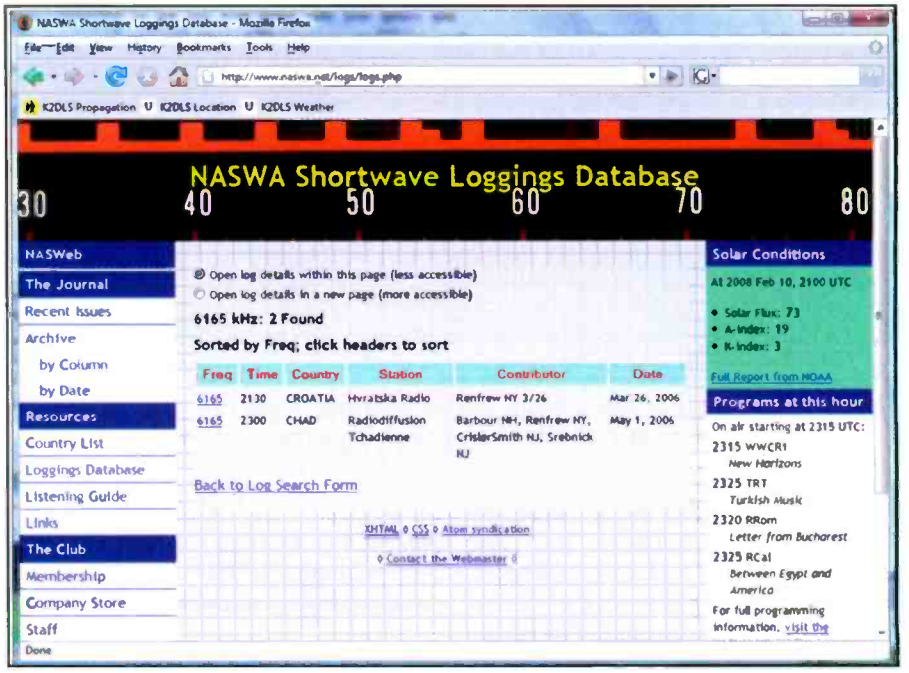


Figure 7. The North American Shortwave Association is a great club with a great website. Check it out at www.naswa.net.

Website: www.naswa.net

Ralph Brandi, the webmaster of the North American Shortwave Association's website, has put together a very nice resource for shortwave listeners. In addition to information about the club, the site features a loggings database. Data is taken from club bulletins as well as the weekly email "Flashsheet," and all you need to do to help identify that mystery shortwave broadcast station is to enter a frequency. All recent reports on or about that frequency are displayed. NASWA is an excellent club for those interested in shortwave broadcast listening and information membership is available on the site as well. Another nice feature of this website is the *NASWA WWW Shortwave Listening Guide* listing on the right hand side of the page (see **Figure 7**).

What Are Your Favorite Digital Tools?

That wraps up this survey of software and websites that will enhance your listening pleasure. Do you know of any great software or websites that were not included? I'd love to hear about them and perhaps cover them in an upcoming article. You can reach me via email at k2dls@arrl.net. ■

by Gerry L. Dexter, gdex@genevaonline.com

VOA To Get A Facelift, Plus Other Tweakings

We have several times now bemoaned the seeming disinclination of the Voice of America to put much time or effort or funds into its declining broadcast infrastructure. Evidence of said: the closing of the Bethany (Ohio) site several years ago and, more recently, the Dixon (California) facility, followed by turning over the Briech, Morocco, site to the government there, not to mention the lack of attention given the giant Greenville (North Carolina) facility, which is beginning to show its age. But now there has been a bit of a turnabout.

The VOA has awarded a large contract to the Harris Corporation to modernize the Voice's broadcast headquarters, an undertaking that will include new automation, new master and quality control, and updating playback and recording systems. In reality, the headquarters upgrade likely has no bearing on what's going on at tower sites, but it's still tempting to hope that, maybe, this indicates the start of a new way of thinking.

The VOA has also announced that its "Radio Aap Ki Duniya" Urdu service has ended shortwave transmissions and now uses only two channels on mediumwave. It seems like only a year or so ago that this service went on the air in response to some perceived urgent need.

Somebody keeps tossing the BBC into the wrong wash cycle—it's shrunk again! BBC shortwave to Europe is no more. What's next? America? Oh wait—I seem to remember there was something in the paper a couple of years back about that...

Now there are rumors—not much more than simple scuttlebutt at this point—that Radio Tirana may be discontinuing shortwave before long in favor of "broadcasts" on the Web, which are much cheaper. Let's hope that doesn't happen. As always I suggest writing to the station to show your support. The snail mail address is Ruga Ismail Qemali No. 11, Tirana, or you can email them at radiotirana-english@hotmail.com.

Radio Prague is once again being relayed over WRMI-Miami, for a full half-hour per week! It airs Saturdays at 0000 on 9955.

The BBC Indian Ocean Relay at Victoria, Seychelles, is pictured on this QSL received by Rich D'Angelo.

Israel was all set to pull the plug on its shortwave broadcasts effective with the arrival of the New Year. But, once again, the programs were granted a three-month delay. It's anyone's guess as to what their status may be as you read this.

Radio Ukraine International is active again from the site at Lvov, using 7440 at 0000 to 0100 in Ukrainian and 0400 to 0500 in English.

That's it for this month's shortwave gazette—now it's over to you.

Reader Logs

Remember, your shortwave broadcast station logs are always welcome. But *please* be sure to double or triple space between the items, list each logging by the station's home country, and include your last name and state abbreviation after each. Also needed are spare QSLs or good copies you don't need returned, station schedules, brochures, pennants, station photos, and anything else you think would be of interest. And how about sending a photo of you at your listening post? It's your turn to grace these pages!

Here are this month's logs. All times are in UTC. Double capital letters are language abbreviations (SS = Spanish, RR = Russian, AA = Arabic, etc.). If no language is mentioned English (EE) is assumed.

ALASKA—KNLS, 7355 opening in CC heard at 1400. (Barton, AZ)

ALBANIA—Radio Tirana, 6120 at 0245 and 7425 announcing times and frequencies at 0440, (Maxant, WV) 9915-Shijak at 2115 and 13640-Shijak at 1540. (Charlton, ON)

ALGERIA—RT Algerienne, 12025 via England in AA at 2015. (Brossell, WI)

ANGOLA—Radio Nacional, 4950 at 0140 with PP talk and mostly Portuguese pops. (Alexander, PA)

ARGENTINA—Radiodifusora Argentina al Exterior, 15345 in SS at 1810. (Maxant, WV) 2248. (Wood, TN)

ASCENSION IS—BBC Atlantic Relay, 6005 at 0529 with ID, news update. (D'Angelo, PA) 7105 to South Africa at 0530. (Parker, PA) 15400 with news at 1630. (Brossell, WI) 1701 and 17830 at 1650. (Charlton, ON) 2223. (Wood, TN) 17830 with news at 1100. (Fraser, ME) Cricket commen-

Help Wanted

The "Global Information Guide" consistently presents more shortwave broadcast loggings than any other monthly SW publication! (An incredible 787 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.*

tary at 1952 and 17855 in FF at 1940. (MacKenzie, CA)

AUSTRALIA—Radio Australia, 6020 at 1100. (Linonis, PA) 6020 in Pidgin at 1020 and 7240 with ABC pgms at 1635. (Barton, AZ) 6020 at 1115, 7240 at 1415, 0710 at 0815, 13630 at 0735 and 15440 at 0440. (Maxant, WV) 9590-Shepparton at 1343. (Charlton, ON) 11550 via Taiwan in unid Lang at 2309 and 11660-Shepparton at 2042. (Brossell, WI) 9580-Shepparton at 1916, 11880-Shepparton at 1912, 15180-Darwin at 0005 and 17795-

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

Deutsche Welle QSLed Rich D'Angelo's report with this card for its Sines, Portugal, transmitter site.

Shepparton at 2340. (MacKenzie, CA) 17785-Shepparton at 2156. (Wood, TN)

ABC Northern Territories Service, VL8A-Alice Springs, 2310 at 1746, VL8T-Tennant Creek 2325 at 1740 and VL8K-Katherine 2485 at 1750. (Patterson, Philippines) 2485 at 1230 going into weather forecast. (Wood, TN)

CBC Intl, 6160 at 0745. (Maxant, WV) 13685 with Western pops at 1435. (Schiefelbein, MO) 15360-Darwin heard at 0740. (Patterson, Philippines)

HCJB-Australia, 15525 in Mandarin at 2330. (MacKenzie, CA)

AUSTRIA—Radio Austria Intl, 6155-Moosbrunn in GG at 2025. (Patterson, Philippines) 13675 at 1645. (Maxant, WV)

BELGIUM—RTBF, 9970 in FF at 2144. Strong WEWN QRM after 2200. (Schiefelbein, MO)

BOLIVIA—Radio Mosoj Chaski, Cochabamba, 3310 in Quechua at 0049 with mostly W talking. (Taylor, WI)

Radio Universitaria, Cobija, (t) 4732 at 0033 in SS but very weak. (Alexander, PA)

Radio Pio Doce, Siglo Viente, 5952.5 at 1015 in SS with Bolivian music at 1036 and "Pio Doce" jingle. (Alexander, PA)

Radio Santa Cruz, Santa Cruz, 6134.8 at 1000 but weak in Quechua with ad string and cow moos SFX. (Alexander, PA)

BONAIRE—Radio Nederland Relay, 11675 at 1215 on Slovenia. (Linonis, PA) 1245. (Fraser, ME) 11730 in DD at 2233 and 17810 at 2018. (MacKenzie, CA)

BOSNIA—Intl Radio of Bosnia, 7115-Bijelijina at 0110 with talk in Serbian and classical music. (Ronda, OK) 0240 with classical music to 0300 and Serbian language pgm. Into FF at 0330. (D'Angelo, PA)

BOTSWANA—VOA Relay, 4930 at 0410. (Parker, PA) 9885 with pops to 0430. Also 13710 at 2042 (thanks Joe Wood) and 15545 in PP at 1728. (Ronda, OK) 12080 in FF with Afro-pops heard at 2018. (Brossell, WI) 17895 at 1651. (Charlton, ON)

BRAZIL (*All in PP—gld*) Radio Difusora, Macapa, 4915 at 0027 with slow music. (Parker, PA) 0507 with long talk. (Wood, TN)

Radio Brazil Central, Goiania, 4985 at 0634 with Spike Jones-like music, ID at 0638. (Wood, TN) 2315 with PP songs. (Brossell, WI) 2353 with M and variety of music. (Parker, PA)

Radio Capixaba, Vitoria, 4935 at 0036 with M talk. (Parker, PA)

Radio Clube do Para, Belem, 4885 monitored at 0405 with some pops, 50s rock. (Parker, PA) 0505 M anncr and reverb. (Wood, TN)

Radio Difusora, Londrina, 4815 at 0015 with what sounded like a political talk. (Ronda, OK) 0219 with M anncr and music. (Parker, PA)

Radio Alvorada, Parintins, 4965 with songs and talks at 0132. (Brossell, WI)

Radio Alvorada, Londrina, 4865 with choir and talk at 0541. (Parker, PA)

Pop'Comm *May 2008* *Reader Survey Questions*

This month we'd like to ask you how important your hobby is to you on the road. Please use the Reader Survey Card and circle all appropriate numbers. Thanks for participating.

When travelling, do you bring some sort of (non-work related) communications device with you?

Yes, always 1
Frequently 2
Seldom 3
Never 4

If so, why do you bring it?

Strictly for enjoyment 5
For convenience, it makes travelling easier 6
To stay in touch with others 7
Just in case of emergency 8

In what circumstances/environments have you used your communications device?

When travelling by car 9
When travelling by plane 10
When travelling by train 11
When travelling by boat 12
When hiking, biking 13

If you don't currently use a communications device when travelling, do you intend to start?

Yes 14
No 15
Haven't thought about it 16

Radio Imaculada Conceicao, Campo Grande, 4755 with talks at 0213. (Brossell, WI) 0620. (Parker, PA)

Radio Cancao Nova, Sao Paulo, 4825 at 0532 with M/W talks. (Parker, PA) 9675 at 0614 with apparent live broadcast. (Wood, TN)

Radio Globo Santos, Guaruja Paulista (t) 5045 at 0534 with slow music at poor level. (Wood, TN)

Radio Aparecida, Aparecida, 6135 at 0839 with what sounded like Brazilian C&W. (Wood, TN)

Radio Anhanguera, Araguaina, 4905 at 0000 with ID and M talk. (Wood, TN)

Radio Novas de Paz, Curitaba, 6080 at 0845 with ballads, //9515 very weak. (Parker, PA)

Radio Guiaba, Puerto Alegre, 11785 heard at 0107 with M talks. (Parker, PA)

Radio Educacao Rural, Tefe, 4925 heard at 0030 with M/W talks. (Parker, PA)

Radio Nacional Amazonas, Brasilia, 11789 with music pgm heard at 0015. (Barton, AZ) 0100 with ID and music. (Parker, PA) 1930 with comedy interludes and music. (Branco, NY) 2047 with talks. (Brossell, WI)

BULGARIA—Radio Bulgaria, 7400 at 0038, 9400 at 2215 and 9700 in SS at 2212. (MacKenzie, CA) 9400-Plovdiv at 1840 with lovely modern music. (Charlton, ON)

BURKINA FASO—Radio Burkina, 5030 heard at 0549 in FF with Afro-pops and heavy QRM from R. Rebelde. (Wood, TN) 2136 in FF. (Taylor, WI) 7230 with abrupt *0810 in vernacular with local tribal numbers and Afro-pops. (Alexander, PA)

CANADA—Radio Canada Intl, 5850 via Sweden at 2115. (Patterson, Philippines) 7195 via South Korea in Mandarin at 2338. (Schiefelbein, MO) 7310 in SS at 1240. (Branco, NY) 9610-Sackville in FF at 1845 and 11865-Sackville in FF at 2033. (Charlton, ON)

CBC Northern Quebec Service, 9625 at 2130. (Maxant, WV)

CKZN, St. John's, 6160 with news and regional weather heard at 2212. (Schiefelbein, MO)

CFVP, Calgary, heard at 0528 mixing with V of Tigray Revolution with C/W selections and ID for "Classic Country AM 1060." (Schiefelbein, MO)

CHU, Ottawa 7335 with EE time anmts at 0042. (MacKenzie, CA)

CHAD—Radiodifusion Nationale Tchadienne, N'Djamena, 4904 at *0429 with anthem, FF anmts, Afro-pops. (Alexander, PA) 0510 with studio chatter in FF and Afro-pops. (Ronda, OK) 0515. (Wood, TN) 2150 with M/F FF anncrs, steel drums, FF news heard at ToH. (Parker, PA) 2316 with news and live reports. (Taylor, WI)

CHILE—CVC-La Voz, Santiago, 6070 at 0607 in SS with contemporary Christian music. (Wood, TN) 11745 in SS at 0051 and 11805 in SS at 0110. (Parker, PA) 17680 in SS at 1359 with short ID and news. (Charlton, ON)

CHINA—China Radio Intl, 5965-Xi'an in CC at 1550. (Barton, AZ) 7285 via Albania at 2025. (Gay, KY) 7325-Kunming in listed Cantonese. Off at 2357, per sked. (Ronda, OK) 9720-Urumqi in a Slavic language at 2054. (Brossell, WI) 9760-Kunming at 1346, 9870-Xi'an in unid Lang at 1837 and 13740 via Cuba at 1542. (Charlton, ON) 9860 in CC at 0042, //11780, 11975 via Mali in CC at 2347 and 11990 in unid Lang closing at 0058. (MacKenzie, CA) 11650-Beijing at 0035, 13600-Xi'an in RR at 0135 and 15160 in CC at 0000. (Parker, PA) 11785 at 0820 and 13675 via Cuba in CC at 1525. (Maxant, WV) 15145-Xi'an in Mandarin at 0720. (Patterson, Philippines)

China National Radio (CPBS), 4460 (p) in CC at 1225 and 7245 in CC at 1400. (Barton, AZ) 4800-Ge'ermu with Network One in CC at 2339 and 4905-Lhasa with Network 8 at 2346. (Strawman, IA) 6090-Ge'ermu Network 2 at 1327 with EE on stress and 9810 with Network 2 with EE ID at 1200 and back to CC. //6065, 6090, 7315 and 7375. (Alexander, PA) 7130-Xi'an Network 2 in Mandarin at 2300

China Radio International's English language staff.

and 11710-Beijing in CC at 0045. (Parker, PA) 9775 at 0038, 12055 at 2350 and Xizang PBS-Lhasa, 4820 at 2358 in Mandarin, ID 0000 and news. (Strawman, IA)

Guangxi PBS, Nanning, 9820 at 1325 with Cantonese service. (Strawman, IA) 2348 in VV with Cuba absent. (Schiefelbein, MO)

Qinghai PBS, Xining, 4220 heard at 2340 in listed Tibetan vocals and some phone calls. Apparently grayline propagation. (Schiefelbein, MO)

Nei Menggu PBS, Hohhot, 9520 at 2351 in Mandarin with Radio Nederland missing. Also 9750 (p) monitored at 0003 with phone correspondents. Listed Mongolian. (Schiefelbein, MO)

Xinjiang PBS, Urumqi, 4330 in Kazakh at 0205 and 5060 in CC at 0002. (Parker, PA) 4980 at 0004. (Strawman, IA) 11770 in CC at 1502. (Brossell, WI)

Voice of Pujiang, Shanghai, 4950 in Mandarin at 1305 with East Asian pops and DJ comments. (Schiefelbein, MO)

Firedrake jammer, 6145 vs. Radio Taiwan Intl at 1600. (Barton, AZ) 6280 against Sound of Hope at 2302, 9850 vs. RFA at 2030 and 0030 at 1639 covering KWHR. (Brossell, WI) 7415 monitored at 1852, //9335, 9385 and 11945. (Mackenzie, CA)

CONGO (Dem. Rep.)—Radio Okapi via South Africa, 9635 at 0405 with FF and vernacular talks, mentions of Congo, "Okapi" jingles. (Alexander, PA) 11890 in FF at 1748. (Brossell, WI)

CROATIA—Voice of Croatia, 6185 at 0700 with three-minute EE news, ID, sked and into Croatian, //9470 via Germany. (Alexander, PA)

CUBA—Radio Havana Cuba, 6180 in SS at 1215. (Linonis, PA) 9550 at 2325. U.S. is imperialistic. (Maxant, WV) 11805 in SS at 2141, 12000 in SS at 1447 and 17735 in SS at 1645. (Charlton, ON)

Radio Rebelde, 5025 in SS at 0525. (Wood, TN)

CZECH REPUBLIC—Radio Prague, 5930 at 2240. (Gay, KY) 2245 with news. Also 13580 at 1405. (Maxant, WV) 7345//9440 at 0030–0100. (Linonis, PA) 9430-Litomysl heard at 2115. (Charlton, ON)

DJIBOUTI—Radio Djibouti, 4780 at 1103 in AA with ID, many mentions of Djibouti and music interludes. (Wood, TN) 2045 with AA talk, HoA music. 2102* (Alexander, PA)

ECUADOR—HCJB, 11960 at 1430 in SS. (Barton, AZ) 12040 in GG at *2258. (Wood, TN)

Radio El Buen Pastor, (p), Saraguro, 4815 in SS at 0225 with EC music, religious music, jingles. Abrupt 0301*. (Alexander, PA)

La Voz del Napo, Tena, 3280 at 0143 in SS with a with phone call, music. (Taylor, WI)

Radio Chaskis, Otavalo, 4909.2 with SS talk, short music breaks heard at 1131. (Alexander, PA)

EGYPT—Radio Cairo/Egyptian Radio, 6290-Zaabal at 2250 with AA with dramatic readings and ME music. (Wood, TN) 7270 at 0235 with ME vocals. (Maxant, WV) 9460 at 0045 in AA. (Linonis, PA) 9990 with news in FF at 2035. (Brossell, WI)

ENGLAND—BBC, 3255 via Meyerton at 0330 to Africa. (Schiefelbein, MO; Ronda, OK) 5875 via Cyprus in Dari to Afghanistan at 0049. (Parker, PA) 5975 via Souh Africa with news at 2230. (Gay, KY) 6110-Rampisham in AA at 2030 and 15130 via Oman at 1355. (Patterson, Philippines) 7430 via Tajikistan in Bengali at 1328. (Taylor, WI) 6095 via South Korea in KK at 1412 and 9410 via Cyprus with news at 1403. (Strawman, IA) 9525 via Cypress Creek at 2250. (MacKenzie, CA) 11625 at 2140. (Maxant, WV) 12095 at 1540. (Fraser, ME)

VT Communications, 7160 at 0540 running a loop anmt "There is currently no service on this channel." (Parker, PA)

FEBA, 7365 at 1358 with test tones, IS and M in presumed Urdu. (Schiefelbein, MO) 9550 via Rwanda in AA heard at 2013. (Charlton, ON)

Bible Voice, 5945 heard at 0810. (Maxant, WV) 15495 in an African dialect at 1635. (Brossell, WI)

EQUATORIAL GUINEA—Radio Nacional, Bata, 5005 in SS heard at 0330. (Taylor, ON) 0625 with 50s "doo wop" in SS. (Wood, TN)

Radio Nacional, Malabo, 6250 at 0615 with SS talks, short music breaks, some Afro-pops. (Alexander, PA)

ERITREA—Voice of the Broad Masses, Asmara, (p) 7100 at 0404 in listed Tigrinya, a short anthem at 0430 and into a music pgm. (Alexander, PA)

ETHIOPIA—Radio Fana, Addis Ababa, 6110 at *0256 with IS, opening ID anmts at 0400, HoA music. Nothing on 7210. (Alexander, PA)

Voice of the Tigray Revolution, Mekele, 0255 sign on with IS, talk at 0400 and HoA music. (Alexander, PA) Mixing with Taiwan/Okeechobee. (Alexander, PA) 6030 (p) at 0405 after Cuba jamming shut down with pgmng similar to other recent logs. Some phone calls and Afro-pop/ME music. (Schiefelbein, MO)

Radio Ethiopia, 7110 at in Amharic at 2035 to 2101 close. (Alexander, PA) 0407 with HoA music. (Ronda, OK)

FRANCE—Radio France Intl, 7160 via South Africa in FF at 2145. (Ronda, OK) 13675-Issoudun in FF at 0846. (Patterson, Philippines) 13695-Issoudun in FF at 2022. (Charlton, ON) 15300 in FF at 1249. (Brossell, WI) 17800 in FF at 1220. (Maxant, WV)

GABON—RTV Gabonaise, 4777 at 0506 with news in FF. (Ronda, OK) 0520 on FF with M/W anncrs. (Parker, PA) 7270 at *0759. (Alexander, PA)

Africa No. One, 9580 at 2220 with FF interview, into Afro-pops at 2224. (Ronda, OK) 2246. (MacKenzie, CA) 15475 with FF talks at 1630. (Brossell, WI) 1706 in FF and 17630 in FF at 1358. (Charlton, ONO

GERMANY—Deutsche Welle, 9545 with news at 0930. (Maxant, WV) 9820 via Rwanda in GG at 0025 and 11690 via Rwanda in GG at 2225. (McKenzie, CA) 11690 in GG to South America at 0040. (Parker, PA) 9850 via Chita, Russia, in Hindi at 0140. (Patterson, Philippines) 11725 via Rwanda in GG at 1825, 13790-Rampisham in AA at 2025, 15275 via Portugal in FF at 1655 and 17800 via Portugal in FF at 1648. (Charlton, ON)

GREECE—Voice of Greece, 7475 in Greek at 2350. (Maxant, WV) 9420 in Greek at 2014. (Charlton, ON) 15630 in Greek at 0650. (Patterson, Philippines)

Sierra Leone's Cotton Tree News broadcasts over the Ascension Relay.

RS Makedonias, 7450 in Greek with ethnic music at 2143. (Strawman, IA)

GUAM—Trans World Radio/KTWR, 9920 in VV at 1440 and 11965 opening in Indonesian at 2200. (Ronda, OK) 9975 at 1446. (Brossell, WI)

Adventist World Radio/KSDA, 9635 in unid Lang at 1410. (Patterson, Philippines) 11690 at 1600 with "Voice of Hope" IDs, music and religious talk. (Alexander, PA) 11850 in JJ at 2100. (Brossell, WI)

GUATEMALA—Radio Verdad, Chiquimula, 4052.5 at 0430 with EE music pgm. (Parker, PA)

Radio Buenas Nuevas, San Sebastian, 4800 in SS at 0300. (Parker, PA) Poor in SS at 1305. Not heard in quite some time. (Ronda, OK)

Radio Cultural Coatan, San Sebastian, 4780 in SS at 1225. (Wood, TN) 1230 in SS with guitars. (Barton, AZ) 0155 with M/W and ranchero pgm. (Parker, PA) 0235 in SS to 0303* (Alexander, PA)

HAWAII—KWHR, Naalehu, 15610 heard at 0755. (Patterson, Philippines)

HONDURAS—Radio Luz y Vida, San Luis, 3249 at 1214 with SS inspirational talk. (Wood, TN)

HUNGARY—Kossuth Radio (p) 3975-Jaszbereny in HH heard at 0713. (Taylor, WI)

INDIA—All India Radio, 4860-Delhi at 0236 in unid Lang M/W anncrs, mx bridges. Very weak. (Parker, PA) 4920-Chennai at 1344 with vocal and tabla. Still in at 1405 recheck. Also 5015-Delhi with ethnic vocals at 1312, 6165-Delhi in listed Sindi at 1420 and 9705-Panaji (Goa) at 2331 with talk and local vocals. (Strawman, IA) 4920 at 1316 with discussion in Hindi. Also 15050-Delhi in listed Sinhala with sub-continental vocals at 1412. (Schiefelbein, MO) 9425-Bangaluru in Hindi at 2149. (Ronda, OK) 9445 in General Overseas Service at 2110, 11620 with Indian music at 1750 and 11715 with chants at 2150. (Maxant, WV) 9820-Panaji in an Asian language at 1439. (Brossell, WI) 11620 at 1900 in presumed Hindi. (Linonis, PA) 15260-Delhi in Tamil at 0730. (Patterson, Philippines)

INDONESIA—Radio Republik Indonesia, 4790-FakFak in II at 1352 with string of pop ballads. (Strawman, IA) 1406 with pop vocals. Thanks to Jerry Strawman for the tip. (Ronda, OK) 1412. (Taylor, WI) RRI-Ternate, 3345 at 1246 with continuous pops. (Strawman, IA)

Voice of Indonesia, 11785 at 1910 in FF. (MacKenzie, CA)

IRAN—VOIRI, 7135-Sirjan in Kazakh with W and AA music to Central Asia at 2235. (Parker, PA) 9575 at 1440 with long discourse in RR. (Schiefelbein, MO) 9660 at 1339. (Strawman, IA) 11930 in AA at 1922. (MacKenzie, CA) 12090 in an Asian language at 1508. (Brossell, WI) 15265 in Kurdish heard at 1226. (Branco, NY)

ISRAEL—Kol Israel, 6985 in EE at 1840. (Fraser, ME) 7545 at 0435 and 9345 with news at 1740. (Maxant, WV) 13630 in HH at 1635. (Charlton, ON)

Galei Zahal, 6972 at 0635 in HH with telephone interview. (Wood, TN) 2323 in HH with M DJ. (Schiefelbein, MO)

JAPAN—Radio Japan/NHK, 7200 with ID at 1331 and shift from II to Thai. (Ronda, OK) 9750 in JJ at 1645. (Barton, AZ) 11665 in JJ at 2336 and 13650 in Thai at 2320 (MacKenzie, CA) 11705 via Canada at 1408. (Charlton, ON) 1410. (Maxant, WV) 15195 in JJ at 0725. (Patterson, Philippines)

Radio Nikkei, 3925 in JJ at 1235. (Wood, TN) 6055 in JJ at 1240. (Alexander, PA) 9595 at 1228 with jazz and pops. (Ronda, OK) 9760 in JJ with pop songs at 2307. (Brossell, WI)

JORDAN—Radio Jordan, 11690 under RTTY at 1455. (Charlton, ON) 1550 relaying local FM. (Maxant, WV)

KUWAIT—Radio Kuwait, 9855 at 2236 poor in AA. (Strawman, IA) 15495 in AA at 0640. (Patterson, Philippines)

LAOS—Lao National Radio, 6130 in LL heard at 0920. (Patterson, Philippines)

LATVIA—Latvia Today, 9290-Ulbroka from 1400-1500, including Radio SWH address. (Alexander, PA)

LIBERIA—ELWA, 4760 at 0619 with M and several IDs, birthday greetings to listeners. (Wood, TN) 2235 with local religious choral numbers, Afro-pops. 2303* (Alexander, PA) 2239 in EE and vern to 2303*. (Taylor, WI)

Star Radio, 9525 (*via Ascension—gld*) at 0725 with greetings to family members. (Maxant, WV)

LIBYA—Radio Jamahiriya, 17725-Sabrata with EE pgm heard at 1456. (Charlton, ON)

LITHUANIA—Radio Vilnius, 7325 heard at 2330 with pgm preview, into news in LL. QRM co-channel CRI. (Schiefelbein, MO)

MALI—RTV Malienne, (t) 4835 at 0640 in FF and vernacular with Afro-pops. (Wood, TN) 9635 in FF and vernacular at 0800 sign on. (Alexander, PA)

MAURITANIA—Radio Mauritanie, 4845 at 0245 with African vocals and talk in AA. (Ronda, OK) 0354 in AA through ToH. Now 24 hours? (D'Angelo, PA) 0500 with haunting ME vocals. (Wood, TN) 2142 M talk. (Parker, PA)

MEXICO—Radio Mil, Mexico City, 6010 at 1150 with lively SS songs. (Ronda, OK) 1350 with music, ID, presumed news at 1400. (Schiefelbein, MO)

Radio UNAM/XEYU, 9599v, 0600 with SS anmts, classical music. Also noted at 1405. (Alexander, PA) 1510 with non-stop instls. (D'Angelo, PA) 1545. (Barton, AZ) 1632 with several "Radio UNAM" IDs. (Schiefelbein, MO)

Radio Transcontinental/XERTA, 4800 (p) at 0350 with light classical music. (Ronda, OK) (p) 1255 with pops and choral selections, continuous light SS music at 1248. (Schiefelbein, MO)

MOROCCO—Radio Medi Un, Nador, 9575 in FF heard at 1844. (Charlton, ON)

RTV Marocaine, (p) 5980 with Koran at 0102. (Strawman, IA)

NETHERLANDS—Radio Nederland, (p) 9345 via Tashkent, Uzbekistan, with EE commentary at 1407. (Schiefelbein, MO) 1419. (Taylor, WI) 9895 via Madagascar in DD at 2202 and 11655 via Madagascar at 1947, //17810. (MacKenzie, CA) 11655 Madagascar in an African dialect at 1645. (Brossell, WI) 11655 at 1820. (Maxant, WV) 11655 at 1823 and 11805 via South Africa at 1950. (Charlton, ON)

NEW ZEALAND—Radio New Zealand Intl, 5950 at 1458 into ToH TS, ID and news. (Barton, AZ) 9765 at 0745. (Maxant, WV) 15720 at 0655. (Patterson, Philippines) 2315. (MacKenzie, CA)

NIGERIA—Voice of Nigeria, 7255 at 2200 with AA sign on. Also 9690 with news at 0825 and 15120 at 2010. (Maxant, WV) 9690 at 0800 sign on with vernacular talk in progress. (Alexander, PA) 1336 with news and ID. (Charlton, ON) 15120 on African unity at 2022. (Brossell, WI) 2039 on African music to 2058*. (Wood, TN) 2208 with news and public affairs items. (MacKenzie, CA)

Radio Nigeria, Kaduna, 4770 at 0445 with news and several mentions of Nigeria. Also at 2201. (Wood, TN) 0618. (Taylor, WI) 2135 in vernacular and EE. (Parker, PA)

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!

This month's prizewinner is **Ray Paradis, of Pittsfield, Maine**, who receives one of those very nice Radio Free Asia coffee mugs, for which many thanks go out to the good folks at RFA in Washington, D.C.

NORTH KOREA—Voice of Korea, 4450 with a music pgm at 1215. (Barton, AZ) 7570 with news at 1340. Also 11710 open at 1500. (Brossell, WI) 13650 to SE Asia in FF at 0142, 13670 to Latin America at 0147 and 15180 to Latin America in SS at 0200 open. (Parker, PA)

Pyongyang Broadcasting Station, 6285 in KK heard at 1302. (Brossell, WI)

NORTHERN MARIANAS—KFBS, Saipan 9920 in VV at 1337. (Ronda, OK)

OPPOSITION—Korean National Democratic Front (to S. Korea) (p) 4450 in KK monitored at 1357. Very weak. (Strawman, IA)

Voice of the People, (to Zimbabwe) 11610 via Madagascar heard at 1750 with talks on the state of that government. (Brossell, WI)

Radio Free Afghanistan, 19010 via Kuwait in Pashto at 0640. (Patterson, Philippines)

Voice of Mesopotamia (to Iran) 11530-Grigoriopol, via Moldova, with ME music heard at 1350. (Brossell, WI) 1355 in Kurdish. (Taylor, WI)

Sound of Hope (to China), 7105-Taiwan heard at 2230 with IS, ID and talks in CC. (Brossell, WI)

Radio Free Asia, 7480 via Tajikistan in Mandarin at 0030, 11605 via Taiwan in VV at 2330, 15430 via Saipan in CC at 2348, //15550. (MacKenzie, CA) 9385 via Northern Marianas in KK at 1512 with news clips. (Schiefelbein, MO) 15150 via Tinian in unid language at 0805. (Patterson, Philippines)

Radio Marti (to Cuba) 5980 in SS at 1120; not jammed! (Linonis, PA) 11930-Greenville in SS at 1831. (Charlton, ON)

Radio Farda (to Iran) 5860 in Farsi at 0046. (Parker, PA) 15690 via Sri Lanka in Farsi at 1330. (Patterson, Philippines)

SW Radio Africa (to Zimbabwe) 12035 at 1754. (Brossell, WI)

Radio Liberty, 9790 via Thailand in an Asian language at 1436. (Brossell, WI)

OMAN—Radio Sultanate of Oman, 15140 at 1427 with pops, chimes or gongs and EE news at 1430. (Alexander, PA)

PAPUA NEW GUINEA—Radio West New Britain, Kimbe, 3235 at 1245 with island-type music through 1300 with a pause at 1304, which seemed like it may have included an ID. (Schiefelbein, MO)

PERU—Radio Vision, Chiclayo, 4790 in SS at 0209 with a preacher. (Parker, PA) 0239 in SS and with preaching and occasional choir. (Wood, TN)

Radio Sicuani, Sicuani (p) 4825 in QQ at 1030, and M/W talking. (Taylor, WI)

Radio Horizonte, Chachapoyas, 5015 in SS heard at 1214 with music, mellow annct. (Taylor, WI)

Radio Maranon, Jaen, 4835 at 0145 with romantic SS ballads, SS anmts. (Alexander, PA) 0235 with M/W anncrs, slow pops, canned ID. (Parker, PA) 2350 with LA music, frequency anmt and station promo at ToH. (Wood, TN)

Radio del Pacifico, Lima, 4974.8 at 2349 with impassioned talk in SS. (Parker, PA)

Radio Bolivar, La Libertad, 5460.3 heard at 0031 with W talk. Weak but fully copyable. (Parker, PA)

Radio Melodia, Arequipa, 5939.3 heard at 2335 with SS talk, IDs, ads, jingles. (Alexander, PA)

PHILIPPINES—FEBC Intl, 9405 in CC at 2314, 9435 in Indonesian at 2315 and 15465 in Burmese at 2340. (MacKenzie, CA)

Radio Veritas Asia, 11820 in unid Asian language at 2312. (Brossell, WI)

PIRATES—WBNY, 6925u heard at *1435, 1441 and *1805, with usual Commander Bunny and discussion of monkeys, mentioning BNN—Bunny News Network parodying CNN. No address annced but they use Belfast. (Zeller, OH) 6950 at 0100 with usual Commander Bunny and his running for president bit. (Linonis, PA)

The Crystal Ship, 6700 at 1541 with The Poet and rock, talk about how we should help veterans returning from Iraq, an Elmer Fudd clip. Drifted up by about 200 Hz. Belfast address. (Zeller, OH) 1810 with pop. (Alexander, PA) 2250 with Vintage WWII-era audio and music. (Schiefelbein, MO) 6899 to 1625* with rock and political opinions. (Gay, KY)

Captain Morgan, (t) 6925u heard at 0115 but very weak. Rock and some bits of *The Outer Limits* TV show. ID based on format, too weak to copy any IDs. (Zeller, OH)

Grasscutter Radio, 6925u at 1320 and *1354 a sort of joint best with Sunshine Radio (for the latter) mentioning testing and slogan "broadcasting from the ionosphere." (Zeller, OH) 1549 with M/F anncrs, rock. (Gay, KY) 1900 with several IDs, pop/rock. (Wood, TN)

Undercover Radio, 6925u at *2105 and *2317 with Dr. Benway opening with tests, then back with various rock numbers, talk of past adventures. Promoted as his 5th anniversary pgm. Gave both the Merlin and undercoverradio@gmail.com addresses. (Zeller, OH) 2125 with email address, pops. (Alexander, PA)

WMPR 6925 at 1955 with techno stuff. (Wood, TN)

Voice of the Bowling League, 6899.8 at 1700 with IDs, ad parodies, comedic (?) skits and novelty music. Also noted on 6950.7 at 1740. (Alexander, PA)

Wolverine Radio, 6925u at 0703 sounded like beatnik poetry from the 50s, with bongos, jazz and other free-form stuff and strange, raunchy things. (Hassig, IL)

Voice of William Shatner, 6925u at 0000 with rock and choir. ID several times. (*Hassig, IL)

Ann Hofffer Radio, 6925 at 2015 with folk selections, guitars, ID. (Alexander, PA)

Psycho Radio/WSKO 6925 with rock at 1550. (Gay, KY)

Voice of the Bat, 6925u at 0033. Miserable signal but apparent clear ID at 0035. 1940s pop and talk by man. No address noted; my first log of this one. (Zeller, OH)

Radio Jamba Intl, 6925 to 1658* Just caught the sign off. It was a real flamethrower signal. (Wood, TN)

WTCR, 3420 at 0154 with alternative music. Belfast address. (Alexander, PA)

Northwoods Radio, 6955 heard at 1523 "broadcasting freedom from the Great Lakes." (Gay, KY)

Mystery Radio, 6219.9 monitored at 0054. Lots and lots of funky things and several IDs. No additional talk noted. Noted on rechecks as late as 0510. (Schiefelbein, MO)

Radio Lowland, (Euro) 6310.1 at 0610 with variety of techo-dance, oldies pop and light instls. (Alexander, PA)

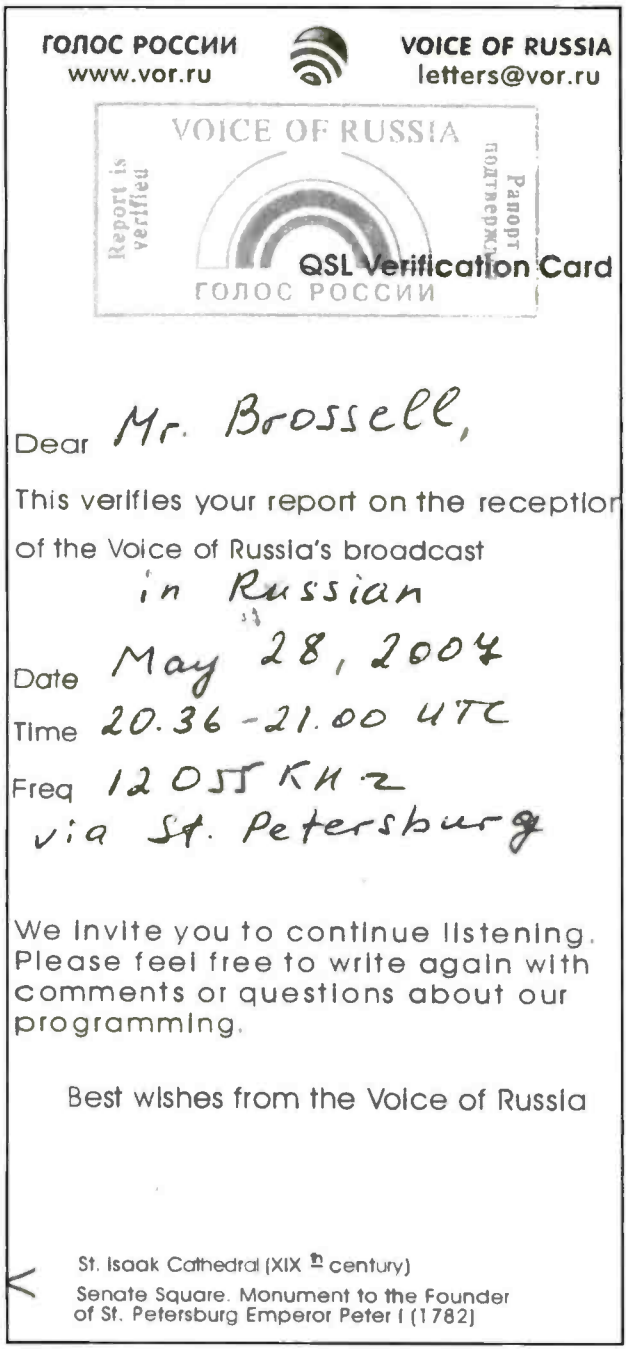
POLAND—Polish Radio, 9450 via Germany at 1313 with reports from various European capitals. (Brossell, WI)

PORTUGAL—RDP Intl, 11620 in PP at 2135 with some kind of sports coverage. (Maxant, WV)

PRIDNESTROVIE (Moldova)—Radio PMR/DMR, 6240-Grigoriopol at 2247 with transmitter on, test tones, some dead air, at 2300 open on the history of PMR in 1989, ID, schedule, IS, sign on in GG. (Taylor, WI) 2310 with commentary. (Fraser, ME) 2320 in FF to the half hour when into GG. (Brossell, WI)

ROMANIA—Radio Romania Intl, 6015 at 2340 with a potato soup recipe, music. (Maxant, WV) 9610 with news at 2300. (Fraser, ME) 9640 at 1849 and 11765 in RR at 1827. Charlton, ON) 11810 at 2049 on unhealthy eating. (Brossell, WI)

RUSSIA—Voice of Russia, 4965-Tajikistan at 1315 with solemn-type hymns in an Asian language. Also 6170-Kharbarovsk in



Robert Brossell scored another hit with this site QSL from the Voice of Russia.

RR at 1316. (Brossell, WI) 5950-Khabarovsk at 0905. (Patterson, Philippines) 6170 in CC at 1255 and 7260 at 1400 mixing with some amateur traffic. (Barton, AZ) 6240 with ID, news at 0400. (Wood, TN) 7125-Petropavlovsk at 1855,1900*. (MacKenzie, CA) 7250 at 0315, 7350 at 0435 and 12070 in GG at 1835. (Maxant, WV) 7250 at 0200 with "Christian Message" at 0200. (Linonis, PA) 7295-Novosibirsk in CC at 1423, 9800-Irkutsk at 1346 and 9900-Samara in Pashto/Dari in 1412. (Strawman, IA) 9800-Irkutsk in RR at 1352. (Ronda, OK) 15465-Moscow in RR at 1705. (Charlton, ON)

Radio Rossii, 7200-Yakutsk at 0104. (Strawman, IA) 0120 in RR. (Ronda, OK) 7320-Magadan with drama in RR at 0251. (Ronda, OK) 2249. (Brossell, WI) 7345-Yakutsk (p) in RR at 1310 with alternating M/W anncrs.

RWANDA—Rdf. Rwandaise, 6055 at 2200 (t) FF and vernacular, variety of Afro-pops and local choral. Covered by Spain at 2257. (Alexander, PA)

SAO TOME—VOA Relay, Pinheira (p), 4940 at 0436. (Tnx Jim Ronda) Into Hausa at 0500. Location presumed; not heard on listed 4960. (D'Angelo, PA) 4960 at 0440. (Parker, PA) 9830 with news in FF at 2103. (Brossell, WI)

SAUDI ARABIA—BSKSA, 4790 at 0455 M in AA with prayers. (Wood, TN) 9555-Riyadh in AA at 1842 and 15435 in AA at 1703. (Charlton, ON) 9570 with AA music at 1205. (Maxant, WV) 15380 with Koran at 1250. (Brossell, WI)

SEYCHELLES—BBC Relay, 9630 at 1847. (Charlton, ON)

SLOVAKIA—Radio Slovakia Intl, 7230 at 0100 with EE service. (Branco, NY) 15460-Rimavska Sobota at 0745. (Patterson, Philippines)

SOUTH AFRICA—Channel Africa, 3345 with interview heard at 0335. (Schiefelbein, MO) African news at 0340. (Brossell, WI) 0350. (Ronda, OK) 9625 at 1730 on gambling problems at 1415, 15235 heard at 1730 on upcoming elections and 17770 at 1510 on gold mining. (Maxant, WV) 15235 at 1713. (Wood, TN) 15235 in FF at 1654 and 17770 on Africa's economy at 1518. (Charlton, ON)

Radio Sondergrense, 3320 in Afrikaans at 0219 with a variety of music by female DJ. (Schiefelbein, MO) 0409 in Afrikaans and EE. (Wood, TN)

SOUTH KOREA—KBS World Radio, 3955 via Skelton at 2212. (Strawman, IA) 9650 via Sackville at 1210. (Maxant, WV)

SPAIN—Radio Exterior de Espana, 9665-Nobeljas in FF at 1850, 17595-Nobeljas in SS at 1355 and 17755-Nobeljas in SS at 1646. (Charlton, ON) 12015 in AA at 2015. (Brossell, WI) 15585-Nobeljas in SS at 1340. (Patterson, Philippines) 17850 in SS at 2100. (Barton, AZ) 17850-Costa Rica Relay, in SS at 1947. (MacKenzie, CA)

SRI LANKA—Sri Lanka Broadcast-ing Corp., 11905-Ekala to SE Asia at 0122 with W in unid lang. (Parker, PA)

SUDAN—Miraya FM, 9825 via Slovakia at 1500 with news, mentioned address of MiyayaFM.com. Wiped out by a DRM transmission at 1505. (Alexander, PA) *1500 (p) with just snatches of audio, mainly talk. (D'Angelo, PA)

SWAZILAND—Trans World Radio, 3200 at 0330 with ID, chimes sequence and 3240 in Ndau at 0335. (Ronda, OK) 4775 at 0352 with anmts and chorus to 0355 ID loop. (Strawman, IA) 0428 in EE and GG. (Wood, TN)

SWEDEN—15240 via Sackville at 1330 with EU news. (Charlton, ON) 1355 with Lila Snow and news "from the top of Europe." (Maxant, WV)

IBRA Radio, 5900-Petropavlovsk, heard at 1213 in Mandarin. (Ronda, OK)

TAIWAN—Radio Taiwan Intl, 3965 via France in GG at 2105. (Patterson, Philippines) 11875 via No. Marianas at 0120. (Patterson, Philippines)

TANZANIA—Radio Tanzania, 11735-Zanzibar, at 1800 with EE news from Spice FM, back to Swahili at 1809. (Alexander, PA) 1826 with talk, prayers and tribal drums, later Afro-pop, ME and tangos. Several IDs as "Radio Dar es Salaam." (Wood, TN) 2045. (Alexander, PA) 2048. (Brossell, WI) 2047 with HoA music. (Ronda, OK)

THAILAND—Radio Thailand, 9535 on with gongs at 2000 EE ID and into GG, EE again at 2009 and close at 2014. Sign on again at 2030 to 2045. (Alexander, PA) 15275 at 0230 on tourism. (Linonis, PA)

TURKEY—Voice of Turkey, 5960 with news at 2245 and 12035 at 1400. (Maxant, WV) 6195 at 2150 on banking there. (Maxant, WV) 7155 in FF at 2100. (Fraser, ME) 15475-Emirler in TT at 1345. (Patterson, Philippines)

TUNISIA—RT Tunisienne, 7275 in AA to Europe at 0550. (Parker, PA) 9720 in AA at 1851. (Charlton, ON)

UKRAINE—Radio Ukraine Intl, 5830 in GG at 0040. (Parker, PA) 2255 in EE. (Gay, KY) 7440 in UU at 0032. (MacKenzie, CA) 0050-0100 in EE. (Linonis, PA) *0057 with instl music, IS at 0059 opening EE. (Alexander, PA) 0310 with news. (Maxant, WV)

UGANDA—Radio Uganda/UBC Radio, 4976 from 0219 abrupt sign on with vernacular talk. Some EE. The next day sign on was about 8 minutes later. (Alexander, PA)

UNITED STATES—VOA, 6045 Thailand Relay in Mandarin at 2245. (Patterson, Philippines) 7235 Northern Marianas Relay in JJ at 1305, 9815 Morocco Relay unid African language at 2030, 11510 Kuwait Relay Radio Deewa service in Pashto/Dari at 1450, 11525-No. Marianas Radio Deewa service in presumed Pashto at 1642 and 11575-No. Marianas, Radio Ashna service at 1645 in unid Lang. (Brossell, WI) 9390 Sri Lanka Relay with Deewa service in Pashto at 1343. (Schiefelbein, PA) 9490 Philippines Relay heard at 2300, 9620 Thailand Relay at 0030, 13640 Saipan Relay in CC at 2305, 15150 Philippines Relay at 2328 and 15205 Philippines Relay in Indonesian heard at 2334. (MacKenzie, CA) 9565 via Germany in Pashto/Dari at 1523. (Taylor, WI) 11805 Philippines Relay in RR at 1650. (Charlton, ON) 15385 Philippines Relay in CC at 0210. (Parker, PA)

AFN/AFRTS, 5446.5U-Key West, at 0025 with "Air Force Radio News." (Parker, PA) 0758 with news, PSAs. Also 12133.5u at 2105 with "Face the Nation." (Wood, TN)

Family Radio/WYFR, 5960 via Wertachtal in AA at 2235. (Patterson, Philippines) 6225 via Tajikistan at 1406 taking phone calls. (Schiefelbein, MO)

Trans World Radio, 4745 via Uzbekistan in Tamil at 1425. (Taylor, WI) 7215 via South Africa in Amharic at 0337. Also 7390 in listed Bundeli with ID at 1400. (Ronda, OK) 9495 (p) via Austria in RR at 1510. (Taylor, WI)

Adventist World Radio, 9635 via South Africa at 2001 and 9830 via Austria at 2121. (Charlton, ON) 9720 via South Africa in Indonesian heard at 2250. (Ronda, OK)

VATICAN—Vatican Radio, 4005 at 0442 with church service in unid lang. (Wood, TN) 6145 with mass at 2200 and 7305 at 0303. (Maxant, WV) 9755 at 2003, 11625 in AA at 1629 and 13765 in SS at 1627. (Charlton, ON) 9900 via Novosibirsk at 1312. (Brossell, WI)

VENEZUELA—Radio Nacional, 11680 in SS at 1255. (Fraser, ME) 15290 in SS at 1932 and 17705 in SS at 2020. (MacKenzie, CA) 17750 in SS at 1400. Charlton, ON) (*all via Cuba—gld*)

YVTO time station, Caracas, 5000 at 0006. (Parker, PA)

VIETNAM—Voice of Vietnam, 5925 at 1408. (Strawman, IA) 6165 at 1308 listed in Hmong. (Schiefelbein, MO) 7150 via Wooferton to Europe in VV at 2200. (Parker, PA)

YEMEN—Republic of Yemen Radio, 9780 in AAheard at 0615. (Wood, TN)

ZAMBIA—Radio Zambia, 5915 at 0240 opening with fish eagle IS, choral anthem at 0250, local tribal music and into vernacular. (Alexander, PA) *0248 and into vernacular. (Ronda, OK)

The Voice-Africa, 13590 at 2030 with upbeat gospel songs and ID as "The Edge." (Ronda, OK)

ZIMBABWE—Voice of Zimbabwe, 3396 heard at 0116 in local language with Afro-pops and occasional M anncr. (Taylor, WI)

And, once again, order is restored! An Everest of thanks to the following folks who did the good thing this time: Rich D'Angelo, Wyomissing, PA; Robert Charlton, Windsor, ON; Joe Wood, Greenback, TN; George Zeller, Cleveland, OH; Charles Maxant, Hinton, WV; Brian Alexander, Mechanicsburg, PA; T.C. Patterson, Cebu, Philippines; Robert Fraser, Belfast, ME; William Hassig, Mt. Prospect, IL; Jim Ronda, Tulsa, OK; Stewart MacKenzie, Huntington Beach, CA; Jerry Strawman, Des Moines, IA; Mike Blanco, Islip, NY; Richard Parker, Pennsburg, PA; Mark Taylor, Madison, WI; Mark Schiefelbein, Springfield, MO; Chris Gay, Lexington, KY; Rick Barton, Phoenix, AZ; Robert Brossell, Pewaukee, WI and Jack Linonis, Hermitage, PA. Many thanks to each one of you!

Until next month—good listening! ■

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

This listing is designed to help you hear more shortwave broadcasting stations. The list covers 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	15160	China Radio International	CC
0000	4835	Radio Maranon, Peru	SS
0030	11990	China Radio International	unid
0030	4935	Radio Capixaba, Brazil	PP
0030	7480	Radio Free Asia, USA, via Tajikistan	Mandarin
0030	5940	Radio Melodia, Peru	SS
0030	7345	Radio Prague, Czech Republic	
0030	5830	Radio Ukraine International	UU/GG
0030	4732	Radio Universitaria, Bolivia	SS
0030	5860	Radio Farda, USA	Farsi
0030	7400	Radio Bulgaria	
0100	3310	Radio Mosoj Chaski, Bolivia	SS
0100	7200	Radio Rossii, Russia	RR
0100	7440	Radio Ukraine International	
0100	4915	Radio Difusora Macapa, Brazil	PP
0100	5980	RTV Marocaine, Morocco	AA
0100	6165	Radio Farda, USA	Farsi
0100	6155	Radio Republica, via England	SS
0100	5900	Voice of Russia	SS
0100	4450	La Cruz del Sur, Bolivia	SS
0130	3250	Radio Luz y Vida, Honduras	SS
0130	13670	Voice of Korea, North Korea	
0130	5035	Radio Aparecida, Brazil	PP
0130	7160	Voice of Islamic Republic of Iran	
0200	3280	La Voz del Napo, Ecuador	SS
0200	4985	Radio Brazil Central	PP
0200	4780	Radio Cultural Coatan, Guatemala	SS
0200	11780	Radio Nacional Amazonas, Brazil	PP
0200	7250	Voice of Russia	
0200	3396	Voice of Zimbabwe	
0200	3340	Radio Misiones Internacional, Honduras	SS
0200	4975	Radio del Pacifico, Peru	SS
0200	17675	Radio New Zealand International	
0230	7320	Radio Rossi, Russia	RR
0230	7115	International Radio of Serbia	various
0230	4815	Radio El Buen Pastor, Ecuador	SS
0230	4845	Radio Mauritanie, Mauritania	AA
0230	15275	Radio Thailand	
0230	6120	Radio Tirana, Albania	
0230	5010	Radio Madagaskara, Madagascar	Malagasy
0300	5025	Radio Rebelde, Cuba	SS
0300	4975	Radio Uganda	
0300	4790	Radio Vision, Peru	SS
0300	5915	Radio Zambia	
0300	7415	WBCQ, Maine	
0300	5910	Marfil Estereo, Colombia	SS
0300	4828	Voice of Zimbabwe	
0300	6025	Radio Amanecer, Dominican Republic	SS
0300	7200	Republic of Sudan Radio	AA
0330	3255	BBC, England, via South Africa	
0330	4965	La Voz-Africa, Zambia	
0330	6110	Radio Fana, Ethiopia	Amharic
0330	6020	China Radio International, via Albania	CC
0345	4775	Trans World Radio, Swaziland	various
0400	15515	Radio Australia	
0400	4885	Radio Clube do Para, Brazil	PP
0400	7110	Radio Ethiopia	Amharic
0400	3320	Radio Sondergrense, South Africa	Afrikaans
0400	4052.5	Radio Verdad, Guatemala	SS
0400	9780	Republic of Yemen Radio	AA
0400	7100	Voice of the Broad Masses, Eritrea	Tigrinya
0400	6335	Voice of Iraqi Kurdistan, Iraq	Kurdish
0400	6030	Voice of the Tigray Revolution, Ethiopia	Tigrinya
0430	4950	Radio Nacional, Angola	PP
0430	7425	Radio Tirana, Albania	
0500	5030	Radio Burkina, Burkina Faso	FF
0500	4780	Radio Djibouti	FF
0500	4770	Radio Nigeria	
0500	4905v	RN Tchadienne, Chad	FF
0500	7275	RT Tunisienne, Tunisia	AA
0500	9705	La Voix du Sahel, Niger	FF
0530	6250	Radio Nacional, Malabo, Equatorial Guinea	SS
0530	5005	Radio Nacional, Bata, Equatorial Guinea	SS
0600	6160	CKZN, St. John's, Canada	
0600	6070	CVC-La Voz, Chile	SS
0600	4760	ELWA, Liberia	
0600	6972	Galei Zahal, Israel	hh
0600	4800	Radio Transcontinental, Mexico	SS
0600	6185	Radio Educacion, Mexico	SS
0600	9675	Radio Cancao Nova, Brazil	PP
0700	5446u	Armed Forces Radio & TV, Florida	
0700	6165	Voice of Croatia/Croatian Radio	
0700	7125	RN Guineennee, Guinea	FF
0700	6010	La Voz de su Concencia, Colombia	SS
0800	7270	Radio Gabon	FF
0800	9635	RT Malienne, Mali	FF
0900	9580	Radio Australia	

UTC	Freq.	Station/Country	Notes
1030	6135	Radio Santa Cruz, Bolivia	SS
1030	4747	Radio Huanta 2000, Peru	SS
1130	6010	Radio Mil, Mexico	SS
1130	5040	Radio Myanmar (Burma)	BB
1200	9650	KBS World Radio, South Korea	
1200	6130	Lao National Radio, Laos	Laotian
1200	9595	Radio Nikkei, Japan	JJ
1230	7310	Radio Canada International	SS
1230	15300	Radio France International	FF
1230	3235	Radio West New Britain, Papua New Guinea	Pidgin
1230	4750	RRI, Makassar (Sulawesi, Indonesia	II
1230	4950	Voice of Pujiang, China	Mandarin
1300	4450	Korean National Democratic Front, North Korea	KK
1300	9450	Polish Radio External Service, via Germany	
1300	6285	Pyongyang Broadcasting Station, North Korea	KK
1300	9580	Radio Australia	
1300	6165	Voice of Vietnam	VV
1300	7135	BBC Relay, Singapore	
1300	11905	Sri Lanka Broadcasting Corp.	Hindi
1330	11530	Denge Mesopotamia, via Moldova	Kurdish
1330	9920	KFBS, Saipan, No. Marianas	VV
1330	9950	Radio Free Chosun, via Taiwan KK to N. Korea	
1330	15240	Radio Sweden, via Canada	
1330	9965	Voice of Hope, Palau	
1400	6095	BBC via South Korea BBC, via South Korea	KK
1400	17680	CVC-La Voz, Chile	SS
1400	13635	CVC-Australia	
1400	7355	KNLS, Alaska	CC
1400	9290	Latvia Today	
1400	11705	Radio Japan/NHK, via Canada	
1400	5985	Shiokaze, Japan	KK
1400	9525	Voice of Indonesia	II
1400	15265	Radio Solh, England	
1400	13580	Radio Prague, Czech Republic	
1430	12000	Radio Havana Cuba	SS
1430	17725	Radio Jamahiriya, Libya	various SS
1430	9790	Radio Liberty, USA, via Thailand	unid
1430	9975	Trans World Radio, Guam	
1430	11510	Voice of America-Radio Deewa, via Kuwait	Pashto/Dari
1430	9520	Radio Veritas Asia, Philippines	unid
1500	17770	Channel Africa, South Africa	
1500	13675	China Radio International, via Cuba	
1500	15140	Radio Sultanate of Oman	
1500	12090	Voice of Islamic Republic of Iran	unid
1500	11770	Xinjiang PBS, China	CC
1500	11680	Radio Nacional Venezuela, via Cuba	SS
1530	11690	Radio Jordan	
1530	13640	Radio Tirana, Albania	
1600	13675	Radio Austria International. via Canada	
1600	9599v	Radio UNAM, Mexico	SS
1600	11625	Vatican Radio	AA
1600	11615	Radio France International	
1630	15400	BBC Relay, Ascension Is.	
1630	15235	Channel Africa, South Africa	FF
1630	11805	Voice of America, Philippines Relay	
1700	15435	Broadcasting Service of the Kingdom, Saudi Arabia	AA
1700	15465	Voice of Russia	RR
1700	15475	Africa Number One, Gabon	FF
1730	11890	Radio Okapi, Congo, via Souh Africa	
1730	12035	SW Radio Africa, via Norway	
1730	11610	Voice of the People, via Madagascar	
1800	11620	All India Radio	
1800	11725	Deutsche Welle, via Rwanda	GG
1800	9575	Radio Medi Un, Morocco	FF
1800	11655	Radio Nederland, via Madagascar	
1830	9555	Broadcasting Service of the Kingdom, Saudi Arabia	AA
1830	7545	Kol Israel	
1830	9665	Radio Exterior Espana	FF
1830	11930	Radio Marti, USA	SS
1830	11765	Radio Romania International	Romanian
1900	11930	Voice of Islamic Republic of Iran	Farsi
1900	11785	Voice of Indonesia	ff
1900	11775	University Network, USA, via Anguilla	
1930	17850	Radio Exterior Espana Costa Rica Relay	SS
1930	13570	WINB, Pennsylvania	
2000	12025	RT Algerienne, via England	AA
2000	9755	Vatican Radio	
2000	9420	Voice of Greece	Greek
2000	15120	Voice of Nigeria	
2000	12080	Voice of America Relay, Botswana	FF
2030	9990	Radio Cairo, Egypt	FF
2030	11735	Radio Tanzania, Zanzibar	Swahili
2100	9830	Voice of America Relay, Sao Tome	FF
2130	9830	Adventist World Radio, Austria	
2130	11620	RDP International, Portugal	PP
2130	9970	RTBF, Belgium	FF
2200	11730	Radio Nederland, Bonaire Relay	DD
2200	7105	Sound of Hope, Taiwan	CC
2200	5975	BBC, via French Guiana	
2200	6265	The Mighty KBC, Lithuania	
2230	8580	Africa No. One, Gabon	FF
2230	12040	HCJB, Ecuador	GG
2230	15345	Radio Argentina al Exterior	SS
2230	9855	Radio Kuwait	AA
2230	6055	Radio Rwanda	FF/vern
2230	7450	RS Makedonias, Greece	Greek
2230	9720	Trans World Radio, via South Africa	unid
2230	5960	Voice of Turkey	
2230	6300	Radio Nacional de la RASD, Algeria	AA/SS
2300	9405	Far East Broadcasting Co., Philippines	CC
2300	9550	Radio Havana Cuba	
2300	15720	Radio New Zealand Intl	
2300	6240	Radio PMR, Pridnestrovie (Moldova)	various
2300	11550	Radio Taiwan International, via Australia	unid
2300	7325	Radio Vilnius, Lithuania	
2300	11820	Radio Veritas Asia, Philippines	unid
2300	7135	RTV Marocaine, Morocco	AA
2300	7380	Radio Belarus,	RR
2330	15525	HCJB-Australia	CC
2330	13650	Radio Japan/NHK	Indonesian
2330	6015	Radio Romania International	
9239	7270	Radio Cairo, Egypt	

New, Interesting, And Useful Communications Products

Trackstick Personal GPS Tracker

With the summer travel season approaching, vacationers may want to check out the Trackstick II Personal GPS Tracker from Trackstick.com. The Trackstick records its own location, time, date, speed, heading, and altitude at preset intervals and, with over 1Mb of memory in a waterproof package, it can store months of travel information. Use it to keep track of the exact routes you take when hiking, biking, or any other activity and record the location of everywhere you travel—you can even import pictures and other information into Google Earth. A GPX photo-stamping feature lets you add photos to your own maps.

The Trackstick II receives signals from 24 satellites orbiting the Earth and uses them to precisely calculate its own position anywhere to an accuracy of within 45 feet. Other applications include photo tours, public safety, homeland security, law enforcement, and child safety.

Trackstick II is available through numerous sources and can be found online for under $200. For more information visit www.trackstick.com.

The Trackstick II from Trackstick.com receives signals from satellites orbiting the Earth and uses them to precisely calculate its own position to within 45 feet accuracy.

CableOrganizer.com Offers "Green" Gadgets

Consumers who want to save the planet—and some bucks along with it—have a couple of offerings available to them through CableOrganizer.com.

The company's Watts Up? electricity meter provides a convenient way to monitor and project energy costs by measuring what standard 120-VAC electrical devices will cost to operate, eliminating the guesswork involved in the price of powering a piece of equipment over a short or long span of time. The meter quickly displays the wattage and the electrical usage cost (16 electrical measurements and values are offered). The Watts Up? meter will also help identify operational problems, measure line voltage, and diagnose voltage drops. Included PC software allows memory to be downloaded into charts and tables.

Another cost-saving gadget, the Kill A Watt power monitor, also provides an economical way to assess the efficiency of your electrical appliances. Just plug any 115-volt (maximum 15 Amp) electric appliance into the Kill A Watt meter and its large LCD display shows the power consumption of the appliance in killowatt-hours. The Kill A Watt power monitor can calculate

The CableOrganizer.com Watts Up? electricity meter measures and displays the wattage and electrical usage cost of standard 120-VAC electrical devices.

the electricity cost of the appliance by the day, week, month, or year. If your electric bills are high, the Kill A Watt power meter can help you pinpoint which electric appliances are consuming too much power and can monitor the quality of your power by checking voltage, line frequency, and power factor.

For more information on the Watts Up? ($72.95–$195.95) and Kill A Watt ($29.95) meters, visit http://cableorganizer.com.

NASCAR Goodies

This year be stylish—and safe—at the racetrack with cool stuff for NASCAR from foneGEAR, a provider of mobile communications accessories.

The company is offering NASCAR Sprint Cup phone cases with detailed imagery of many popular NASCAR drivers, including Dale Ernhardt, Jr., Jimmie Johnson, Tony Stewart, and Jeff Gordon. Each case incorporates a molded color design with the logo and signature of the featured driver. Licensed foneGEAR cases feature swivel belt clips, durable construction, and vivid color logos on the company's patented hangtags.

Also available are safetyFONES, stereo headphones designed so kids and teens can safely listen to loud communications including radio transmissions, music, video, and gaming systems at reduced risk of sound-induced hearing loss. safetyFONES limit average noise levels to 85 dB, below the level where increased risk of hearing loss occurs. Featuring soft earpads that allow in outside noise to ensure that users can hear what is happening around them, they're designed to sit outside the ear so no small parts enter the ear canal. In addition to being lightweight and comfortable, they are designed for smaller users.

The company's ecoFONE cellular phone cases are environmentally friendly, made from renewable natural fabrics, and are

NASCAR Sprint Cup phone cases from foneGEAR feature swivel belt clips, durable construction, and vivid color logos on the company's patented hangtags.

sold with minimal retail packaging to reduce waste and minimize environmental impact.

For additional information and pricing, visit www.fonegear.com/

New Xscape Lithium Battery Extension System

A new battery charging system is designed to increase battery life for handheld electronics and phones, costing less money than other battery accessories currently available, according to a company news release. The Xscape line, available through wow.battery.com, comprises portable rechargeable lithium-ion batteries that will extend the power of iPhones to three to five times normal capacity; other products supported include any iPod, MP3, MP4, cell phone, PDA, blue tooth or GPS device on the market.

There are several models available within the line. The Xscape XP-30U is a USB to iPhone/iPod cable with built-in battery for recharging MP3/MP4 players, iPhones, and other mobile phones. Rated at 550mAh at 3.7 volts, it will charge a portable device on its own or when plugged into a USB port in any computer. The Xscape XP-60U is a lithium ion battery rated at 2500mAh at 3.7 volts that is claimed to increase iPhone and iTouch battery life by 200 percent. The Xscape XP-70U lithium ion battery is compact, rated at 4700mAh at 3.7 volts, and delivers a claimed 500 percent improvement in recharging mobile phones, MP3/MP4 players, GPS units, bluetooth headsets, PDAs and handheld game players. The Xscape XP-90U provides the user with 8000mAh at 7.4 volts for use with portable DVD players, camcorders and other devices with a larger power requirement. It can also discharge the battery completely of its remaining power prior to fully recharging it.

The Xscape line battery charging system (the XP-60U shown) will extend the power of iPhones, iPods, MP3s, MP4s, cell phones, PDAs, GPSs and similar devices.

The Xscape line ranges in price from $49.95–$69.95. For more information, contact www.wowbattery.com

by Ken Reiss, radioken@earthlink.net

Scanner Systems

As the technology involved becomes more complicated, scanner listeners are faced with a need to understand trunking, digital, and a whole lot of other radio systems. If you're new to scanning, this can be somewhat daunting as it's a lot of information to process all at once, and in some cases, until you understand all of it, your scanner won't work correctly. Let's see if we can demystify some of the technology and help you understand why it works the way it does (when it *does* work).

"Conventional" Radio

We're all familiar with the concept of channels. If you want to watch TV you tune to a certain channel; to listen to the radio you tune to a favorite station's "channel," or frequency, to listen to it. The difference is that these channels are used for broadcasting continuous programming, while two-way radio systems are used as needed, but there are channels involved here, too.

You don't need to know, or care, what actual frequencies TV Channel 7 is on, you just know that the news is on at 6. Two way-radio systems don't have such convenient schedules, but the users of those systems don't really care what actual frequency they're on, either...they just need to know that Channel 3 on their radio is the dispatcher for their district and Channel 8 is the car-to-car channel for getting doughnuts. Keep that in mind for a few minutes while we discuss less sophisticated radio systems.

The so-called conventional radio systems (conventional because it represents the old way?) are just like the TV channels. Each channel is assigned a fixed frequency, and all the traffic for that channel takes place on that frequency. The limits are how many channels you have available versus what kind of divisions the users of the system need. You may not care if they're all on the same channel if there's only a few, but things get pretty crowded if you've got a large city on a single channel, as New Orleans found out not so long ago.

I'm certain that if you've owned a scanner for more than five minutes, you probably have a pretty good handle on how conventional radio systems work. Each channel has a dedicated frequency (or two) for its use and no other traffic takes place on that channel. If a car needs to talk to some other unit, there's a channel switch on the car radio and that's a different frequency, much like the TV channel idea.

Single frequency operation is the simplest form of this and is referred to as simplex. Only one person can talk at a time and the other units (and your scanner) can only hear that person, or car, or whatever talking if they are close enough for the signal to reach there. Simplex is cheap and easy. In a simplex system, both sides transmit and receive on the same frequency. This is the simplest type of radio system and one that is used in many places throughout the country because of that.

Unfortunately, if the area to be covered is large, then some of the mobile units won't be able to hear each other, and that can be the cause of some safety concerns and can make operation difficult if the dispatcher has to constantly relay things. If two units that can't hear each other transmit at the same time, the dispatcher may not hear anything but garble. If a mobile unit transmits close to another mobile unit, the second unit may not hear the dispatcher in the mess. The solution to that was to put the mobiles on one frequency and the base station on another. At least the dispatcher would always have a clear channel to talk on and the mobiles could hear. That solved half the problem.

The issue of mobiles unable to hear each other remained, however, and that could be a huge safety concern. In a busy emergency everyone trying to talk at once can make it impossible for anything to get through. Those issues gave rise to the repeater, a device that is placed in a high location (so that the line-of-sight range is the greatest) and everything it hears on one frequency it repeats or re-transmits on another. The mobile units transmit on this second frequency, called the input frequency, but listen on the output frequency. That way, everyone who is tuned into the channel hears everything that the repeater hears (which is, hopefully,

In many metropolitan areas, competition for tower space is at a premium, not to mention high-rise buildings to put them on. This antenna system outside St. Louis is carrying four or five systems, plus a radio station and, lower down, a cellular system.

This Uniden Trunktracker was greeted with great enthusiasm when it first appeared. Prior to this, there was no easy way for a scanner listener to follow along with the conversations on a trunking system.

everything there is to hear; if not, the system has failed).

This type of operation (with or without the repeater) is called half duplex. Only one person can talk at a time through the repeater, but it does require two actual frequencies. Many urban systems are set up like this to help with the weaker transmission of handheld transceivers, and many rural systems use it because of the larger distances that can be covered with the repeater in a central location.

Full duplex operates rather like a telephone, like a cell phone, to be exact. One person talks on one frequency (the mobile) and the other person talks on the other (the base). Both can talk at the same time and the conversation is sent along for the people to decipher. One big advantage here is that there's no "push to talk" button so it takes no training for a full duplex system beyond knowing how to say "hello."

Both full duplex (which is not used in public safety communications) and half duplex have two disadvantages.

One is that there is a cost associated with the repeater in purchasing it, having it installed, running and maintaining it. These costs can be substantial in metropolitan areas where every square foot is at a premium.

The second disadvantage is that it takes two actual frequencies to make up a single channel. When these systems first appeared, that wasn't a big deal, but over the years the public safety frequencies have become ever more crowded, particularly in the large metropolitan areas where there are lots of departments wanting frequency space. It reached an almost critical point in the 1980s when many of the bands were full in larger cities and no more frequencies could be allocated to anyone. If you were lucky, there might be frequencies available in another band, but switching bands requires another set of radios and equipment, and that's also an expensive proposition.

On UHF (which was developing at around the same time the repeater was becoming more affordable), repeaters are very common and are almost standard equipment on 800 MHz. On VHF Hi and Lo, they are not quite as common, although the 148–174 MHz band is full of them. At one time the input and output frequencies were exactly 5 MHz apart on UHF. Unfortunately, that's not the case any longer. And 800 MHz offers some input bands where you can expect to find the input to repeaters about 45 MHz higher, but even that's not always true either.

Trunking

As the lack of frequencies was becoming an acute problem in many metropolitan areas, the need for yet another band emerged. Unfortunately, it meant all new equipment again, but there were lots of channels available up there. At the same time, a new technology emerged to multiply the available channels: trunking.

Trunking systems work on the idea that most of the time a two-way channel is quiet. Even on busy channels there's some dead time, and on quiet channels, hours can go by without any transmissions. On a conventional system, either simplex or duplex, there's nothing that can be done about that and the channel (one or two frequencies) is tied up waiting for something to happen.

Trunking separates the idea of a channel from a frequency. It's the frequencies that are in short supply. An agency can only get so many allocated from the FCC, and adding additional frequencies ranges from difficult to impossible. But we really don't care about frequencies; we care about channels! If nobody on the channel is talking, we don't really need the frequency...any frequency!

It's an oversimplification, but this is basically what happens. One of the frequencies (a real frequency in a group of five or more usually) is designated the control channel. The rest of the frequencies (usually duplex pairs, as trunking always involves repeater operation) are given to the controller to use as it sees fit. Nobody has a specific frequency, but instead each of the channels represents a "talkgroup." There might be a talkgroup for the 1st district, and another for the trash pickup, and another for car-to-car chatter, and still another for supervisors. When any one of those users says, "I need to talk" by pressing a microphone, the radio system signals the controller to say, "someone wants to talk on talkgroup 55123," which happens to be the 1st district. The controller then sends out a message that says all units assigned to channel 55123 switch to a particular frequency.

At that point, it's a real frequency with a repeater and the conversation takes

Trunktracking scanners are now available in all shapes and sizes and a few include digital modulation as an option.

place. Once that conversation is completed, the frequency is released back to the pool and the next time someone wants to talk on the 1st district they might well get a different frequency/repeater, but all the units will hear it. The advantage is that there is literally no limit on these "virtual channels" (okay, there are some practical limits, but bear with me), because they're created as needed and dropped just as quickly. It allows for sharing a common pool of repeaters while most of them are quiet, and it keeps the repeaters that are there in use more frequently, making much better use of the limited number of actual radio frequencies available.

Trunking Programming

The trouble for us scanner folks comes in when we try to listen to a trunking system with a radio that's "not aware" of the coding system or the commands taking place on the control channel. Our conventional scanner just goes plodding along from frequency to frequency catching whatever conversations might be happening in the various conference rooms as we go. So you might hear Channel 3 with officers in an exciting pursuit, and then the next frequency could be the dogcatcher or some other equally interesting city service. The Channel 3 guys might have had several conversations on different repeaters by the time you catch up with them again, or it may just be over.

Here's where the trunking scanner comes into play. In order to follow the conversations you need to have a radio that "knows" how the system works. A trunktracking scanner can follow that control channel information just like the radio in the police car. So you can hear only what happens on Channel 3 if that's what you're interested in. Or you can let it scan the virtual channels that you're interested in just like a conventional scanner. Once it's programmed, you won't be able to tell the difference either, but the programming itself is a bit different.

Specifically, we've been talking about the Motorola trunking (type II), which is the most common system out there today. There are a few others and if you have one of those, how you program your scanner may be a bit different. You may have to do some research to see if you can find out what type of system is in use in your area. Then follow the sometimes cryptic instructions that came with your scanner and see if you can get it programmed. If not, drop me a line and we'll see if we can find some more helpful hints to get you going.

Digital

Digital is really not a radio system per say but just a way of encoding the voices onto the radio wave. It's more closely related to AM and FM than to duplex or simplex. It is, however, a kind of scary thing for scanner listeners as it generally means a new radio. Most digital systems today are trunked but that may also change at some point in the future. If you're near a digital system, you'll need a digital trunking scanner to listen to it. We'll take a closer look at digital and all its implications in an upcoming "ScanTech" column.

More To Come On Scanner Systems

And there you have it. Trunking provides great benefits to the communications industry by making better use of the limited frequency space available. You'll be seeing more and more of it, and on other bands besides 800MHz as time goes on. If you're not already, it's probably time to start getting acquainted.

And speaking of getting acquainted, I'd love to hear from you. Your input is always welcome, so send your comments, suggestions, photos, frequency of the month entries, and anything else you think might be of interest to fellow scanner listeners to Ken Reiss, 9051 Watson Rd. #309, St. Louis, MO 63126, or e-mail me at radioken@earthlink.net.

Until next month, Good Listening! ■

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 winner for this month is Brad Lorenzen of Springfield, Missouri. Congratulations, Brad.

Our frequency this month, in keeping with our trunking theme, will be 856.5875. Have a listen and let me know what you hear. Even if you don't hear anything, you can still send that in and we'll enter your name into the drawing for a one-year subscription to *Popular Communications*. What have you got to lose?

Send your "Frequency of the Month" entries to Ken Reiss, 9051 Watson Rd. #309, St. Louis, MO 63126, or e-mail to radioken@earthlink.net. Make sure to indicate on the envelope or subject line that it's for "Frequency of the Month."

by Bruce A. Conti, BAConti@aol.com

The Ultralight DX Phenomenon

First there were crystal radios, then one-tube sets, and now there are "ultralights." Sparked by the popularity of the Sony SRF-59 AM/FM Walkman, a very capable retrograde pocket radio, ultralight DXing has ignited an explosion of experimentation and interest in radio electronics. In this digital age of endless entertainment options, including cable TV, the Internet, and wireless phones, the rapid growth of ultralighting is quite remarkable.

Ultralight Defined

"The sudden boom in ultralight radio interest took everybody by surprise, and the AM DX community is only now trying to sort out the definitions, and create some guidelines about this new phenomena," said Gary DeBock, a Washington State DXer and ultralight enthusiast, in response to my inquiries about the subject. "We are still attempting to create an administrative framework that will give support and direction to the enthusiasts in this new niche of the AM DX hobby, and not every decision will be without controversy." DeBock continued:

DXpedition enthusiasts in particular are already creating a lively forum of discussion about how these tiny receivers should be used, and what should be allowed. This is healthy, in my humble opinion. We have very serious experimentation currently with antenna transplants into ultralight radios, and one of my own projects transplanted a 6.25-inch loopstick from a Sony ICF-S5 into an SRF-39FP ultralight, resulting in a huge boost in sensitivity. It certainly isn't a stock ultralight, but is it on a different DXing level than the Sony

The Sony SRF-59 AM/FM Walkman "Silver" (www.sonystyle.com).

Reception on ultralights like the Coby CX53, Pogo Radio Your Way LX, Takashi World Band Radio, and Sony SRF-42 AM Stereo Walkman can be enhanced by the RadioShack AM Loop or similar inductively coupled loop antenna.

ICF-2010, for example? What if we transplant an even bigger antenna into an ultralight radio, along with filter mods and other refinements, making it a DXpedition superstar...would it still be an ultralight? Whether we agree on this or not, that is the direction that Guy Atkins, John Bryant, and myself are inclined to go.

World-renowned mediumwave DXers Atkins and Bryant are two co-conspirators at the forefront of the ultralight movement. Though not an ultralight, the Sony ICF-2010 is a classic portable communications receiver best known for its unparalleled AM synchronous detection circuitry. The 2010 was discontinued in 2003, yet it's still the reference for comparison of portables to date.

Regarding ultralight experiments, DeBock said:

The "hot-rodded" SRF-39FP already has sensitivity at least up to the ICF-2010 level, but it is analog and obviously will not be the first choice of DXpeditioners. We plan to modify a Sangean DT-200VX to make it a super-sensitive, super-selective digital wonder, but if we succeed in this, some will obviously question what kind of animal we have created, and whether it is really an ultralight. Since there is no judge that can satisfy everybody, the current scramble seems to be in the direction of making these tiny radios as competitive as possible for DXpeditions, and letting the AM DX community sort out the definition concepts later.

The Sangean DT-200VX, like the SRF-39, SRF-59L and others in the Sony Walkman lineup, has quickly gained superstar status among ultralight DXers. The "P" version of the SRF-39 was manufactured with a clear plastic chassis for prisoner use. The clear chassis allowed easy inspection for contraband by prison security.

Ultralight Classifications

What is ultralight DXing? In its most basic form, ultralighting is done with a pocket radio reminiscent of the classic transistor radios from years gone by. Consider it an upgrade from the good old days of DXing with oatmeal-box crystal radios, a back-to-nature minimalist movement for radio hobbyists, and for some simply a rekindled youth.

Ultralighting seems to have started in earnest with the discovery of the Sony SRF-59 AM/FM Walkman as a surprisingly good AM DX receiver. The SRF-59 is a rather unassuming analog AM/FM radio. Analog tuning can be clumsy at first, until one develops a feel for the thumbwheel control. Station identification is a challenge without a digital display, but the analog control allows for precise tuning of all frequencies, including reception of transoceanic signals at 9-kHz intervals, unlike digital tuners that may be limited to 10-kHz steps. The SRF-59's DX/local switch is handy for operating barefoot or when coupled to a high-gain external antenna. With superb sensitivity and selectivity for a radio of its size, the SRF-59 has become the definitive ultralight.

In an effort to further define ultralighting, www.dxer.ca, the self-described "official ultralight radio resource center," has introduced two ultralight equipment

FCC Callsign Changes

Pending

New Call	Location	Freq	Old Call
KZQZ	St. Louis, MO	1430	WIL
WGDJ	Rensselaer, NY	1300	WTMM

Changes

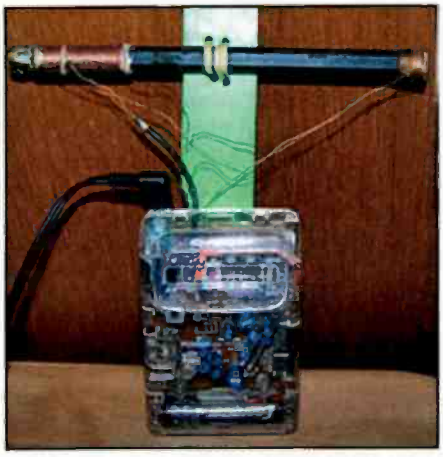
WXQW	Fairhope, AL	660	WWFF
KSFB	San Francisco, CA	1260	KOIT
KSMX	Santa Maria, CA	1240	KSMA
WIBB	Macon, GA	1280	WLCG
WAIT	Crystal Lake, IL	850	WCPT
WCPT	Willow Springs, IL	820	WAIT
WFNI	Indianapolis, IN	1070	WIBC
KYYS	Kansas City, KS	1250	KKHK
KMMM	Pratt, KS	1290	KWLS
WKYW	Frankfort, KY	1490	WFKY
KJXX	Jackson, MO	1170	KUGT
KMPT	East Missoula, MT	930	KLCY
WKBR	Lancaster, NH	1450	New
WRCE	Watkins Glen, NY	1490	WTYX
WVNC	Masonboro, NC	820	New
KZLI	Catoosa, OK	1570	KMUR
WCXZ	Harrogate, TN	740	WRWB
KQBU	El Paso, TX	920	KBNA
WXTG	Hampton, VA	1490	WLRT
KZNW	Wenatchee, WA	1340	KWWX
WJBE	Five Points, AL	88.5	New
WKGA	Goodwater, AL	97.5	WZLM
WHRP	Gurley, AL	94.1	WXQW
WJOU	Huntsville, AL	90.1	WOCG
WWFF-FM	New Market, AL	93.3	WHRP
WZLM	Thomaston, AL	97.7	WKGA
KMVV	Sterling, AK	94.1	KANC
KWSK	Pinetop, AZ	106.7	New
KVGQ	Snowflake, AZ	99.7	New
KXRN-LP	Laguna Niguel, CA	93.5	KNIG-LP
KTPI-FM	Mojave, CA	97.7	KVVS
KVVS	Rosamond, CA	105.5	KOSS
KSRY	Tehachapi, CA	103.1	KTPI-FM
KMPB	Frisco, CO	90.3	KTDX
KQSE	Gypsum, CO	102.5	KQZR
KQZR	Hayden, CO	107.3	KTRJ
KDVW-LP	Montrose, CO	100.9	New
KCCS	Starkville, CO	91.7	New
KSJL	Strasburg, CO	97.7	New
WURH	Waterbury, CT	104.1	WPHH
WJBT	Callahan, FL	93.3	WROO
WMYE	Fort Myers, FL	91.9	WMEY
WROO	Green Cove Springs, FL	92.7	WJBT
WRTH	Key West, FL	89.1	New
WRAZ-FM	Leisure City, FL	106.3	WZMQ
WAYP	Marianna, FL	88.3	WJNF
WPDJ	Trailtown, FL	91.5	New
WWLG	Peachtree City, GA	96.7	WLTM
WAKB	Waynesboro, GA	100.9	WTHB-FM
WTHB-FM	Wrens, GA	96.9	WAKB
KUHI	Haiku, HI	106.5	New
KMXM	McCall, ID	101.1	KMCL-FM
WTZI	Rosemont, IL	88.1	WFRT
WAYI	Charlestown, IN	104.3	WLRX
WRTW	Crown Point, IN	90.5	New
WIBC	Indianapolis, IN	93.1	WEXM
WHZN	New Whiteland, IN	88.3	WWDN
KRGO	Alton, IA	91.5	New
KKFD-FM	Fairfield, IA	95.9	KIIK-FM
KDWI	Ottumwa, IA	89.1	New
KZWF	Patterson, IA	105.9	KZLN
KDWT	Perry, IA	91.7	New
KZWU	Pleasantville, IA	96.3	New
KJML	Columbus, KS	107.1	KMOQ
KMOQ	Columbus, KS	105.3	KJML

classifications for contesting and record-keeping: barefoot and unlimited. Obviously the barefoot class is limited to the use of a radio without any aids or modifications. The unlimited class sets the stage for experimentation as follows (taken from the website):

Unlimited Class is any UL (ultralight) radio as defined and recognized by the committee with any of the following changes or additions: Internal modifications relating to BPF (band pass filter) or IF (intermediate frequency) filter replacement or improvement and replacement of resistors and capacitors in the audio processing section are permitted and encouraged. Peripheral accessories such as preamps, external antennas, amplified or passive, DSP or analog filters, Q-multiplier, antenna couplers, tuners, phasers or other matching devices may be used. The incoming signal must first enter the ferrite bar antenna of the UL, or the ferrite bar may be bypassed and signal fed into the RF and IF stages via the input points of the bypassed ferrite antenna, being processed solely through the complete circuitry of the UL. The purpose and spirit of this rule is to use all of the internal circuitry of the UL. Other than at the antenna input where the signal input may be pre-amplified, through the use of tuned circuits, RF amplifiers and Q-multipliers, no active device may be inserted into the circuitry. This disallows heterodyning or frequency conversion devices where by the ultralight is used solely as an IF amplifier, fixed or tunable. This rule does not prevent the attachment of a digital frequency readout device.

There's no attempt to further define the parameters of an ultralight radio other than by specific models identified by "the committee." A compendium of accepted ultralight radios is also provided at www.dxer.ca for reference. Otherwise, the door is wide open for interpretation, although the compendium will serve as a baseline for comparison against thousands of ultralight-type models produced since the introduction of the transistor radio decades ago.

While the typical ultralight might be a modest shirt pocket-size radio costing no more than $25, at the very high end the Pogo Radio Your Way LX AM/FM radio and mp3 player/recorder at $200 easily



An unlimited class SRF-39P ultralight with hardwired external ferrite loopstick modification by Gary DeBock.

fits within the ultralight category, as well as in your shirt pocket. At the bottom of the spectrum, pocket radios under the brand names Coby, jWin, Kaito and the like, often sold at discount stores for $5 or less, are usually DX duds. Though per-

KAHE	Dodge City, KS	95.5	KOLS	WTBD-FM	Delhi, NY	97.5	New
KZRS	Great Bend, KS	107.9	KZLS	WITH	Ithaca, NY	90.1	New
KSOB	Larned, KS	96.7	KGTR	WRMR	Lindenhurst, NY	89.3	New
KVOB	Lindsborg, KS	95.5	KQNS-FM	WTIB	Farmville, NC	94.3	WWNK
KZUH	Minneapolis, KS	92.7	KILS	WKOO	Oriental, NC	94.1	WWHA
KWLS	Winfield, KS	107.9	KSJM	WKGV	Swansboro, NC	104.1	WWTB
WYJZ	Fearsville, KY	91.7	New	KLUU	Jamestown, ND	88.9	KLRX
WFKY	Frankfort, KY	104.9	WKYW	WMRN-FM	Marion, OH	94.3	WDIF
WWRA	Clinton, LA	91.9	New	WRXS	Marion, OH	106.9	WMRN-FM
KBDV	Leesville, LA	92.7	New	KOBN	Burns, OR	90.1	New
KPCP	New Roads, LA	88.3	New	KETP	Enterprise, OR	88.7	New
KWTG	Vidalia, LA	104.7	KPXS	WLRI-LP	Gap, PA	92.9	WOPR-LP
WYRX	Lexington Park, MD	97.7	WRKZ	WBZW-FM	Pittsburgh, PA	93.7	WTZN-FM
WYPO	Ocean City, MD	106.9	WRXS	KRFW	Watertown, SD	91.9	New
WCSY	Hartford, MI	103.7	WHIT-FM	WJZO	Oliver Springs, TN	106.1	New
KRFG	Glenwood, MN	90.5	New	WLNQ	Spring City, TN	88.5	New
KVCS	Spring Valley, MN	89.1	New	KXSS-FM	Amarillo, TX	96.9	KMML-FM
WSKK	Ripley, MS	102.3	WFXO	KIOX-FM	Edna, TX	96.1	KEZB
KZGM	Cabool, MO	88.1	New	KNTE-FM	El Campo, TX	96.9	KIOX-FM
KQQX	Hermann, MO	93.3	KNSX	KBXT	Franklin, TX	101.9	KZTR
KBLV	Kansas City, MO	99.7	KYYS	KVDG	Midland, TX	90.9	KAQQ
KLRX	Lee's Summit, MO	97.3	KCXM	KAMA-FM	Missouri City, TX	104.9	KPTY
KIIK-FM	Waynesville, MO	102.3	KJPW-FM	KPIT	Pittsburg, TX	91.7	New
KOZY-FM	Bridgeport, NE	101.3	KMOR	KPTY	Port Arthur, TX	93.3	KQBU-FM
KDJY-LP	Callaway, NE	102.7	KAWA-LP	KTMY	Centerville, UT	105.7	KXRV
KMOR	Gering, NE	103.9	KOZY-FM	WJJX	Appomattox, VA	102.7	WSNZ
KOOO	Lincoln, NE	101.9	KLTQ	WZGN	Crozet, VA	102.3	WSUH
KQLN	Alamo, NV	91.3	New	WSNZ	Lynchburg, VA	101.7	WJJX
KAVB	Hawthorne, NV	98.7	New	WUSH	Poquoson, VA	106.1	WUFH
WSNQ	Cape May Court House, NJ	105.5	WGBZ	WJJS	Roanoke, VA	104.9	WZBL
KDLW	Belen, NM	97.7	KLVO	WWVB-FM	Spotsylvania, VA	99.3	WYSK-FM
KABQ-FM	Bosque Farms, NM	104.7	KTEG	WZBL	Vinton, VA	106.1	WJJS-FM
KLVO	Los Alamos, NM	106.7	KZNM	WXTG-FM	Virginia Beach, VA	102.1	WXTG
KSFQ	Santa Fe, NM	90.7	KSFR	WCLM-LP	Woodstock, VA	95.7	WSCE-LP
KTEG	Santa Fe, NM	104.1	KABQ-FM	KXBG	Cheyenne, WY	97.9	KQMY
KSFR	White Rock, NM	101.1	KSFQ	KJXN	Jackson, WY	89.1	KURT
WEFX	Calcium, NY	94.1	WZNY	KRFD	Thayne, WY	91.9	New

formance could be improved at least marginally by inductive coupling to a passive loop antenna, such as the RadioShack AM Loop or the Select-a-tenna, upgrading to a Sony or Sangean radio will result in a more rewarding ultralight DX experience.

Perhaps there will be further definition as the ultralight movement grows in popularity. One suggestion might be splitting the unlimited class into limited and ultra-modified classes. The limited class would allow for internal modifications only, such as relocation of the ferrite bar, or replacement of components, but without extending beyond the original pocket radio form factor. In this class an external antenna could be inductively coupled only. An ultra-modified class would allow for components and connections outside the confines of the pocket radio, including the hardwiring of an oversized external ferrite bar antenna like the Gary DeBock modified SRF-39P. Then there could be an antique radio division for all classes, using pocket radios at least 30 years old.

Who knows what else might develop as more DXers discover the fun and excitement of ultralighting.

Ultralight Records

John Bryant has been keeping records of ultralight achievements on www.dxer.ca since the start of the phenomenon. Here are some of the impressive AM broadcast signals logged on ultralight radios. Note the unanimous popularity of Sony SRF-series Walkman radios.

526 ZLS Bahamas—1194 miles, SRF-59. (Brett Saylor-PA)

530 Radio Visión Cristiana, Turks & Caicos—3403 miles, SRF-59. (Colin Newell-BC)

550 KTSA San Antonio, Texas—459 miles. SRF-T615. (John Bryant-OK)

580 WKAQ San Juan, Puerto Rico—1350 miles, SRF-59. (Gil Stacy-GA)

747 JOIB Sapporo, Japan—4402 miles, SRF-59. (Gary DeBock-WA)

750 XETI Tempoal, Mexico—1000 miles, SRF-T615. (Bryant-OK)

760 HJAJ Barranquilla, Colombia—2244 miles, SRF-59. (Rob Ross-ON)

780 YVMN Coro, Venezuela—2280 miles, SRF-T615. (Ross-ON)

800 PJB Netherlands Antilles—1598 miles, SRF-59. (Stacy-GA)

850 KOA Denver, Colorado—1277 miles, SRF-59. (Joe Miller-MI)

910 Radio Cadena Agramonte, Cuba—1538 miles, SRF-59. (Niel Wolfish-ON)

972 HLCA Dangjin, South Korea—5201 miles, SRF-59. (DeBock-WA)

1300 WJMO Cleveland, Ohio—1482 miles, SRF-37V. (Allen Willie-NL)

1520 KRHW Sikeston, Missouri—700 miles, SRF-59. (Saylor-PA)

1521 BSKSA Duba, Saudi Arabia—5424 miles, SRF-37V. (Willie-NL)

1566 HLAZ Cheju, South Korea—5474 miles, SRF-39P and SRF-M37V. (Dennis Vroom-WA)

1575 Radio Farda, UAE—5748 miles, SRF-37V. (Willie-NL)

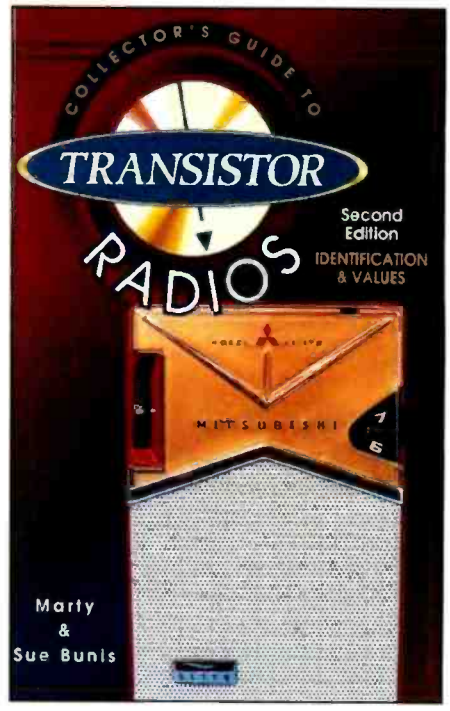
1610 Radio Buenas Nuevas, Argentina—5614 miles, SRF-37V. (Willie-NL)

1610 XEUACH Chapingo, Mexico—957 miles, SRF-37V. (John Callarman-TX)

1700 KVNS Brownsville, Texas—2016 miles, SRF-59. (Kevin Schanilec-WA)

Transistor Radio References

Collector's Guide to Transistor Radios by Marty & Sue Bunis (2nd Edition, 1996) might be of particular interest to ultralighters. Although out of print, copies are still available through amazon.com and used book stores. Jam-packed with nearly 400 color photos and info on over 2,900 transistor radios listed alphabetically by manufacturer, it remains the standard reference for transistor radios.



Collector's Guide to Transistor Radios by Marty & Sue Bunis.

Authors Marty and Sue Bunis are well known to antique radio enthusiasts. They started the "Transistor Network" club some years ago as a break-away from the New England Antique Radio Club, specializing in collecting transistor radios from the '50s and '60s. The club was short-lived, disbanding in 1997, but back issues of the *Transistor Network* newsletter can be found online; just google "transistor network."

Visit www.dxer.ca online to learn more about ultralighting. Check the latest records, read reviews of ultralight radios, and submit your favorite ultralight radio for consideration. The group also sponsors contest events. In an open invitation to a recent ultralight DX sprint, John Bryant concluded, "The primary purposes of the event are not to establish winning scores, but to foster camaraderie among participants, and to demonstrate that enjoyment can be had in our chosen hobby with minimal equipment, at very low cost, requiring only a willingness to sit at the dials."

On that sentiment we conclude this month's look at the ultralight phenomenon. Don't forget to let us know about your ultralight experiences. Until then, 73 and Good DX! ■

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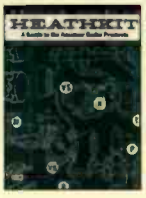

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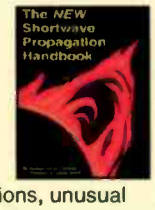

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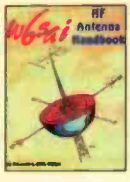

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by Kent Britain, WA5VJB

Using SWL Diversity Antennas

Ahhh, ever since those early days when I spent a month's allowance for an old shortwave radio at a garage sale, I've had a soft spot in my heart for them. These days I have about two dozen radios with at least one shortwave band around the house.

Today I most enjoy prowling the shortwave bands with my Racal RA6790 (**Photo A**). *Note to Readers: If you have any experience working on these, drop me an email, mine has picked up an annoying habit.* To enhance my listening experience, I've found that a DSP filter is a handy addition, and external speakers also improve the sound. (As a quick aside, I used 4-Ohm speakers, so I just wired them in series to get 8 Ohms. When you parallel or series speakers watch that +/- on the speaker phasing. If the cone on one is going out while the cone of the other is pulling back, the sound is pretty strange. This is a phase condition that just doesn't occur in nature over a range of frequencies, so the human ear finds it sort of annoying.)

Photo A. My favorite SWL radio, the Racal RA6790.

I guess my second favorite has to be the RadioShack DX-394 (**Photo B**) since I have three of them around the house. If you can work with surface mount components, there are several simple modifications that improve the background noise and AGC functions on the DX-394; a simple Internet search will turn up these modifications so I won't list them here. Again, an external speaker sounds much smoother than that little internal speaker. And you can add one of those noise canceling or DSP audio processors as well. The DX-394 also works well on an external battery pack, which is very nice in my area since we have far-too-frequent power failures.

Now, The Antennas

Most of the time I have a ground-mounted vertical with 300-plus buried radials connected to my Racal. But I also have two other antennas I can switch in: a 20-foot wire in the attic that I often find works better than the big one out back, and an active antenna (but we covered those just a few months ago).

When the shortwave signals bounce between a couple of ionization layers several times, the angle and polarization of those waves can get pretty mixed up. So it can get hard to predict what kind of antenna will work best. A simple solution is shown in the accompanying **Figure**—just have several antennas and use the one that "hears" best.

Photo C shows a coax type-N, TV antenna, TV video, and an audio switch box. All of these switch boxes work fine for switching shortwave antennas. You don't need special coax relays just to switch between a few long-wire antennas. Many of the TV and cable-type antenna/coax switches use type-F connectors. Type Fs work great on shortwave, and the 75-Ohm connectors and cables have very low loss on these frequencies. Even video switches work fine for switching your shortwave antennas. HeathKit used to use RCA plugs as high

Photo B. My second favorite SWL radio, theRadioShack DX-394.

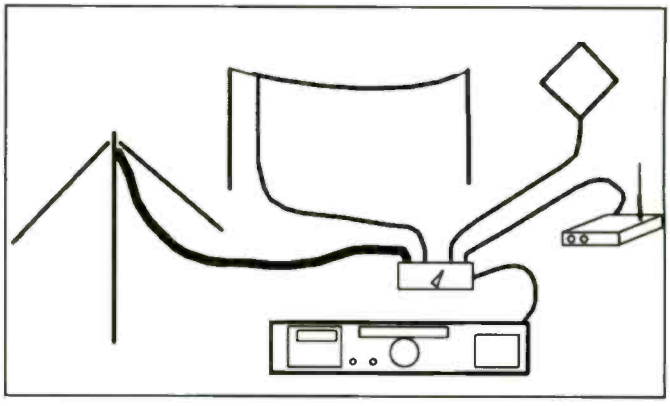


Figure. Connecting multiple antennas to your SWL radio.

Photo C. TV antenna and video and audio switches you can use to switch SWL antennas.

as 148 MHz, those RCA plugs, switches and cables are fine on shortwave and up to 30 MHz. A good video switch must have an excellent SWR to over 6 MHz to carry video without ghosts.

It's certainly easy enough to build your own antenna switch with toggle switches or most any multipole switch. But if you don't like to roll your own, a CATV A-B switch, the DVD/VHS/converter video switch, or even a speaker selection switch can be used for your shortwave antennas; the frequencies are low, power levels are low, and impedances are not critical. Let me know how you make out.

From Our Readers

There were a few comments/questions from our readers that I'd like to share this month. One was on the topic of measurements, specifically, mHz, kHz, MHz, and GHz. Let's do a quick review.

Almost 40 years ago the frequency measurement of cycles per second was changed to Hertz to honor Dr. Hertz for his work with electromagnetic waves. Most languages capitalize the first letter of a person's last name, so it's Hz not hz. Next, mHz is the designation for milli-Hertz. For instance, 100 mHz would be .1 Hz, a sine wave that takes 10 seconds to complete. Moving up, kHz is the designation for Kilo-Hertz or 1000 cycles per second, but the capital K was already used in the scientific community for Kelvin temperature, thus the use of a small k. KHz, with the capital K, would mean temperature in cycles per second, which is meaningless, so it's kHz guys! MHz is Mega-Hertz or 1,000,000 cycles per second. It's MHz, not Mhz, which would be an insult to the Hertz Family. GHz is Giga Hertz or 1,000,000,000 cycles per second (again it's GHz, not Ghz). I'll skip over THz and beyond at this time, just remember it is mHz, kHz, MHz, and GHz.

From a reader in California we get the question: *Silver has less resistance than copper, so would a silver wire antenna work better on shortwave?*

Not really. A long wire antenna has about a 1000-Ohm impedance, and 1 Ohm of loss in copper versus the .8 Ohms of loss in silver wire is not going to change things very much. And on shortwave your big enemy is usually noise, not signal levels, so you would never hear a difference.

But, for fun, let's look at a mobile antenna. A mobile antenna for 3 to 7 MHz may have an impedance of only 1 or 2 Ohms. Much of your loss with HF mobile antennas is in that 50 Ohm-to-2 Ohm matching network, or the antenna tuner. Now that few 10ths of an Ohm can make an improvement, especially if the antenna is used for transmitting. But for shortwave, just make the copper antenna 1 inch longer and you're ahead of the game.

Whenever room temperature super conductors become available, I have several antenna designs I want to play with. Room temperature super conductors would really improve many antennas, especially ones used for transmitting. I've worked with some passband filters using super conductors in liquid nitrogen. The sides of those filters were absolutely amazing! Ok, maybe a little much for most hobbyists, but still fun.

From Texas we get a question on HDTV: *Since we all have to switch from analog to digital TV next year, will you publish any information on HDTV-to-NTSC TV converters?* No, and that is not a very likely project for any hobbyist. Converting an 18-Mbps compressed data stream to something resembling NTSC video is not simple. It requires some serious computing horsepower, a hunk of

Photo D. My collection of noise canceling headphones and ear buds.

memory, and a lot of complex software. But I do have an HDTV "Cheap Yagi" in the works. It will work great with that converter the government is going to help you buy (hihi).

From Ohio, we're asked about noise canceling headphones. One reader would like to get a pair of these instead of a DSP audio filter for his radios. It's an interesting idea, but I'm afraid they won't clean up the radio signal at all. Noise canceling headphones always have a battery and two small microphones built into each earpiece (**Photo D** shows a few of my noise canceling headphones and a set of noise canceling ear buds). They take the outside noise from the microphones, amplify it just the right amount, turn it upside down, then feed this anti-noise to each speaker in each earphone. Now outside noise is "cancelled" and reduced about 90 percent. It's great for listening to MP3 music while I'm on my tractor, but there is no noise processing on the radio signal or MP3 music. If so, you wouldn't be able to listen to music anyway. Just try listening to music though one of those DSP noise limiters. They treat any continuous note as a heterodyne and take it out—leaving a lot of holes in the music when they're finished!

Until Next Time...

As always we welcome your questions, suggested construction projects, and possible topics for future columns. Drop me an email at wa5vjb@cq-vhf.com or visit www.wa5vjb.com for other antenna projects. I look forward to hearing from you.

by Tom Swisher, WA8PYR, airscan65@gmail.com

The ABCs Of Scanning The Skies

This month we're pleased to release the "Plane Sense" column from its holding pattern with "new" columnist Tom Swisher, WA8PYR (formerly of "Military Radio Monitoring" fame), in the pilot's seat. Over to Tom.—Editor

So you've decided to give aviation monitoring a try and have tracked down sites on the Internet loaded with aviation frequencies. Did you find yourself a bit vexed looking at those aviation frequency listings and wondering what all those abbreviations mean? I'm betting you did, so I'm going to use my first column to address that right away. We'll also go over the meaning of classes and look at just what there is to hear out there. In other words, the basics.

Sites like Airnav.com have excellent frequency listings for airports all over, but they refer to frequencies and other aspects of airport operation with some pretty esoteric abbreviations. You've probably said to yourself, "Abbreviations? Those aren't abbreviations? They're code!!!" And in many ways, you're right. Many of these abbreviations were developed in the mid-20th Century, and at the time (and for many years after) the primary means of communication was via teletype. With bandwidth on the wires being a limited resource, a message had to be gotten across quickly and in a way that was easy to understand. Thus, a variety of abbreviations or acronyms was developed to save bandwidth yet still get the message across. Although teletype is rarely, if ever, used today, the abbreviations and acronyms have persisted. It doesn't make it easy for newcomers to aviation monitoring to figure out what they're listening to, though.

To help you along the road to peace, love, and understanding, we've provided a basic primer of abbreviations and their meanings (see "Common Aviation Abbreviations").

Aviation Classes

Another listing given for airports is the airspace class; this is given as CLASS (x),

Those cool aviation comms originate from some pretty cool places. Here's a view of the Potomac TRACON facility. (Photo courtesy of FAA)

A view of the Jacksonville ARTCC facility. (Photo courtesy of FAA)

"If you want to start off simply, set your scanner to search between 118 and 138 MHz with a 25-kHz step size. While the aviation band goes below 118 MHz, the frequencies between 108 and 118 MHz are reserved for navigational aids."

where X is a letter, A through G. This refers to and gives the frequencies for controlled airspace at that particular airport. Each airspace classification carries various requirements for how an aircraft must be equipped and how flight operations are carried out. The classes are as follows:

Class A—Airspace above 18,000 feet. All flight conducted using IFR or SVFR, with clearance from ATC. All flights separated by ATC.

Class B—Flight conducted using IFR, SVFR, or VFR, with clearance from ATC. All flights separated by ATC.

Class C—Flight conducted using IFR, SVFR, or VFR, with clearance from ATC. IFR and SVFR flights separated by ATC; VFR flights maintain separation from other VFR flights with verbal information from ATC.

Class D—Same as Class C, except VFR flights maintain separation from all other aircraft with verbal information from ATC. All aircraft are given information on position of other aircraft.

Class E—Same as Class D, except VFR aircraft are not subject to ATC clearance. All controlled aircraft are given information on position of other aircraft when possible.

Class F—Flight conducted under IFR or VFR. Separation of flights provided by ATC and information given regarding other flights where possible. Not used in the U.S.

Class G—Flight conducted under IFR or VFR. No separation of flights by ATC, but information given regarding other flights where possible.

Controlled airspace is usually found at medium to large airports; smaller airports are generally, but not always, uncontrolled and can often be found within controlled airspace.

So, What Is There To Listen To?

If you want to start off simply, set your scanner to search between 118 and 138 MHz with a 25-kHz step size. While the aviation band goes below 118 MHz, the frequencies between 108 and 118 MHz are reserved for navigational aids. Searching will grab anything local, as well as aircraft in the air; since they're so high, aircraft on the airways above 18,000 feet will be audible from many miles away.

To make things even easier, periodically we'll feature the communications profile of one or more airports in the United States. This issue, we're going to start off with Port Columbus International Airport.

Opened by the city of Columbus in 1929 on a site selected by Charles Lindbergh, as part of a cooperative effort between Transcontinental Air Transport and the railroads, Port Columbus was an integral link in the first transcontinental air service. Passengers would board the Pennsylvania Railroad's "Airway Limited" in New York in the evening and ride in comfort and luxury to Columbus.

Upon arrival at the Port Columbus rail station the next morning, passengers would disembark and walk across to the terminal (which still exists), where they would board a Ford Trimotor aircraft for the next part of the trip. The flight would carry them during daylight hours to Waynoka, Oklahoma, where passengers would alight and board the Santa Fe Railroad for an overnight journey to Clovis, New Mexico. There, they would transfer to another Ford Trimotor for the remaining trip to Los Angeles.

The rail-air combination only lasted a few years; with the advent of effective lighting and navigation aids for night flying, the need for the rail portion of the trip was ended. Port Columbus is still in operation, though; it's a major airport serving hundreds of flights every day, and is well worth a visit.

If you're in the Columbus area and want to try listening in, check out the following frequencies:

Tower	132.7/257.8
Ground	121.9/348.6
Clearance Delivery	126.3
Final Approach	118.2/353.9
Discrete	119.65
Emergency	121.5/243.0
Approach/Departure	119.15/338.225 North, 125.95/371.975 South
Class C Airspace	120.2/317.775 North, 132.3/279.6 South
Unicom	122.95
ATIS	124.6

There you have it for this time. Now that you've got the basics, tune in to aviation—it can be quite a lot of fun to listen to. Then drop me a line and let me know what you've heard.■

Common Aviation Abbreviations

APPR—Approach
ARTCC—Air Route Traffic Control Center
ATC—Air Traffic Control
ATIS—Automatic Terminal Information System
AWOS—Automatic Weather Observation System
CLNC DEL—Clearance Delivery; channel used by ATC to issue flight instructions to pilots
DEP—Departure
DME—Distance Measuring Equipment
EMER—Emergency (refers to 121.5 MHz, the international emergency frequency)
FBO—Fixed Base Operator; companies at an airport selling aviation fuel and pilot supplies
GND—Ground; the Ground Control frequency
GUARD—Refers to 243.0 MHz, the military emergency frequency; some will call this "UHF Guard" and 121.5 "VHF Guard"
IFR—Instrument Flight Rules
LFR—Low-frequency Radio ranging
LOC—Localizer
SVFR—Special Visual Flight Rules
TACAN—Tactical Air Navigation; military navigational aid
TRACON—Terminal Radar Approach CONtrol; the ATC facility at a controlled airport with terminal airspace
TWR—Tower; the Tower frequency (also known as "Local Control")
UNICOM—A common channel used to contact services located at an airport
VFR—Visual Flight Rules
VOR—VHF Omni-Range navigation system
VORTAC—A combination of VOR and TACAN in a single facility

by Kirk Kleinschmidt, NTØZ, kirk@cloudnet.com

PSK31: RTTY's Replacement Is All Grown Up!

I'm sure people of every successive generation have rolled their eyes and wondered mightily about "the youth of the day." For example, instead of walking to and from school in Arctic blizzards, torrential downpours, and searing heat (yes, with buzzards circling overhead), today's kids are driven to school in fleets of armored SUVs helmed by soccer moms gone wild.

And while kids in my generation went outside in the morning and reluctantly came indoors as late as possible (getting into ever-increasing mischief the whole while), today's kids can barely tear themselves away from whatever game console is the rage. And when they do manage to go outside, they're limited by the "carpal thumb" syndrome caused by chronically mashing buttons on said console's handheld controllers.

The same generational transitions happen in ham radio, too. Spark gave way to continuous wave, AM to SSB, etc. And nowadays, radioteletype, RTTY, the original two-tone keyboard-to-keyboard mode, has largely given way to PSK31, the now-preferred keyboard-to-keyboard mode, which will be 10 years old at the end of this year.

Although spark transmissions are now understandably verboten, I know that hams still have occasional AM QSOs and that RTTY isn't *completely* six feet under—especially for digital-mode contesters—but it has one foot in the grave. And the equipment we use for RTTY, well, it's a whole new ball game. A *computer* ball game (more on that later).

We've come a long way from the clunky teleprinter machines used by early RTTY ops. Even if you haven't seen the gear I'm talking about in a ham shack, you've undoubtedly seen it in older movies about war or broadcasting! Behind a typewriter-looking keyboard sat a teleprinter with a large continuous roll of low-grade yellow paper. As the receiver's analog demodulator converted the deedle-eedle tones into readable characters, those characters were impact-printed onto the paper, making a lot of clattering, clunking, whirring, and clicking noises in the process.

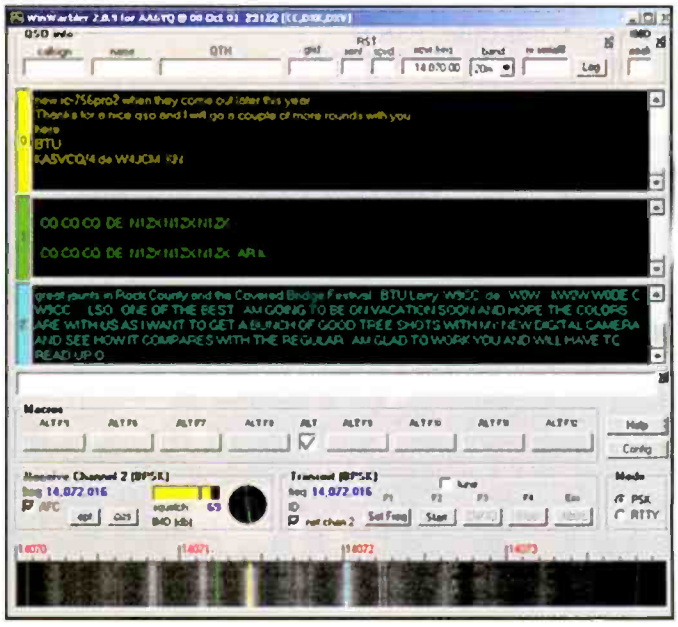
The SignaLink USB from Tigertronics is a reasonably priced digital-mode interface that features a built-in sound system. This model connects to your PC with a single USB cable instead of using your PC's sound card, which isn't optimized for ham radio applications and interfacing. Note the TX, RX, and Delay controls on the front panel—very handy! For more info, see www.tigertronics.com.

As RTTY hardware improved in the '70s and '80s, hams and SWLs started monitoring shortwave RTTY and fax stations with a variety of equipment, ranging from cheap two-diode PC serial interfaces to expensive HAL or Universal terminal units.

In the late '80s, multimode terminal units from Kantronics and AEA (often dubbed multimode communications processors, or MCPs, which were used with PCs or "dumb" terminals) were the rage, pushing aside even the more robust RTTY-only gear made by companies such as TONO and HAL.

During this time, RTTY itself saw competition from the various error-correcting "handshaking" modes—AMTOR, packet, PACTOR, G-TOR, CLOVER, and so on—and I wondered even then whether the RTTY era was coming to an end. RTTY was still around then, just like it's still around today, but it wasn't exactly the "in" thing unless you were a ham radio digital-mode contester (still true today, only to a greater degree).

The error-correcting modes were fun for a while, but I found that working other stations via AMTOR, which relentlessly chirps away until all data is correctly transmitted and acknowledged, was too much like using the Internet. It didn't *feel like radio*, where our ability to copy ebbs and flows according to the whims of propagation. Today, although digital hams *could* use AMTOR, the error-correcting mode is used almost exclusively for transmitting bulletins.



Although there are literally dozens of excellent PSK software packages available nowadays—and most are free for the download—my favorite is still WinWarbler, written and maintained by Dave, AA6YQ. Part of his excellent DXLab suite of cutting-edge ham radio programs, WinWarbler can send and receive PSK31, PSK63, and RTTY. In PSK mode it can simultaneously monitor up to 47 PSK transmissions across the band (it's like watching every cable TV channel at the same time)! Check it out at www.dxlabsuite.com/winwarbler/.

This beautiful row of vintage RTTY gear was a gift from the North American Data Communications Museum (NADCOMM) to the San Diego State University Library. You can see and hear this amazing old gear in action at www.nadcomm.com. Unlike modern electronic hardware, this stuff has a mechanical elegance that's rarely (if ever?) found today.

What ham radio needed was a digital mode that could optionally incorporate some means of error correction *without* requiring back-and-forth chirp-chirping to ensure copy. Hindsight being what it is, we now know that the breakthrough—which marked a turning point in ham radio's use, acceptance, and signal performance of digital-mode communications—was called PSK31.

Introduced in late 1998, PSK31 quickly zoomed to the digital forefront and is now a major player on the world stage. It's the digital mode of choice for an ever-increasing number of hams who've never worked the keyboard modes before. If you've always wanted to get started in RTTY but lacked the hardware or the fortitude to mess with it all, PSK31 is for you!

Want to make your own PSK rig? I don't mean just the sound and I/O interface—I mean the entire PSK31 transceiver! Thanks to the kits that are available from Small Wonder Labs, you can build a complete PSK31 transceiver for 20, 30, or 40 meters for about $100 (about $60 for the new 80-meter version). The 20-meter model is shown here. It runs on 12 Vdc and puts out 2–3 W—enough to make stateside and DX contacts, especially on 20 meters. See all of the versions at www.smallwonderlabs.com. This photo is from K1VY's excellent PSK page at www.psk31.com.

The Magic Of The Mode

Peter Martinez, G3PLX, the whiz-kid who came up with AMTOR, also developed PSK31, the mode that's dethroned RTTY and has become the basis for much digital-mode experimentation and innovation. Unlike the big, expensive and complex RTTY terminal units of yesterday, PSK31 uses the DSP brains of your PC's sound card and mostly free software that runs in Windows, Mac, or Linux.

The "PSK" in PSK31 stands for Phase Shift Keying, the space-age modulation technique used to transmit an entirely new digital code. The "31" refers to the data rate, or baud rate, of the transmitted signal. It also represents the bandwidth occupied by a PSK31 signal: a paltry 31 Hz!

The digital code itself is called *Varicode*, a term coined by G3PLX because each character is made up of a varying number of data bits, just like Morse code! Commonly used letters have fewer bits, while rarely used characters have a whole bunch. This keeps the transmitted bandwidth the same while maximizing data throughput.

In practical terms, PSK31 takes up almost no bandwidth; its weak-signal performance is better than that of regular Morse code (and a definite improvement over RTTY); and it will likely cost you less than a chicken dinner to get started.

QRP ops and those limited by covenants and deed restrictions should note that PSK31 is *so* efficient that it works famously while running low power (1 to 20 W is plenty). There are many other nifty PSK31 features, and you can discover them on the Internet. There's a YouTube link (see under "Hardware") that will get the ball rolling, or simply search for PSK31 on Google.

Variants

PSK63, a direct offshoot of PSK31, can sling characters at 100 wpm but takes twice the bandwidth (hence the name PSK63). PSK63 offers faster contest exchanges and improved performance on radio paths that travel over the poles. The two modes use the same hardware and software.

Also using the same hardware and software are the multiple frequency-shift keying modes (MFSK) like MFSK16, a multitone data protocol developed by Murray Greenman, ZL1BPU, for use on the HF ham bands, and FSK441, JT6M and JT65 (parts of the *WSJT* family of radio modulation systems developed by Joe Taylor, K1JT, for use in weak-signal VHF QSOs), which were mentioned in last-month's column on meteor-scatter communications.

SWLs have been working hard to decode various MFSK systems on the shortwave utility bands for years. Coquelet, Piccolo, and THROB, to name only a few, are mostly used for government, military, and commercial comms. Demodulating and decoding these signals can be quite complex, as many slightly different variations are used, and even if an SWL *demodulates* the signal, the contents may still be encrypted and difficult or impossible to *decode*.

In addition to the thrill of being able to use such cutting edge digital systems as hams, all of these modes and more—SSTV, FAX, and even digital voice—use the same low-/no-cost hard-

ware and the same free software. What a bargain!

Hardware

The hardware required to connect your PC's sound card to your radio, and to make an optional PTT connection between your PC and your rig, can be built from junk-box remnants or purchased from any electronics store for less than $10. That's as close to free as you can get nowadays! There are several excellent videos on YouTube that show PSK31 in action, and a video by K7AGE shows how to connect your PC to your radio for transceive operation. Point your web browser to www.youtube.com and search for PSK31.

Ready-made interfaces are available from West Mountain Radio, Tigertronics, MFJ, and others. Traditional interfaces handle PTT and audio inputs/outputs between your PC soundcard and your radio. Newer digital-mode interfaces incorporate low-noise, built-in sound chips and require only a single USB connection to your PC, no PC sound card required. Some of the new designs sport a lot of bells and whistles—and have a price tag to match—but several, like the new Tigertronics SignaLink USB, can be purchased for less than $100.

Get Started

Steve Ford's introductory *QST* article, "PSK31 2000," is still an excellent introduction, although the free PSK software is better nowadays. Get your copy from http://k0bk1.org/pdf/0005042.pdf.

PSK's Hottest Hotspots

PSK31's distinctive ringing signals can be found in most digital subbands, but especially near 14.070 MHz. Early on, 20 meters was the only hotspot. Now, however, when the band is open, PSK activity spreads out, centering mostly around the following frequencies. Look for PSK31, PSK63, MFSK-16 and MT63 signals here (in MHz):

1.838
3.580–3.585
7.035, 7.080
10.132–10.139
14.070–14.075
18.100
21.070, 21.109
24.920
28.120–28.130

Links to a huge variety of digital-mode software, hardware, and tutorials can be found at http://ac6v.com/software.htm#DIGITAL. You'll find free-to-download PSK31 software, detailed info about PSK31, build-them-yourself hardware interface schematics and excellent links to related sites.

Almost any PC made within the past 10 years that sports a 16-bit sound card (it's a $5 item on eBay if yours doesn't), at least one copy of the many free PSK software packages, a fairly stable HF SSB rig (USB is the standard for PSK31, although older modes such as RTTY, AMTOR, packet, and clover default to LSB), and a set of cables to interconnect the components will get you on the air. You probably have all this stuff in your shack. Old, inexpensive laptops (even of the 486 variety) work well and are compact and portable.

Where To Operate

Once you have your software and hardware up and running, tune around the digital subbands (especially on 20 meters) and look for PSK31 signals (see "PSK's Hottest Hotspots"). They're distinctive, so you won't have much trouble finding them. PSK31 signals don't "deedle-eedle" like RTTY, and they don't "chirp" like AMTOR, they "warble" like a science fiction mind-control machine. Once you've heard a PSK31 signal, you won't mistake it in the future. The same goes for MSFK-16, which sounds like a calliope played by a drunken monkey. You'll see!

In PSK31's earliest days we had to manually tune our radios to work other stations. Because of the super-narrow bandwidths involved, this was a real pain. Today, we just tune our rigs to the PSK "hotspot" on each band and let the software, with its graphical interface, do its magic.

Once you see a signal (or six) displayed on the "waterfall display," simply click your mouse on one of the displayed signals and your software will start decoding it instantly! The software's "automatic frequency control" will track your QSO partner if he/she drifts up and down in frequency. Once the desired signal is locked and you're seeing text flow across your screen, PSK31 QSOs proceed pretty much like regular RTTY.

Is RTTY Dead?

Six years ago we wondered whether PSK31 (or PSK-whatever) would replace RTTY. The answer is yes...and no! For day-to-day operating, PSK *has* replaced RTTY. PSK has all of the benefits of Baudot RTTY, plus better weak-signal performance. The gear is inexpensive, widely available, and works well.

And like antique cars and steam-powered tractors, it will retain a fascination for many enthusiasts and you'll probably be able to make RTTY QSOs decades in the future. You see, the same sound card hardware and free PC software that makes PSK possible can also operate RTTY! Two hams could start chatting via PSK and decide to switch to RTTY with a single mouse click! And because RTTY is still faster in the frantic back-and-forth, send-receive conditions found in contests, RTTY is still king of the hill in competitions. Not to mention that you can easily run full legal power with RTTY, which is heavily frowned upon when running PSK modes.

So Happy Birthday, PSK31. You're all grown up. I can't wait to see what you'll become 10 years from now! As always, send your QSL cards, questions, and letters to me at kirk@cloudnet.com, or via snail mail to "Ham Discoveries," *Popular Communications*, 25 Newbridge Rd., Hicksville, NY 11801. I look forward to hearing from you. ■

by Tomas Hood, NW7US, pc-prop-man@hfradio.org

Two Different Predictions For Solar Cycle 24

You may not have noticed it, but recently certain propagation prediction and modeling software programs (for instance, ACE-HF) that attempted to obtain the smoothed sunspot number (SSN) for future dates, no longer were able to complete that function. This occurred on January 1, 2008, because of the government's failure to issue updated predictions for solar cycle activity for 2008 and beyond.

The National Geophysical Data Center (NGDC), a part of the National Oceanic & Atmospheric Administration (NOAA) and other agencies, has now fixed its SSN listing, allowing the software functions to work again. This was prompted by the folks at ACE-HF, who also asked the NGDC to include data back through 1997 from their old table as well as estimates for Cycle 24, so ACE-HF can now retrieve SSNs from 1997 through 2018. **Figure 1**, by the way, is an attractive EIT (for Extreme ultraviolet Imaging Telescope) depiction of most of a solar cycle.

The government listing was delayed because of the difficulty in deciding on the month of the current solar cycle's minimum, on which future months' estimates are based. They have posted the following "readme" that qualifies the current estimates:

The sunspot prediction file is a PRELIMINARY look at Cycle 24. Our prediction program required the month and year of minimum to produce output. Solar minimum for Cycle 24 has not been officially determined. We used July 2007 as the minimum date to produce an outlook. Solar minimum will be adjusted monthly until the OFFICIAL value/month is determined.

Another interesting turn of events regarding the prediction of Solar Cycle 24 is this statement released by the International Solar Energy Society (ISES) regarding the Solar Cycle Progression and Prediction Displays (see **Figures 2** and **3**):

The initial ISES Solar Cycle 24 Prediction was released in April, 2007. The panel charged with determining the prediction was unable to agree on a single solution and have so far provided two predictions. Those two predictions are available here, along with an average of the two predictions. The average is currently being used as the official prediction. The ISES panel does not consider this to be an adequate solu-

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.

tion. To mitigate this, the lower and upper bounds used with the average cover the range of the two predictions issued by the panel. When the panel converges on a single prediction, the files here will be updated to reflect the new prediction. The two predictions issued by the panel can be accessed in the files named Predict_low.txt and Predict_high.txt.

To view the latest predictions, including these two files, point your Internet browser to www.swpc.noaa.gov/SolarCycle/.

Scientists have issued cycle predictions only twice before. In 1989, a panel met to predict Cycle 22, which peaked that same year. In September 1996, scientists met again to predict Cycle 23, six months after the cycle had begun. Both groups did a better job at predicting timing than intensity, according to Space Environment Center scientist Douglas Biesecker, who chairs the current panel of experts that came up with last April's (2007) prediction for Solar Cycle 24. He describes the group's confidence level as "high" for its estimate of a March 2008 start month for the new cycle, and "moderate" overall for the two estimates of peak sunspot number and when those peaks would occur.

One major disagreement among the current panel members involves the importance of magnetic fields around the sun's poles as Cycle 23 decays. Those who predict a weak Cycle 24 point to the end-cycle polar fields as the foundation of their forecasting approach. The strong-cycle forecasters place more importance on other precursors extending over a several-cycle history. Because Cycle 24 sunspots have already appeared this year (2008), the strong-cycle group holds that Cycle 24 will be a moderate to strong cycle.

No one will know for sure until we are well into the solar cycle. What's more, scientists need at least one year of new solar cycle data to really create the curves that allow them to better forecast the rest of the cycle's activity levels and the timing of the peak.

High Frequency Propagation

As we move away from the winter shortwave season into the longer days of summer, the overall trend in shortwave propagation is the opening up of the higher frequencies into many areas of the world. Some of these openings will be longer in duration than during the winter season. However, the openings occurring on the highest frequencies on the edges of ionospheric propagation of a given path can be variable in strength. These openings are subject to fading and could be short-lived.

The cause of this change is complex. The length of daylight over a region of the ionosphere, the intensity of the solar radi-

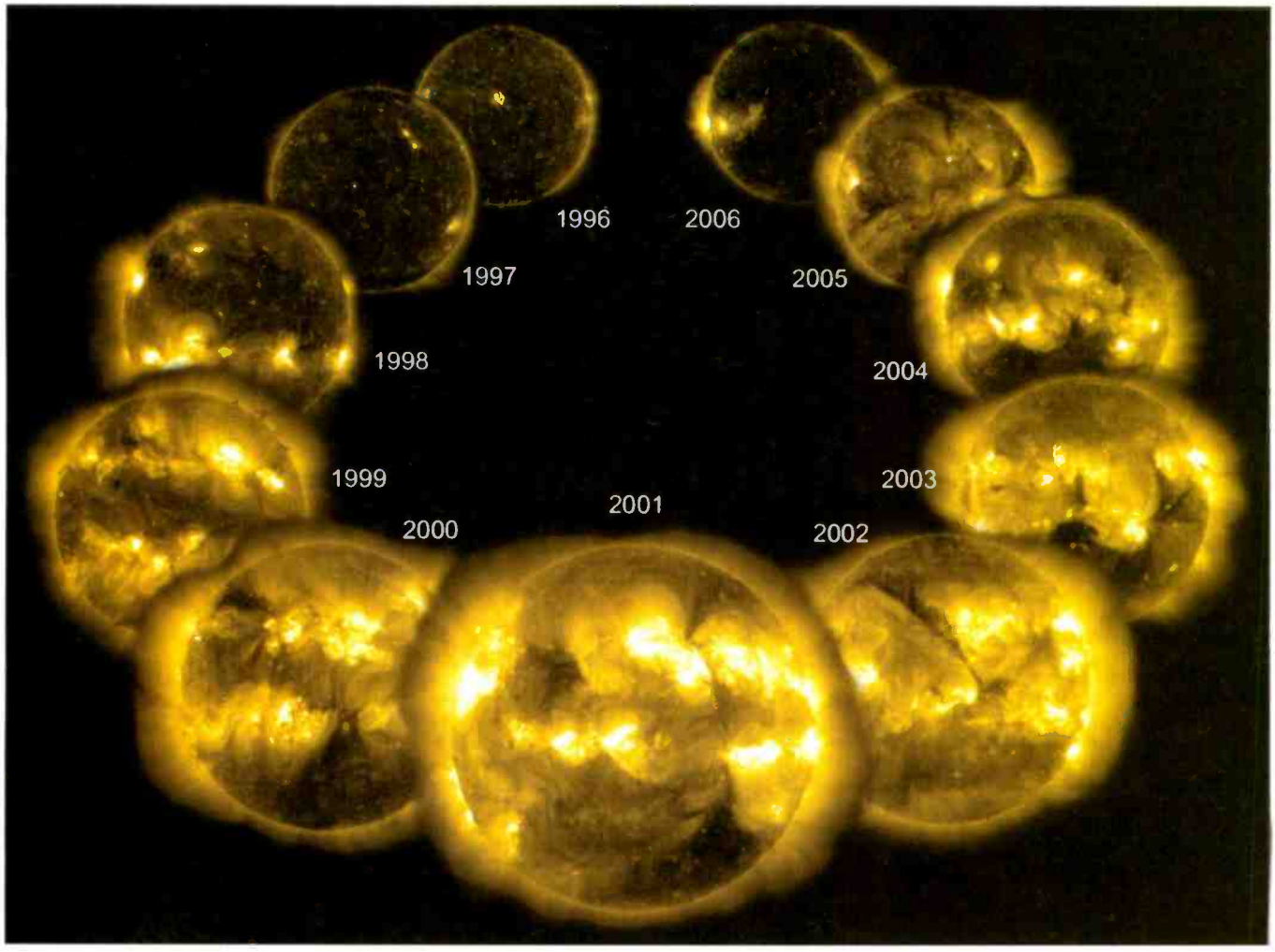


Figure 1. An EIT image from each year of nearly an entire solar cycle assembled by Steele Hill (NASA GSFC). The Solar and Heliospheric Observatory (SOHO) celebrates its 12th launch anniversary on December 2. In late 1996, shortly after its launch, SOHO was able to observe the last minimum of the roughly 11-year activity cycle of the sun. The minimum was followed by a rapid rise in solar activity, peaking 2001 and 2002. Activity levels have slowly declined since then. We might now have reached, or just passed, the end of Cycle 23. (Image courtesy NASA/SOHO)

Optimum Working Frequencies (MHz) - For May 2008- Flux = 66, 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	20	20	20	20	18	16	15	14	13	12	11	11	11	13	15	16	17	18	19	19	20	20	20	20
NORTHERN SOUTH AMERICA	26	26	26	24	22	20	18	17	16	15	14	13	13	15	18	20	22	23	24	25	26	26	26	27
CENTRAL SOUTH AMERICA	26	23	21	19	18	17	16	15	14	13	13	15	15	17	19	21	23	24	25	26	27	27	28	27
SOUTHERN SOUTH AMERICA	22	16	15	14	14	13	13	12	12	12	11	11	11	14	17	19	21	22	24	25	26	26	26	24
WESTERN EUROPE	11	10	10	9	9	10	12	11	10	10	9	13	15	16	17	18	18	19	19	18	17	17	16	14
EASTERN EUROPE	9	8	8	8	12	14	12	11	10	9	9	9	13	15	16	17	18	17	17	16	15	13	10	9
EASTERN NORTH AMERICA	24	24	23	23	22	20	19	17	16	14	13	13	15	17	18	20	21	22	23	23	24	24	24	24
CENTRAL NORTH AMERICA	13	13	13	13	12	12	11	10	9	9	8	7	7	9	10	11	11	12	12	13	13	13	13	13
WESTERN NORTH AMERICA	7	7	7	7	7	6	6	6	5	5	4	4	4	4	5	5	6	6	6	7	7	7	7	7
SOUTHERN NORTH AMERICA	22	21	21	21	20	20	18	16	15	14	13	12	12	12	14	16	17	18	19	20	21	21	21	21
HAWAII	18	18	18	18	18	18	18	17	15	14	13	12	11	10	10	10	11	12	14	15	16	16	17	17
NORTHERN AFRICA	15	14	13	12	11	11	13	12	11	10	11	14	15	17	17	18	18	19	19	19	19	18	18	16
CENTRAL AFRICA	16	15	14	13	12	13	12	11	11	10	10	13	15	16	17	18	18	19	19	19	19	19	19	17
SOUTH AFRICA	15	14	13	13	12	12	14	16	15	14	13	15	17	18	20	21	21	22	23	21	20	18	17	16
MIDDLE EAST	12	11	11	12	14	14	12	11	10	10	9	11	14	16	17	18	18	19	19	18	17	16	14	13
JAPAN	18	19	19	19	19	18	18	17	16	15	14	13	12	12	13	13	12	11	11	13	15	16	17	18
CENTRAL ASIA	19	19	19	19	18	18	18	17	16	15	14	13	12	12	14	15	16	15	14	13	13	14	16	18
INDIA	16	17	17	17	17	16	14	12	10	10	9	9	8	9	9	8	8	8	8	10	13	14	15	16
THAILAND	16	17	19	19	18	18	17	17	16	14	13	12	11	11	14	15	16	16	15	14	13	12	12	14
AUSTRALIA	27	28	28	28	28	28	27	26	24	22	20	18	17	16	15	14	14	13	12	12	15	20	23	25
CHINA	18	18	19	19	18	18	17	16	15	13	12	11	10	11	14	15	14	12	12	11	13	15	16	17
SOUTH PACIFIC	27	27	28	27	26	24	22	17	15	14	14	13	12	12	12	11	11	11	11	20	23	25	26	27

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	23	23	23	22	20	18	17	15	14	13	12	12	13	15	17	18	20	21	21	22	22	23	23	23
NORTHERN SOUTH AMERICA	24	24	24	21	20	18	17	15	14	13	13	12	13	15	17	19	20	21	22	23	23	24	24	24
CENTRAL SOUTH AMERICA	26	23	21	19	18	17	16	15	14	13	13	14	16	18	20	22	23	24	25	26	27	27	27	27
SOUTHERN SOUTH AMERICA	21	17	16	15	14	13	13	12	12	12	11	11	14	16	19	20	22	23	24	25	26	26	26	24
WESTERN EUROPE	14	12	11	10	10	10	12	12	12	13	15	16	16	17	18	18	18	18	19	18	18	17	16	15
EASTERN EUROPE	9	9	8	8	8	12	12	11	10	10	13	15	16	17	18	18	18	18	17	17	16	15	13	9
EASTERN NORTH AMERICA	17	17	17	16	15	14	13	12	11	10	9	9	11	12	14	14	15	16	16	17	17	17	17	17
CENTRAL NORTH AMERICA	8	8	8	8	7	7	6	6	5	5	4	4	5	5	6	6	7	7	7	8	8	8	8	8
WESTERN NORTH AMERICA	13	13	13	13	13	12	11	10	9	9	8	7	7	8	10	11	11	12	12	13	13	13	13	13
SOUTHERN NORTH AMERICA	15	15	15	15	14	13	12	11	10	9	9	8	8	9	11	12	12	13	14	14	15	15	15	15
HAWAII	21	21	21	21	21	21	20	18	16	15	14	13	12	12	11	11	13	15	16	17	18	19	20	20
NORTHERN AFRICA	19	17	16	14	13	13	13	12	11	12	14	15	16	17	18	19	19	19	19	20	20	20	19	19
CENTRAL AFRICA	16	15	14	13	12	12	13	12	11	12	14	15	17	17	18	19	19	19	19	20	20	19	19	18
SOUTH AFRICA	14	14	13	12	12	12	12	18	16	15	15	17	20	21	23	24	26	26	24	21	19	17	16	15
MIDDLE EAST	13	12	11	11	13	14	12	11	11	13	15	16	17	17	18	18	19	19	19	18	18	17	15	14
JAPAN	19	19	18	18	18	17	16	16	14	13	12	12	14	15	14	13	12	11	12	14	15	16	17	18
CENTRAL ASIA	19	19	18	18	18	17	16	15	13	12	11	11	14	15	16	17	17	15	14	13	13	14	16	18
INDIA	12	13	15	15	15	14	12	11	10	10	10	13	15	16	15	14	13	11	9	9	8	8	8	8
THAILAND	16	17	18	18	17	16	15	13	12	11	10	11	14	15	16	17	18	17	15	14	13	12	12	14
AUSTRALIA	27	28	28	28	27	27	26	23	21	19	18	17	15	15	15	14	13	13	12	12	16	21	24	26
CHINA	18	18	18	18	17	16	15	13	12	11	10	11	14	15	16	15	14	13	12	12	13	15	16	17
SOUTH PACIFIC	27	28	27	26	25	23	20	15	14	13	13	12	12	12	11	11	11	11	13	21	24	25	27	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	19	18	18	16	15	14	13	12	11	10	10	10	12	13	14	15	16	17	17	18	18	18	19	19
NORTHERN SOUTH AMERICA	21	21	20	18	17	15	14	13	12	12	11	11	12	14	16	17	18	19	20	21	21	21	21	22
CENTRAL SOUTH AMERICA	25	23	21	19	18	16	15	14	14	13	13	15	17	19	21	22	23	24	25	26	26	27	27	27
SOUTHERN SOUTH AMERICA	20	17	16	15	14	13	13	12	12	12	11	11	16	18	20	22	23	24	25	26	26	27	25	23
WESTERN EUROPE	15	14	13	12	11	12	11	10	10	13	14	15	16	17	17	18	18	18	18	17	17	17	16	16
EASTERN EUROPE	10	10	9	9	8	13	12	11	12	14	15	16	17	18	18	19	19	18	18	17	17	16	14	11
EASTERN NORTH AMERICA	8	8	8	7	7	6	6	5	5	4	4	5	5	6	7	7	7	8	8	8	8	8	8	8
CENTRAL NORTH AMERICA	18	18	17	17	16	15	13	12	11	10	10	10	12	13	14	15	16	17	17	18	18	18	18	18
WESTERN NORTH AMERICA	24	24	23	23	22	20	19	17	16	15	13	13	14	17	18	20	21	22	23	23	24	24	24	24
SOUTHERN NORTH AMERICA	19	18	18	18	16	15	14	13	12	11	10	10	11	13	14	15	16	17	17	18	18	18	19	19
HAWAII	23	23	23	23	22	21	19	17	16	15	14	13	13	13	12	12	14	16	18	19	20	21	22	22
NORTHERN AFRICA	19	17	16	15	13	13	13	13	13	14	16	18	20	21	22	23	23	24	24	24	23	23	22	20
CENTRAL AFRICA	16	15	14	13	12	12	14	14	13	14	16	18	20	21	22	23	23	23	23	23	23	21	19	18
SOUTH AFRICA	14	14	13	12	12	12	12	16	15	14	15	18	20	22	23	24	25	26	24	21	19	17	16	15
MIDDLE EAST	16	15	14	13	13	13	12	11	11	13	15	16	17	18	18	19	19	20	20	20	20	20	19	18
JAPAN	19	18	18	17	16	15	14	13	12	12	13	15	16	15	14	13	12	11	12	14	16	17	17	18
CENTRAL ASIA	18	18	17	17	16	15	14	13	13	13	14	15	16	17	17	18	17	16	15	14	13	13	16	18
INDIA	8	8	8	8	13	13	12	12	12	14	15	16	17	18	17	17	17	16	16	15	13	10	9	9
THAILAND	15	17	17	16	15	13	12	11	11	14	15	16	17	18	18	18	19	17	16	15	14	13	12	13
AUSTRALIA	27	28	27	27	26	24	22	20	18	17	16	15	15	15	14	13	13	12	12	12	17	22	24	26
CHINA	17	17	17	16	15	14	13	12	12	13	15	16	17	17	16	16	15	13	13	13	14	15	16	16
SOUTH PACIFIC	27	27	26	26	24	22	18	14	14	13	12	12	12	11	11	11	11	11	16	21	24	25	26	27

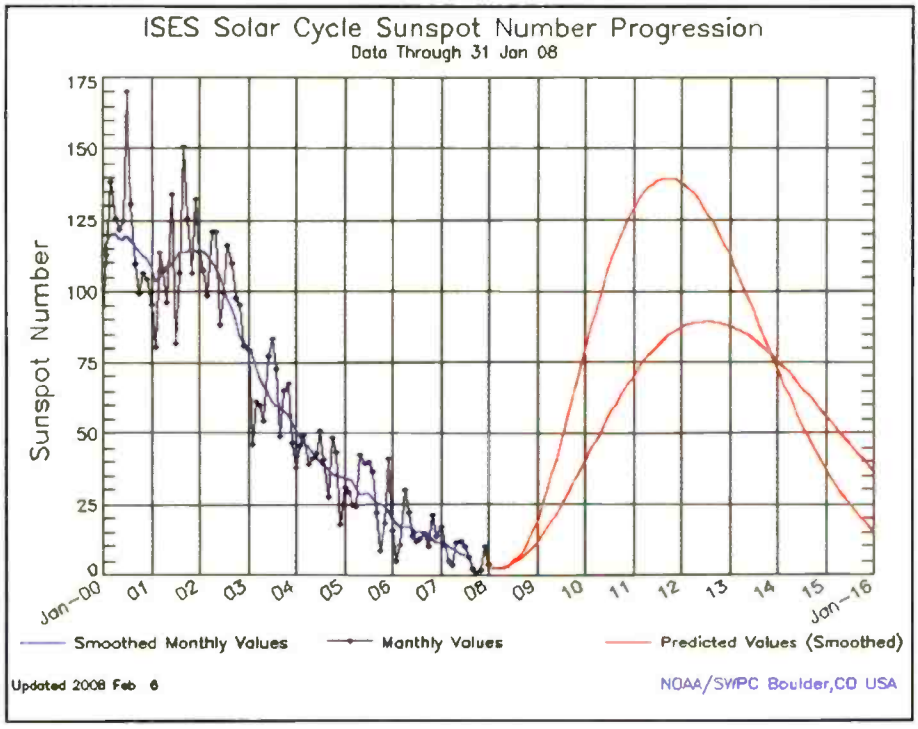


Figure 2. The Smoothed Sunspot Number curves for Solar Cycle 24, with Cycle 23 actual data in black. Note the two different red curves starting in 2008. Scientists are not in agreement as to which prediction is the more likely to fit the real solar cycle activity. (Source: NOAA/SWPC, NOAA's Space Weather Prediction Center)

ation, and the density and height of the various layers of the ionosphere all affect the propagation of the shortwave frequencies we're interested in. Winter daytime propagation over a given path could sustain higher frequencies than the same path during the summer daytime, while the summer nighttime frequencies will be higher than the winter nighttime frequencies on that same path (partly due to the proximity of the Earth to the sun during these two seasons; in the winter, the Earth is closer).

On the higher HF frequencies (16 through 11 meters), fairly good daytime openings should be possible on north/south paths during May. Sixteen meters will be the best bet out of the higher bands, not only because of propagation, but also because more international broadcasters will still use this band around the clock.

Most DX signals, and the strongest signals, will be found on the middle and lower HF bands. Look for peaks in signals around the hours of sunrise, and again just before sunset, and into the late evening. Daytime paths are best when they terminate in areas where it is night. This enhances propagation to remote parts of the world and lengthens the DX window. Twenty-five and 22 meters will have more stable signals than those on 19 meters, especially on north/south paths, again around the hours of sunrise and sunset. Thirty-one meters again becomes one of the strongest and most reliable bands, though you will find it congested. Look for Europe and Africa early in the morning through late morning, then north/south openings during the day if the solar activity is low (otherwise the *D*-layer absorption will wipe out the band). As sunset approaches, look for South Pacific, then Asia as the sun sets.

During the night, 41 through 60 meters should provide good openings from Europe, Africa, and the east. Some DX should be possible on 75 through 120 meters, but signals are expected to be mainly weak and covered by seasonal noise. Static levels also increase noticeably during May, and signals may sound weaker on DX openings during the daylight hours.

VHF Ionospheric Openings

Possible transequatorial propagation and occasional sporadic-*E* (*Es*) propagation will keep the VHF enthusiast happy. *Es* ionization is expected to increase considerably during May, and fairly frequent VHF meteor-scatter short-skip openings should be possible. These are likely to occur over distances of approximately 1,000 to 1,400 miles. Although *Es* open-

ings can take place at just about any time, the best time to check is between 10 a.m. and 2 p.m. and again between 6 and 10 p.m. local daylight time.

A seasonal decline in transequatorial (TE) propagation is expected during May. An occasional opening may still be possible on VHF. The best time to check for VHF TE openings is between 9 and 11 p.m. local daylight time. These TE openings will be north-south paths that cross the geomagnetic equator at an approximate right angle.

Auroral activity is generally lower now than during March and April, due to the change in the orientation and position of the Earth and magnetosphere in relation to the solar wind. Watch for planetary K-Index (Kp) values above 6, which occur on days when we see coronal holes affecting space weather or the arrival of coronal mass ejections a few days after any major solar flare.

One meteor shower, the Eta Aquarids, will occur in May. The Eta Aquarids peak on May 6, but start around April 20, 2008. This shower has a peak rate of up to 60 visuals per hour. Look for TV and FM broadcast pings (short bursts of signals, refracted off the ionized trails from the burning meteorite) during these events. If you're an amateur radio operator, look for 6- and 2-meter openings off the ionized meteor trails.

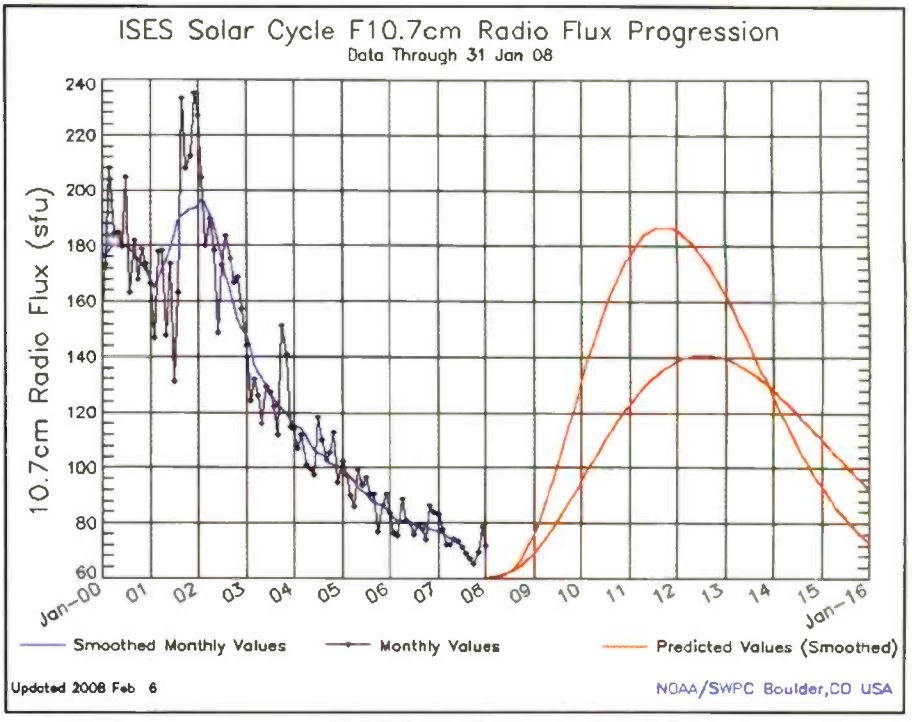


Figure 3. The Smoothed Solar Cycle F10.7cm Flux curves for Solar Cycle 24, with Cycle 23 actual data in black. Again, note the two different red curves starting in 2008. And, again, scientists are not in agreement as to which prediction is the more likely to fit the real solar cycle activity. (Source: NOAA/SWPC, NOAA's Space Weather Prediction Center)

Current Solar Cycle Progress

Are we at the very end of Solar Cycle 23, or are we at the very beginning of Cycle 24? The current numbers suggest that we're at the very edge of the cycle change. Certainly, with the arrival of reversed-polarity sunspots, we must be at the very beginning phase of the new cycle. We'll know in a few more months when we can statistically find the solar minimum.

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7-cm observed monthly mean solar flux of 72.1 for January 2008. The 12-month smoothed 10.7-cm flux centered on July 2007 is 72.5. The newly released predicted smoothed 10.7-cm solar flux for May 2008 is 62.

The Royal Observatory of Belgium reports that the monthly mean observed sunspot number for January 2008 is 3.4, a very large jump back down from December's 10.1, but still up from November's 1.7 and October's 0.9. The lowest daily sunspot value of zero (0) was recorded on January 9, and on January 12 to 29. The highest daily sunspot count was 12 on January 4, 2008. The 12-month running smoothed sunspot number centered on July 2007 is 7.0. The forecast for May 2008 calls for a smoothed sunspot count of 5, reflecting a gradual start to Cycle 24.

The observed monthly mean planetary A-Index (Ap) for January 2008 is 6, which is typical for the beginning of winter. The 12-month smoothed Ap index centered on July 2007 is 7.4. Expect the overall geomagnetic activity to be varying greatly between quiet to minor storm levels during May.

I'd Like To Hear From You

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 using a cell phone or other WAP device, 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.

Happy signal hunting! ■

by Gordon West, WB6NOA, WB6NOA@arrl.net

DSP Noise Reduction Speakers

If you listen to your scanner and two-way radio system for hours on end, you can appreciate the external speaker jack for a big speaker. My ham rig's original external speaker was a 12-volt DC-powered Variable Response Console from Alpha Delta Communications. The big speaker gave me rich audio, and I could power on the fully adjustable analog equalization network, giving me high boost, low boost, and a relatively decent null to reduce an annoying high-frequency heterodyne whistle. It even had a jack for headphones, allowing me to play with high and low boost knobs for just the right pitch, without driving everyone else in the radio room nuts!

Each of my scanners had a Motorola speaker box, which certainly gave a fuller, richer-sounding audio output than did the relatively small speakers in the scanners themselves.

When I added a similar-type GE speaker to my 2-meter/440-MHz ham set, things sounded fuller, but the rumble of repeater output CTCSS was a distraction. Even my big Alpha Delta VRS was not totally effective in rolling off the low CTCSS tones.

Plenty of DSP speaker systems to improve older radio performance.

It Just Keeps Getting Better

This was 10 years ago, about the same time that SGC Corporation introduced a marine radio with Advanced Digital Signal Processing (ADSP) 12-volt powered noise *subtraction* system. It was big and bulky and the red, amber, and green LED bar graphs looked really "gee whiz" in my radio room.

Boy! Did the SGC ADSP audio noise subtraction system work well! On ham radio, it would take about five seconds to analyze the background noise, and then slowly reduce it to nearly zero. On the VHF/UHF sub-audible above 103.5 Hz, it would magically analyze the steady tone frequency and subtract it from the big speaker output. On my scanner, "basso profundo" dispatchers now had the same characteristic as a tenor, minimizing speaker rumble.

Soon, SGC was joined by other radio manufacturers employing an imported European Digital Signal Processing (DSP) chip that would perform near magic on audio signals coming out of your radio system.

The DSP would far outshine my analog high-pass and low-pass adjustable circuits in my earlier powered speaker system. With DSP filtering, broad analog response curves turn into steep digital walls for precise noise attack and specific frequency response.

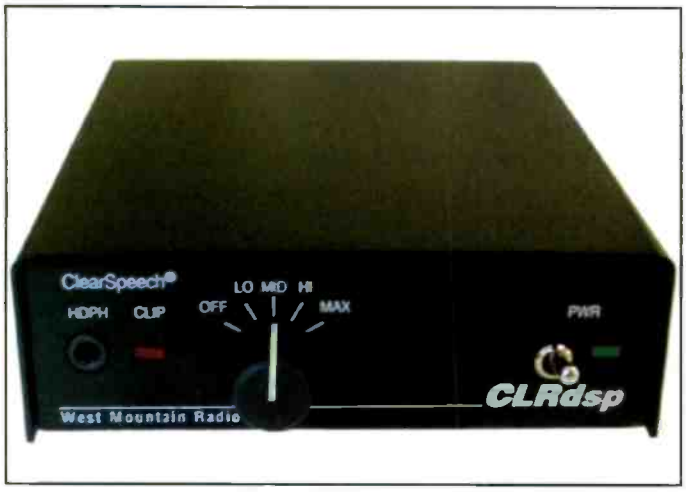
Here's How It Works

The audio out of your radio's external speaker jack first enters the DSP speaker's analog-to-digital (A/D) converter, then goes to the DSP ROM. It then goes out the processor's RAM to the digital-to-analog (D/A) converter, then to a headphone or speaker jack or its own built-in speaker. Inside the DSP chip is a very-high-speed microprocessor that performs a routine called Multiply And Accumulate (MAC) in just one clock cycle. In most of the newer DSP speaker systems, all the software programming is automatic, leaving you with only a DSP level adjustment.

As analog audio enters the analog-to-digital stage inside the chip, a sample and hold circuit may sample both amplitude and specific frequency in time, executing millions of audio "slices" that are converted into binary numbers. While audio CD players must execute high sampling frequencies, human speech is much easier to quantify then a rock band!

Within this single DSP chip, built into the speaker enclosure, background hiss and high-frequency hash is "subtracted" from the output signal. This same circuit may also attack any steady tone, either CTCSS or a high-frequency heterodyne whistle, and subtract it, too. But, magically, any tone rapidly changing in frequency, such as Audio Frequency-Shift Keying (AFSK), or any tone that is intermittent, like Morse code CW, is recognized as likely meaningful and passes through to the D/A converter, and ultimately to the built-in speaker.

"Mathematical equations control and alter the binary numbers that pass through the DSP chip, resulting in numbers which are converted back into tangible audio signals, and subtracting repetitive numbers that are analyzed as background hash, hiss, rumble, or an annoying heterodyne," said Pierre Goral, the late founder of SGC, which is an acronym for Stoner Goral Corporation.



West Mountain Radio DSP speaker system.

Two-level adjustments with the SGC DSP speaker.

Elaborate high-frequency transceivers may incorporate continuous variable DSP filters, some imbedded deep in the Intermediate Frequency (IF) stage of the transceiver. This is where some of your big bucks go when buying an HF radio featuring sophisticated IF DSP filtering.

In most new DSP speakers, filter parameters are pre-set, and your only adjustment may need to be the *amount* of DSP filtering desired. The more filtering you add, the more mechanical will be the speech your speaker recovers. And while audio DSP filtering is far less efficient than DSP filtering in the IF, there is still plenty of magic that a DSP speaker can bring when plugged into the back of your radio transceiver or shortwave receiver.

Here's What It Does

As an example, I monitor for UHF weak-signal propagation beacons, 2,500 miles away across the Pacific. I would drive everyone nuts in my house if I were to listen to the background noise at medium volume. Turn on the squelch, right? Setting a squelch for weak-signal CW reception will lead to an annoying squelch-break problem: The signal must be many microvolts in intensity before it gates the squelch transistor open, and that open squelch may only last for a fraction of a second, causing you to miss an extremely weak signal well below your squelch-break setting.

With a DSP speaker, I turn up the volume, turn squelch completely off, and then switch in the highest DSP level to subtract the hash. It's like magic—you hear the steady background hash get lower, and lower, and lower—like water trickling down the drain, until there's almost nothing coming out of the speaker. Yet, let a 1/2 microvolt of CW signal sneak in from the transpacific beacon and *instantly* your non-squelched receiver is passing the distant propagation beacon, just barely peeking through the noise.

For scanners, a weak signal that barely breaks squelch is an ideal attack for DSP—squelch off, DSP on, and your speaker goes nearly silent until it detects a distant station transmitting.

On high-frequency ham bands, the modern DSP speaker attacks and cancels annoying steady heterodyne tones and quickly hushes background hash. Like a miracle squelch control that knows no squelch-break threshold!

The GAP in-line DSC module with multiple inputs and output jacks.

Here's Who To Contact

The modern DSP speaker runs on 12 volts and usually incorporates a modest audio amplifier. The West Mountain Radio CLRspkr (www.WestMountainRadio.com) offers 3 watts amplification and four noise reduction levels: -6 dB, -

The large Heil Sound DSP speaker system.

10 dB, -13 dB, and -17 dB. This speaker system also has a 1/8-inch phone jack on the back for connection to an external loudspeaker or single mobile headphone.

West Mountain uses ClearSpeech Adaptive filters from NCT (www.nctclearspeech.com), developers of signal processing technology. And John Kalotai, N1OLO, of West Mountain tells me the noise subtraction is so good that the CLRspkr only passes the signals you want to come out of the speaker, including the higher XYL voices, all loud and clear, too! White noise and repetitive static get filtered out.

The SGC (www.sgcworld.com) ADSP 2 offers multiple noise reduction levels, up to 26 dB, and features a relatively small black metal enclosure and status LEDs. This is nearly the same size and style as the Gap HEAR IT speaker (www.gapantenna.com), featuring dip switches that let you pre-set eight levels of noise canceling to suit your listening level. The dip switches are not as convenient as an adjustable knob, but Gap also offers a HEAR IT fully adjustable -20dB DSP filter, that goes between your existing speaker and your radio. The Gap products are magnificent performers! By the way, BHI (www.bhinstrumentation.co.uk), in England, is the DSP chip manufacturer for SGC, GAP, and W4RT Electronics (www.w4rt.com), suppliers of ham radio accessories.

TimeWave (www.timewave.com) offers an LCD display DSP unit that lets you see the exact settings of the variable DSP filters, ideal for digital modes. The TimeWave DSP equipment is more expensive, but is truly designed for the electronics technician who wants the ultimate in variable DSP setting for digital reception.

MFJ (www.mfjenterprises.com) has many DSP audio filters, most front-panel adjustable and ideal for base station use when you're frequently changing DSP levels.

Heil Sound (www.heilsound.com) DSP speaker systems can also be found, used, and are extraordinary performers on communication receivers. Most ham operators kept them off their transceivers because transmit RF would sometimes get into the DSP audio amp, resulting in transmit SSB modulation coming out of the DSP speaker. It's important to choose metal housing for high-power, high-frequency base station use. And with *all* DSP mobile and base speaker systems, you should place multiple RF chokes in the lead lines to prevent transmit RF from getting back into the DSP speaker.

So try DSP soon, and listen for yourself to all that magic DSP can bring to your ears! ■

by Ron McCracken, KG4CVL / WPZX486

REACT Month Celebrates Much

"What's with this 'REACT Month?' you may ask. Well, it arrives annually in May, just as people begin to think about travel for Memorial Day, the Fourth of July, weekend jaunts, and summer vacations. In the excitement of making plans, REACT Month reminds us of our need to plan for safety.

REACT Teams across the nation and around the world will host safety displays in public places and provide speakers on safety topics to community groups. Their goal is to help radio enthusiasts get the best from their radios in an emergency by learning correct distress call procedure.

Other REACT Teams will conduct neighborhood SOS Drills to help residents prepare for severe weather outbreaks or similar local emergencies.

Individual REACT volunteers will continue to monitor CB Channel 9 and FRS/GMRS Channel 1 for distress calls from travelers, boaters, hikers, and others.

Turnabout

REACT Month is also a time for Teams to celebrate the achievements of their volunteers. REACTers quickly realize their need for on-going training in order to be of maximum service to those in distress. Likewise, to assist local authorities effectively when needed, REACT personnel need to be familiar with the requirements of those agencies. During REACT Month REACT Teams will often recognize those who have helped train their members over the past year, too.

The Points of Light Foundation, established by former president George W. Bush, recently honoured two REACT members for their contributions. As is often the case, their community service extends beyond REACT. Each has received letters of congratulations from both the current President Bush and the former President Bush.

Sue Currie of Louisville Metro REACT (Kentucky) was one of the honorees. In addition to her REACT efforts, Sue serves with the Red Cross and the United Way. She was honored by the Red Cross with its Clara Barton Award in 2007.

Bill Kofron, Colleton County REACT (South Carolina) is another honoree. Bill rides with the Blue Knights law enforcement motorcycle club in one of his "other lives." He also serves as chaplain to a VA hospital and the Fraternal Order of Police. He, too, helps the Red Cross as well as the Heart Association and other groups in addition to his REACT duties. He was named REACTer of the Year for 2007 by the South Carolina REACT Council.

Neil Jackman, REACT Nicholson (Mississippi), was recognized by REACT International, Inc., upon becoming only the second REACT volunteer so far to successfully complete the rigorous requirements of a REACT Certified Emergency Communicator. Each candidate must complete an advanced, in-depth REACT course in emergency communications. A candidate must then be evaluated during a real incident or major exercise in order to qualify for certification.

In other news, Tom Currie, Training Chairman for REACT International, Inc., has been appointed by the National Registry of Certified Emergency Communications Volunteers (NRCEV) to its Certification Board. Currie has been an amateur radio and CB operator for 30 years. He serves with Louisville Metro REACT and has held various offices with his Team and the Kentucky REACT Council. He has also represented REACT on the Kentucky Volunteer Organizations Active in Disasters (KyVOAD).

There's More

These individual accomplishments all contribute to stronger REACT Teams, better able to serve their communities. They develop Team pride and encourage fellow REACTers to pursue goals in related fields of interest. That all pays off in stronger REACT Teams ready to serve the public.

REACT of Grand Island (Nebraska) is one fine example. For five years, Team members have been experimenting with webcams at events where the Team was participating. This year Grand Island REACTers were able to post to the Internet live coverage of their involvement at the Husker Harvest Days Festival. They're now sharing the technology with other Nebraska Teams.

Citizen Corps of Minnesota called upon Ramsey County REACT to mount a safety display at its two-day conference. Thousands of attendees learned more about REACT and its radio role in safety. Some wanted to join REACT and the Team was happy to oblige. Meanwhile, other Ramsey County

REACTer Sue Currie, recent Points of Light honoree, earlier received the Clara Barton Award from the American Red Cross.

REACTer Bill Kofron, another recent Points of Light honoree, was also named REACTer of the Year for 2007 by the South Carolina REACT Council.

REACTers were busy assisting with communications at an event featuring service dogs that aid the blind and disabled. Handling multiple events simultaneously is a stretch, but Ramsey County REACT did it.

Orange County REACT (California) has integrated FEMA's Incident Command System courses and documents into its Team operations. Their knowledge was put to the test in the California wildfires. Orange County REACT linked up with CREST REACT to provide authorities with radio reports on observations of fire movements in a standard format and using standard report forms. This reduces the chance of error when homes and lives hang in the balance.

REACTer Roberta "Bobbi" Ernston proudly holds her FCC exam. She scored 100% to become KDØCVG, Albert Lea REACT's newest amateur radio operator.

Albert Lea REACT (Minnesota) recently gained its newest amateur radio operator, Roberta "Bobbi" Ernston, KDØCGV. Bobbi earned her Technician class license through the Albert Lea Amateur Radio Club. She's long monitored CB radio with Albert Lea REACT to help truckers stay alert along highways in her area. She now has a new radio resource to use in her service to the community.

York County REACT (Pennsylvania) became the third REACT Team to conduct an SOS Drill for its community. Wisely, they chose the Emergency Preparedness Fair being held in their town as their operations center. That meant the SOS Drill would get maximum public exposure. It was their first attempt, and the Drill brought only a handful of contacts from citizens. However, the Team was pleased with its success and has learned that it will need even greater publicity when it next mounts an SOS Drill. REACT SOS Drills have now taken place on the U.S. east and west coasts, and in Canada.

Room for You

REACT always has the welcome mat out. Hopefully, the reports above will strike a chord within you that will prompt you to put your radio to work in the service of your community. REACT offers you the opportunity and the training—and the recognition.

Consider joining your local REACT Team. If your community has none, you and a few friends can form one. What better time to do it than during REACT Month? Just call 1 866 REACT-9-9 or send an email to REACT.HQ@REACTintl.org for a Team Charter kit. You'll be right in time for half-year dues. Bonus! ■

by Peter J. Bertini, radioconnection@juno.com

Measuring Receiver Sensitivity

It's often said a man is only as good as his tools. I think this is a wise adage, and I'm a sucker when it comes to buying the best test equipment I can afford! I love to experiment, and I enjoy dabbling in both vintage and modern electronic communications equipment. I also like to design and homebrew my own ham equipment. My work is only as good as my education and the equipment that backs that up. Both reinforce each other.

Fortunately, we live in good times. I am not a rich man, but there's so much high-end lab-quality test equipment from industry and government sources being dumped on the surplus market. And as the supply often greatly exceeds the demand, the prices on desirable goodies frequently drop within reach of the meager assets in my very thin wallet.

Photo A. This rack is full of "heavy metal" vintage communications equipment and accessories. At the top of the rack is a vintage Globe Scout 40A ham transmitter. Going lower, the large receiver with the modernistic styling (by famed industrial designer Raymond Loewy) is a Hallicrafters model SX-42. The RCA AR-88 receiver (middle of the rack) was exported by the United States to the United Kingdom and the USSR during WWII as part of the Lend-Lease war program. They're scarce in the states, but common and popular in both Canada and the UK. The bottom receiver is a Hallicrafters SX-28, an extremely popular vintage communications receiver from the WWII era with classic styling and a handsome, funky look. The two units beneath the SX-28 are SSB (single sideband) adapters; one is the B&W model 370, the other is the Central Electronics model A Sideband Slicer.

There are some extreme bargains to be had! For instance, signal generators that cost tens of thousands of dollars 20 or 30 years ago are now available for a few hundred dollars. But the asking prices can vary greatly depending on where and how you shop. The best bargains are found at the bigger, well-attended ham fleamarkets. For example, if you can make the yearly pilgrimage to the Mecca of ham radio gatherings, the Dayton Hamvention, you'll find deals galore in the large outdoor fleamarket. Remember few vendors want to haul all of that equipment back home! On the other hand, dealing on Internet auction sites means buying sight unseen, from professional resellers, and you'll be bidding against a worldwide market to boot!

We've discussed RF signal generator basics in past columns. We've shown how to improve the utility of the Heath SG-8 signal generator, a basic low-cost instrument that was marketed to meet the needs of the most frugal radio enthusiast. Stepping up another notch in quality would encompass signal generators marketed for the radio and TV service industry. A brief list of manufacturers that catered to those markets would include familiar brands like Hickok, Simpson, Heath, Eico, RCA, and Precision. Many of these early generators are functional and in daily use to this day.

Based on the positive feedback from our past musings on restoring and using shop test equipment I think this might be a good time to delve further into the mysterious realm of signal generators. This column will need to be continued in a future issue, as there's a lot of material to cover—but if you stay with me I promise you'll learn a lot about using signal generators and how to make useful and accurate RF measurements!

Unfortunately, service shop-grade signal generators have limitations. While the output level is adjustable, the levels are relative and not calibrated. The modulation level might be adjustable, but the percentage of modulation isn't known. The dials are analog, and the precision and scale accuracy are often less than what is needed. Precision means the degree to which the dial resolves your ability to set the generator to an exact frequency; for example, it's possible to set the dial to the closest 10ths of kHz or kHz. Accuracy means that the frequency you set the generator dial to is also the exact frequency the generator is generating!

When Do You Need A Lab-Quality Generator?

Ready access to a good, professional lab-grade signal generator is a must for the serious radio aficionado—the type of experimenter who actively builds, modifies, and designs his own receivers, or who's intent on getting the most performance from his equipment.

How often have you wondered if a recent alignment or the replacing of weak tubes measurably improved a receiver's sensitivity? Or whether an attempt to "soup up" a vintage communications receiver by replacing the 6SK7 RF stage with a hotter 6SG7 really did any good? In theory a 6SG7 tube has a better noise figure and more to gain to overcome the noisy mixer stage. Is the sensitivity improved, or did the changes make the

radio worse! And what did you give up in exchange? Is the dynamic range compromised, meaning the radio is now more prone to overload? These questions can be answered if you have the proper test equipment, and if you know how to use it!

Does everyone who services or repairs old radios need a high-end signal generator? Honestly, the answer is probably no. I've performed many basic alignments armed with the venerable SG-8 generator with its companion frequency counter that was the subject of a restoration in a past column. But to determine how sensitive, in quantifiable terms, a SW or ham receiver is requires generator that's capable of generating an output signal level that is accurate and calibrated.

For example, measuring the Signal-Plus-Noise-to-Signal Ratio is one method to determine the sensitivity for an AM receiver; it shows how well a receiver can recover modulation (information) from a weak signal. SINAD (degree of quieting) is a method used for measuring FM receiver sensitivity. For example of this, an FM receiver's sensitivity might be specified as being 0.45 µV (microvolts) for 20 dB SINAD using this method.

If you're a vintage communications receiver fan like I am, your interest is probably piqued by now! **Photo A** shows a rack full of "heavy metal" receivers in my collection that are awaiting restoration. If you're wondering why these boatanchors are also often called heavy metal, consider that the RCA AR-88 receiver in the center of the rack weighs 100 pounds by itself! Boatanchors and heavy metal are synonymous with equipment that is large, heavy, and bulky. I believe our sister publication *CQ* magazine may have coined the "boatanchor" phrase back in the days when converting old military sets to ham use was a popular means for hams to get on the air cheaply.

What Is A Good Signal Generator

Here's the good and the bad news. While there are many, many lab-quality generators to chose from, some are really good and many others are real dogs. The Hewlett Packard model HP-8640 arguably set the gold standard for signal generators dating from the 1970s era, and these generators are very common and steadily coming down in price. The HP-8640 was an extremely popular model, and thousands were used by the military and in private labs. The ARRL's Technical Lab was a proud recipient of one of the first HP-8640 generators.

Photo B. My Boonton 102F generator. The modern-looking unit above it is a Cushman model CSM-50A cell site monitor; its features include a signal generator, spectrum analyzer with tracking generator, and a receiver that can accurately measure AM modulation percentage, FM deviation, and frequency. These service monitors are commonly used for aircraft, marine radio, and commercial two-way radio servicing. Their prices are falling and they're becoming a bit more affordable. The Tektronix X-Y display scope is a spectrum display for a highly modified A&A Engineering spectrum analyzer.

The generator had a low noise floor (important for making receiver dynamic range measurements) and, depending on the options, the HP-8640 generator could cover up to either 520 or 1040 MHz. Another option allowed the signal to be phase-locked to an internal frequency standard for rock-solid frequency stability. But here's the rub! These generators used nylon gears that are beginning to age and some are failing, and they also used proprietary integrated circuits that are no longer available. Know what you're buying, and be sure it's from someone you can trust.

Another example is the HP-8660 synthesized generator. These have a higher oscillator noise floor, which may limit their utility for making dynamic range measurements. Excessive oscillator noise floor is a weakness found in many synthesized or phase locked RF signal generators, but they offer push-button frequency entry as well as other nice features, such as presettable sweep frequency limits. I've been told to avoid the failure prone HP-8660B, which was marketed for only one year, and to look for an HP-8660C or D version instead.

I suggest spending no more than you can afford to lose. This equipment is generally very reliable, but it is aging equipment, and if it fails you may need to find a parts donor to steal parts from, or at worst you may end up with an unrepairable unit. A lot of skill and knowledge is often needed to repair these units, even if parts are available. On another note, I've spent more for the factory service manuals than I have for some pieces of test equipment. I've only scratched the surface here. I could talk about various signal generators made just by Hewlett Packard alone for many columns!

Clemens SG83-C

My favorites are a pair of Clemens SG-83C analog RF signal generators. These are basic no-frills, lab-quality instruments. They have a very low noise floor, good dial accuracy, and an accurate and calibrated RF attenuator. They tune down to 50 kHz, which is a plus for many Drake and Hallicrafters receivers that have IF stages in this range, and up to 54 MHz, over several ranges. Another plus is that they can be powered from an internal 9-volt transistor battery in the field. They're also very simple and extremely easy to

repair and service; all of the electronic components are readily available.

Unfortunately the Clemens units were only offered for a few years, relatively few were made, and they now have an almost cult following. Folks who own them tend to hang onto them. They are reliable, simple, stable, easily to align, and accurate enough for my needs (one of the two Clemens SG83-C generators I own is shown in **Photo B**). I'm only mentioning these models because they're simple, basic analog generators that are capable of doing a fine job. There are only four active devices (transistors) in the SG83-C!

A HP-8640 Wanna-Be!

The best lab-quality generator I own is a Boonton model 102F; this model covers from 450 kHz to 1040 MHz. Its specifications are very close to that of the HP-8640. Fortunately, this unit's design is within my skill level for repairs if problems arise. Besides having digital frequency readout, it also has a very versatile AM and FM modulator, and the generator also can be phase locked and features a very accurate attenuator system.

The FM modulator can be modulated up to ±200 kHz deviation, and the FM modulator is direct-coupled down to DC. This means the instrument can be used with a function generator and oscilloscope to perform IF sweep alignment. I'll show the advantages of doing swept IF alignments when we restore the RCA AR-88 communications receiver in a future column. Sweep alignment is also the proper way to align early FM receiver IF stages. The Boonton has a decent noise floor. I paid around $300 dollars for the 102F several years ago, and the prices have come down since then (my Boonton 102F is shown in **Photo C**).

If I were in the market today I'd probably be looking at the Fluke 6060A signal generator since many of these units are now showing up surplus all at once and thus sell for reasonable prices. A good HP-8640 would also be on the top of my list, but it would have to be one that was thoroughly checked out first!

As I said, there are many good RF signal generators out there, but there an equal number of problem-prone models that should be avoided at all costs! I'd suggest conferring with a knowledgeable individual before committing to buying any generator. And always buy from a reputable source! Many dealers dump problem units on Internet auctions sites as being "untested," or they'll state something like this as a disclaimer, "the unit seems to power up, but we are unable to test further." Do you really think a savvy dealer is going to give away a top dollar unit without knowing exactly what he is selling?

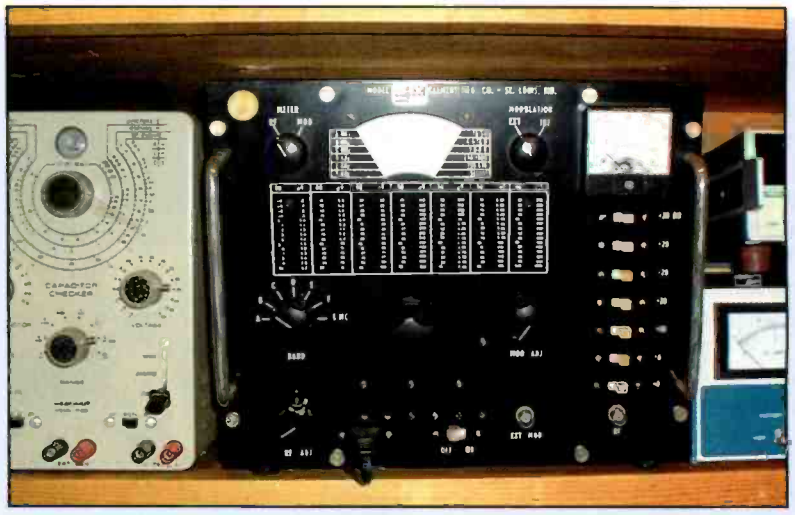


Photo C. This is one of the two Clemens signal generators I own. They're very basic units, but have lab-quality features. They have decent analog dials that are accurate and precise, they're stable, and the RF signal output level attenuator setting is accurate. Also the percentage of AM Modulation can be set to the desired level. These last two features are needed to do accurate Signal-Plus-Noise-to-Signal Ratio measurements.

Microvolts And Receiver Sensitivity

Here's where we get into the nitty-gritty of receiver measurements, and this is also a very confusing topic. First, you need to determine how receiver sensitivity is stated and how it is measured. For as long as I can remember, manufacturers have specified receiver sensitivity in µV. For example, my SX-28A manual states that the receiver has a sensitivity of between 6 to 20 microvolts (µV) for a 500-milliWatt (mW) output over the entire range of the receiver. Here's the fly in the ointment: microvolt-based sensitivity measurements are meaningless unless other important receiver parameters are also known.

What's Up With Microvolt Readings?

Let's suppose you measure two different receivers for sensitivity—and I am again getting ahead of myself since we haven't shown how to do this yet—and your tests show that both receivers have the same 1-µV sensitivity for 10dB S+N/N (Signal-Plus-Noise-to-Noise Ratio). Does this mean both receivers are equally sensitive?

Alas, it's impossible to give an honest answer without knowing what antenna impedance the set was designed for! Ham and SWL receivers typically have input impedances between 50 and 300 ohms. Some sets were designed for use with high-impedance 300-ohm balanced line, while others were intended for use with 50-ohm coaxial feedline.

For µV-based sensitivity measurements to be meaningful we must know the receiver impedance! Consider this: Is a 1-µV sensitivity for a receiver with a 300-ohm antenna impedance the same as a receiver with a 50-ohm impedance? An antenna intercepts only so much signal energy from the "ether," and that amount of signal represents a finite amount of energy, or power. We can change (transform) the captured signals to a different voltage or impedance, but the amount of power from the antenna is a constant and cannot be created or destroyed in the process.

The power law that states *impedance is equal to voltage (squared) divided by watts* proves that the RF energy needed to produce a 1-µV signal for different receiver impedances isn't the same power level. Thus, unless the receiver antenna impedances are the same, or corrected for, sensitivity tests based solely on µV readings between different receivers can be very misleading and result in erroneous conclusions.

Some earlier receiver manufacturers may not even have specified the designed antenna impedance for their sets. In fact, many vintage receivers were designed for extremely high impedances, as would be encountered with short wire antennas. I'll show how to deal with these as well later on.

A Quick Intro To dBm And dB!

The difference between dB and dBm is that dBm is an absolute power reading. For example, 0 dBm is a power level of 1 mW. Thus, 10 dBm would *always* be a power level of 10 mW. Here's another example: –10 dBm is always a power level of 0.1 mW, or 100 µW. Engineers prefer to work in dBm-based measurements. Modern signal generator attenuator scales provide signal level readings for voltage level and for dBm power levels. Professional receiver specifications are now all based on dBm-defined measurements.

On the other hand, DB is a comparative reference. For example, there's a 3-dB difference between transmitters with 5- and 10-watt outputs. (Doubling the power is a gain of 3 dB, increasing the power by 10 times is a 10 dB increase.) DBs are useful as comparisons between two power or voltage levels. Again, I'm getting ahead of myself, and I'll discuss this subject further in my next column. For now let's concentrate on working with voltage measurements!

A Common Pitfall To Avoid

Let me make a few more points before wrapping up. Here's another trap that I've seen technicians fall into. We can correct for different impedances by using an RF transformer to match a signal generator to a load with different impedance. Let's say we have a 50-ohm generator, and a receiver designed for a balanced 200-ohm antenna feedline. An RF transformer with a 1:2 winding ratio would yield an impedance transformation that's the square of the turns ratio, or 4:1 Z (impedance).

Using a matching transformer between the signal generator and receiver sounds good in theory; it should provide a proper match between the signal generator and load, but remember that while we can transform impedance or voltage higher or lower, power is a constant and cannot be created or destroyed. This means the dBm readings on the generator attenuator scale will always be correct, but the µV readings need to be doubled since the RF voltage at the receiver is twice that present on the signal generator output! This is why professionals like using dBm-based specifications. There's no ambiguity!

Some folks have come up with very outstanding sensitivity measurements because they've forgotten that the sensitivity is the voltage at the receiver antenna terminals, after the matching transformer, and the not the µV reading shown on the generator's attenuator scale or indicator (this is the signal voltage level at the generator's RF connector!). Thus, with the 2:1 RF matching transformer, the actual µV signal at the receiver antenna is twice that shown on the attenuator scale! Yes, I just repeated myself, but I want to hammer this point home.

There are other pitfalls, too, such as the need to terminate the generator into a load that matches its impedance, and that's where I'll start off next time!

And Until Next Time...

I know I've probably jumped around too much, assumed too much, and left many questions unanswered. It will make more sense when I'm able to show how to apply this knowledge on the bench. I think most experimenters learn more via hands-on experience than reading the dry prose I've written so far! And don't worry, I'll show you what all of those fancy gauges and dials that are on those generators are used for. I welcome your comments on the job I'm doing so far!

In the meantime, keep those old tubes glowing and those soldering irons warm!

by John Kasupski, KC2HMZ, kc2hmz@verizon.net

U.S. Coast Guard To Continue HF Weather Broadcasts

As dutifully reported in this column some time ago, back in April 2007, the U.S. Coast Guard asked for public comment on the need for its HF high-seas weather voice, fax, and NAVTEX broadcasting services. The idea of seeing these services discontinued had originally struck me as potentially dangerous, especially for those smaller commercial operators who aren't in a financial position to equip their vessels with expensive satellite equipment. Nevertheless, I offered no opinion in this space other than to encourage persons concerned to submit comments, so that the Coast Guard could weigh the need for its services against the cost of maintaining or replacing the infrastructure necessary to provide those services, much of which, according to the Coast Guard, has exceeded its reasonable life expectancy.

It occurred to me this month that since the official public comment period had long since ended (the comment period officially closed in August 2007), that it was time to revisit this subject and see what the public's comments were. I did, in fact, do this, locating the actual text of the public comments on the Internet and reading through dozens submitted by people ranging from operators of small pleasure craft to captains and executives of large commercial operations. I wasn't surprised when it turned out that the vast majority of comments were in favor of the USCG retaining its HF weather information services.

Armed with that, I was all set to write a column this month presenting these facts and urging the Coast Guard to continue to do its duty in helping to protect the safety of vessels, not only on the high seas but on America's territorial waterways as well.

Then, the strangest thing happened...an agency of the government decided on its own to do the right thing! After analyzing the public's response, the Coast Guard concluded that it was necessary to continue to provide these services and issued a report on its study of the situation, which you can find on the Internet using the link on the page at the following URL:

http://www.navcen.uscg.gov/marcomms/high_frequency/HF-WX_notice.htm

This is a lengthy PDF document, but the report's conclusion is what matters. Quoth the Coast Guard: "The responding public collectively believes that the USCG HF broadcasts are essential to their safety. There is no viable alternative to the USCG HF broadcasts because present alternatives are perceived by the public to be out of financial reach. Also, marine weather forecasts available through these alternative sources may not guarantee the same level of accuracy, timeliness, and/or sufficiency as provided by the USCG HF broadcasts."

The infrastructure in question—that is, the Coast Guard's total HF infrastructure, consisting of 123 Rockwell-Collins

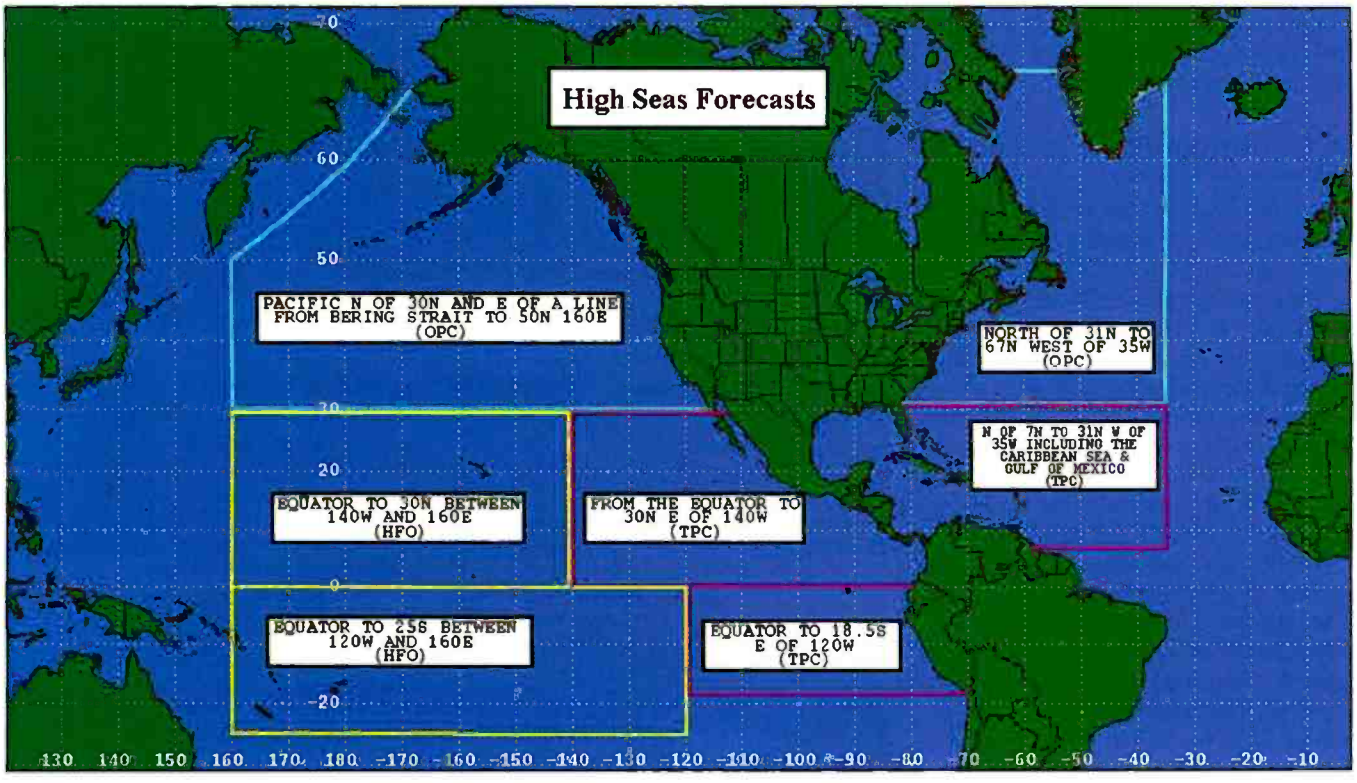


Figure. The USCG broadcasts weather information for a considerable expanse of ocean, as shown on this USCG graphic.

HF80 and Harris RF-755 10-kW transmitters—has reached the end of its useful life because repair parts are ever harder to find and ever more expensive to purchase as these transmitters get older. We will undoubtedly see all but the most critical of the Coast Guard's HF services discontinued, since the USCG does not have funding to replace all these transmitters.

However, the transmitters used for the HF weather broadcasts—a total of 20 Coast Guard transmitters along with three Navy transmitters on Guam that are used to broadcast HF weather fax, voice, and text (SITOR) forecasts to mariners for the areas shown in the accompanying Figure—will be replaced so that these services can be continued. These transmitters cost about $200,000 a pop with installation, according to the Coast Guard, bringing the bill for replacing the transmitters used in providing these services to a total of around $4 million.

Admittedly, four million bucks is not pocket change, but for those who depend on those services for the safe operation of their vessels, it will be money well spent. It's also nice to see that The Powers That Be at USCG have decided in the best interests of mariners in this matter.

For us radio buffs, of course, this also means that the potential loss of numerous HF utility targets has been averted. Thus, we can continue to log these HF voice and digital transmissions, while vessel operators can continue to use the information contained in them to sail more safely. I love a happy ending!

Something Else Worth HAARPing On

A major event that captured the attention of many utility listeners took place in January when the HF Active Auroral Research Program (HAARP) in Alaska and the Long Wavelength Array (LWA) in New Mexico conducted two days worth of lunar echo experiments on HF.

Many listeners heard the CW signals on one or both of the frequencies 6.7925 or 7.4075, and heard either the transmitted signal from Earth, the "echo" after it bounced off the lunar surface and returned to *terra firma*, or for those who were really lucky, both. The HAARP people reported that they received over 550 reports from North America, Australia, Europe, and the Pacific islands, some of which included audio recordings and other data that will be especially valuable.

Some who heard of this event or listened during it may wonder why it was so easy to hear these signals. It could, in fact, easily be heard with most any general coverage receiver capable of receiving CW, along with a suitable antenna such as a 40-meter dipole—especially by listeners who are familiar with the kind of heavy artillery hams typically roll out

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."

when trying to achieve EME (Earth-Moon-Earth) contacts on the ham bands.

The answer is simple, actually: The HAARP website states that the transmitter power of the HAARP facility is 3,600,000 watts (can you hear me now?). That's considerably more than the 1500 watts typically available to hams running at the maximum legal power limit. HAARP's transmitting antenna used for the experiment adds a gain of 28.6 dB (over isotropic) at the frequency used for the experiment. That's plenty to produce a signal reading in the range of S-5 or so on a typical commercial shortwave receiver with a dipole receiving antenna, given how S-meters on commercial communications receivers are usually calibrated.

While HAARP and the dazzling array of equipment at its location just north of Gakona, Alaska (see **Photo A**), has been well documented, the aforementioned LWA is not as widely known. Described by parties interested in its development as an effort to advance the science of astronomy by using inexpensive antenna stations to build a very large aperture with which researchers can probe the depths of space at frequencies between 10 and 88 MHz, the LWA is actually a collaboration of four institutions, participating as members of the Southwest Consortium: the University of New Mexico, the University of Texas at Austin, the Department of Energy's Los Alamos National Laboratory and, of course, the U.S. Navy's Naval Research Laboratory. There's also significant collaboration with non-member entities, such as the National Radio Astronomy Observatory.

Plans for the LWA, which is still under construction, call for more than 50 stations spread out across a distance of some 400 kilometers. The prototype for this array was built on the Plains of San Augustin in southwestern New Mexico in the fall of 2006, and is referred to as the LWDA, for Long Wavelength Demonstrator Array. Its antennas (see **Photo B**) are only about four feet tall, and are basically dipoles as antenna designs go, acting much like old omnidirectional TV-style antennas. However, combining 16 of these antennas allows researchers to collect data comparable to a traditional dish-type telescope 70 feet in diameter!

The aim of the project is simply to open a new window into the electromagnetic spectrum. The portion of the RF spectrum between 10 MHz and 90 MHz is relatively unexplored. It's hoped that the LWA project will provide valuable data in several key scientific areas, perhaps leading to new discoveries about the origins of the universe, or maybe even the ability to predict those pesky geomagnetic storms that "black out" HF, sending us off to make sure the antennas are still connected to our radios!

Upcoming Space Missions To Watch For

As we edge into the spring months, the departure of snowbanks and icicles in the northern latitudes will have many of us turning to outdoor activities, but some will remain doggedly attached to their radios and looking for events to monitor. The space-shot enthusiasts among us will therefore want to know the basics of NASA's scheduled springtime launches.

The first of these, already looming as this May issue hits your mailbox in late April, is from the Kennedy Space Center, where the space shuttle *Discovery* is slated to blast off from launch pad 39A at 8:26 EDT on April 24. *Discovery* will transport to the International Space Station some Japanese-built scientific equipment, namely the Kibo Experiment Module's Pressurized Module (JEM-PM) and Remote Manipulator System (JEM-RMS).

A little over three weeks later, on May 16, a Delta II rocket carrying GLAST (Gamma-Ray Large Area Space Telescope, basically a scientific instrument for detecting gamma rays) will be launched sometime between 11:45 a.m. and 12:45 a.m. EDT according to NASA's current schedule. GLAST is the heir to its successful predecessor, the Compton Gamma Ray Observatory, and will depart for its mission from pad 17B at Cape Canaveral's Launch Complex 17.

When June 15 rolls around, those of you who are in listening range of Vandenberg AFB will want to listen for the Delta II liftoff to deploy OSTM, the Ocean Surface Topography Mission on the Jason-2 satellite, a follow-on to the original Jason mission. This is scheduled for 4:47 a.m. EDT, or 1:47 a.m. PDT, so you'll have to be an early riser (or a night owl) to catch this one as it leaves from Launch Pad SLC-2 at Vandenberg.

By the time those events have transpired (*if* they transpire...NASA's launch schedule is subject to sudden revision due to a wide variety of factors), we'll be edging into summer. Then, hopefully, I will remember to update you on what's scheduled for June, July, and August (August is especially busy, with three launches currently shown on the schedule at the NASA website). If I forget, check in on the #popcomm channel on IRC-Global and remind me. While you're there, you can also try your hand at enjoying the fun of live interactive utility monitoring.

Over To Our Readers For A Final

Last, but certainly not least, for this month is another collection of logs from

Photo A. This is the HAARP antenna "farm"—the little white rectangles are trailers the size of a tour bus. (Photo courtesy HAARP)

the world's leading experts in utility listening—our readers!

But before we get to their submissions for this month, I'd like to point out that the email address used for submitting logs and other neat stuff to me has changed. Please make a note of the new address, which is also at the top of the column:

kc2hmz@verizon.net

The chief causal factor for the change is that this month, I decided to stop being such a cheapskate and join the 21st Century by ditching my old dialup Internet access in favor of a much faster DSL setup.

We welcome submissions of logs, shack photos, story ideas, and other neat stuff pertinent to utility station monitoring. Just send them to that e-mail address, and I'll take care of putting them to good use on these pages.

With that, many thanks to these readers who have submitted the logs which follow: Al Stern, Satellite Beach, FL (ALS); Steven Jones, Lexington, KY (SJ/KY); Glenn Valenta, Lakewood, CO (GV/CO); Mark Cleary, Charleston, SC (MC/SC); Chris Gay, Lexington, KY (CG/KY), and a few from your columnist for good measure.

2187.5: V7LI7, *KRASLAVA*, 37,261-ton Marshall Islands-registered chemical/oil products w/eight routine TEST messages to NMG, USCG, New Orleans, LA, no acknowledgements, in GMDSS DSC from 0603Z to 0910Z; C6T2062, *ARCTIC OCEAN*, 10,303-ton Bahamas-registered refrigerated cargo ship w/routine Safety call to sister reefer C6T2064, *ATLANTIC OCEAN*, 10,285-ton Bahamas-registered refrigerated cargo ship, requesting simplex voice contact on 4077.0 kHz, in GMDSS DSC at 0619Z. (SJ/KY)

2872.0: Gander Radio wkg airliner for SELCAL check ALGP in USB at 0520Z. (ALS)

2899.0: Shanwick Radio wkg var airliners for position reports and SELCAL checks in USB at 0511Z; Gander Radio wkg United 932 for posrep 53N 40W and fuel report in USB at 0624Z; Gander wkg REACH 766 with posrep of 52N 40W in USB at 0635Z. (ALS)

2971.0: Shanwick Radio wkg var airliners for posreps and SELCAL checks in USB at 0513Z; Gander Radio wkg United 908 for posrep and SELCAL check in USB at 0516Z. (ALS)

3016.0: Shanwick Radio wkg airliners for posreps and SELCAL checks in USB at 0558Z. (ALS)

3167.0: Unid USN vessel making callouts, in USB at 1039Z. (MC/SC)

3291.4: Unid (ENIGMA V2A) YL/SS with 5-fig grps in AM at 0204Z. (CG/KY)

3389.0: Unid (ENIGMA V2A) YL/SS with 5-fig grps, badly distorted, in AM at 0135Z. (CG/KY)

3452.0: San Francisco Radio, flight report from WESTJET 923, in USB at 0608Z. (GV/CO)

Photo B. This antenna used in the Long Wavelength Array may not appear to be part of a cutting-edge scientific program, but it is. (Photo courtesy Southwest Consortium)

3455.0: New York Radio wkg Air Mexico 001 for clearance to change altitude from FL350 to FL370, in USB at 0522Z; New York wkg Martinair 607 for posrep in USB at 0525Z; New York wkg Getaway 11 for posrep in USB at 0532Z; New York wkg Air Europa 440 for clearance to LFPO (Orly, Paris, France); given secondary freq 5550, in USB at 0534Z. (ALS)

3485.0: Gander VOLMET with aviation WX, followed at hh+25 by New York VOLMET, in USB at 0528Z. (JK/NY)

4014.9: MARS net, AAA9RD, AAA9CA, and group, passing traffic and talking about non-active members, in USB at 0426Z. (GV/CO)

4021.5: R26611 (UH-60L) clg B1Z171 (1-171 AVN) in USB ALE at 0032Z. (MC/SC)

4038.5: NNN0RBD, USN MARS net control station, working NNN0XAT and NN0QCJ with net check-ins, misc. chit-chat, and weather, in USB at 0225Z. (GV/CO)

4077.3: MO beacon, strong here, in CW at 0439Z. (GV/CO)

4089.2: Dasher beacon, weak but readable, no fades, in CW at 0448Z. (GV/CO)

4125.0: Unid 2 stations in Russian, comms just ending, no station IDs, in USB at 0245Z. (GV/CO)

4146.0: Unid Creole-accented EE chit-chat about boats and family, in USB at 0249Z. (GV/CO)

4149.0: Tug *CENTURIAN*, WBN3022, radio check with WPE JACKSONVILLE in USB at 0620Z. (MC/SC)

4149.0: Unid vessel wkg WPE Jacksonville re: docking instructions, in USB at 0428Z. (GV/CO)

4316.0: Unid multiple OM/SS in QSO in USB at 0435Z. (JK/NY)

4372.0: 6HJ and 02H (USN vessels) in Link-11 coord net, in USB at 0212Z. (MC/SC)

4396.0: WLO, synth YL/EE maritime WX BC in USB at 2358Z. (JK/NY)

4724.0: HF-GCS station ANDREWS with two 28-character EAM in USB at 0707Z. (JK/NY)

5470.5: Unid with 5-fig grps (cut numbers) in CW at 0200Z. (CG/KY)

5598.0: New York Radio wkg Martinair 070 for SELCAL check in USB at 0635Z. (ALS)

5600.0: Unid boaters in QSO re: tying boats off on buoys for the night, in USB at 0604Z. (GV/CO)

5652.0: Unid 2 stations QSO in ANDVT at 0556Z. (GV/CO)

5696.0: CAMSLANT directs SWORDFISH 02 to search Santaren Channel for Go-fast, in USB at 0039Z. (MC/SC)

5711.0: DOD CAPE wkg Space Shuttle SRB retrieval ship *Liberty Star* re position to maintain for STS-122 Space Shuttle launch, in USB at 1757Z. (ALS)

5732.0: J36 (MH-60J, CGAS Elizabeth City) clg LGV (USCGC *LEGARE*) in USB ALE at 1350Z. (MC/SC)

5778.5: R26604 (UH-60L) clg B1Z171 (1-171 AVN) in USB ALE at 1840Z. (MC/SC)

6131.0: Link-11 data transmission at 1403Z. (MC/SC)

6215.0: CAMSLANT making callouts, in USB at 2113Z. (MC/SC)

6501.0: NMN, USCG Portsmouth, VA, synth OM/EE with maritime storm warnings here and simulacast on 8764.0, in USB at 2133Z. (JK/NY)

6586.0: New York Radio wkg Iberia 6620 in USB at 0537Z; New York wkg Sunwing 424 for clearance/routing in USB at 0540Z; New York wkg Martinair 070 for SELCAL check, oceanic clearance EHAM (Amsterdam, Netherlands), and routing in USB at 0545Z; New York wkg Air Canada 090 for SELCAL check/routing, secondary freq 5520, in USB at 0605Z. (ALS)

6586.0: New York Radio wkg JetBlue 727 for SELCAL check/routing, relays msg from Continental 336, in USB at 0650Z; New York wkg Continental 336 for posrep "overhead FLORI" and fuel report in USB at 0652Z. (ALS)

6721.0: REACH 2527 (KC-135E) wkg unid HF-GCS station, in USB at 1821Z. (MC/SC)

6760.0: Link-11 data transmission at 2219Z. (MC/SC)

6792.5: HAARP-LWA, heard from 0530Z–0600Z, lunar echos sometimes as strong as the source, in CW from 0530Z–0600Z. (GV/CO)

6855.0: Unid (ENIGMA V2A) YL/SS with 5-fig grps in AM at 2110Z. (CG/KY)

7527.0: RDC (USCGC *CAMPBELL*) clg F29 (HU-25) in USB ALE at 2211Z. (MC/SC)

7633.5: USAF MARS station AFA1YV (Binghamton, NY) wkg SENTRY 51 (Tinker AFB 552ACW AWACS E-3) for phone patch; IDs as DARKSTAR in comms with IRON HORSE, in USB at 2158Z. (ALS)

7635.0: HEAD CAP 40 net control in National CAP Net with HEAD CAP 50 and Louisiana CAP station, in USB at 1511Z. (MC/SC)

8156.0: CORAL HARBOUR BASE (Royal Bahamas Defense Forces) wkg unid station in USB at 1242Z. (MC/SC)

8177.0: Link-11 data transmission at 1405Z. (MC/SC)

8255.0: Unid OM/SS calling Radio Mexico without response, in USB at 0247Z. (GV/CO)

8294.0: WPE (Crowley Maritime, Jacksonville) wkg WBN3016 (Tugboat *Defender*) for posrep in USB at 1810Z; WBN3016 in ship-ship comms with Tug *Monitor* in USB at 1813Z. (ALS)

8379.0: V7HD3, *DISCOVERER ENTERPRISE*, 69,500-ton Marshall Islands-registered "world's largest and most advanced drilling ship" w/callsign and abbreviated ID "DSCE," online info put position 50 miles SSE of southeastern tip of Louisiana, in SITOR-A at 2050Z; C6FK8, *SOTRA SPIRIT*, 95,240-ton Bahamas-registered crude oil tanker w/MMSI and abbreviated ID "SOTR" in SITOR-A at 2105Z; S6TD, *EAGLE ALBANY*, 107,160-ton Singapore-registered AET crude oil tanker w/AMVER/SP for departure from Cayo Arcas, Mexico en route to Lake Charles, LA, arrive next day, in SITOR-A at 2115Z. (SJ/KY)

8383.5: 3EAT, *PIGEON POINT*, 48,315-ton Panama-registered chemical tanker w/monthly NBDP test message to WLO, Shipcom R., Mobile, AL, included vessel name plus MMSI and abbreviated ID "PPOX," in SITOR-A at 1515Z. (SJ/KY)

8388.0: 3EKC, 35,971-ton Panama-registered bulk carrier w/MMSI, abbreviated ID "SPAR," HELP and OPR commands in SITOR-A at 2223Z; 9V9484, TAMPERE, 31,135-ton Singapore-registered vehicles carrier w/MMSI and abbreviated ID "TAPE" in SITOR-A at 2245Z. (SJ/KY)

8394.0: Unid vessel w/SELCAL MKCV (4360) for TAH, Istanbul R., Turkey, good signal here but no contact, in SITOR-A at 1359Z. (SJ/KY)

8776.0: PLYBOARD (US MIL) with EAM broadcast in USB at 1835Z. (MC/SC)

8806.0: WLO synth YL/EE with east coast oceanic forecast here and on 8788.0, in USB at 0520Z. (GV/CO)

8855.0: United 842 calling Bogata Radio with no joy (though I heard Bogata), in USB at 0512Z. (GV/CO)

8912.0: VES (USCGC *VENTUROUS*) clg 07M in USB ALE at 1411Z. (MC/SC)

8971.0: FIGHTING TIGER 21 (P-3C, VP-8) wkg GOLDENHAWK in USB at 1547Z. (MC/SC)

8983.0: CAMSLANT diverts CG 2121 (HU-25, ATC Mobile) cover flight for HH-65 from Houston searching for overturned vessel, in USB at 1533Z. (MC/SC)

8992.0: DRAGO 51 (KC-135R) p/p via Andrews HF-GCS to LIBERATOR CONTROL at Andrews AFB, in USB at 1532Z. (MC/SC)

8992.0: HF-GCS Station OFFUTT wkg JOSA 777 for phone patch to DSN number at Andrews AFB after QSY here from 11175.0 due to condx, in USB at 2020Z; HF-GCS Station HICKAM wkg SPAR 55 for phone patch to Hickam AFB CP in USB at 0103Z. (ALS)

9007.0: PEACH 33 (E-8 JSTARS) p/p via TRENTON MILITARY to JTIDS Test Lab, in USB at 1750Z. (MC/SC)

9120.0: NIGHTHAWK 7 (HMX-1 helo) wkg other NIGHTHAWKs, in clear USB and ANDVT comms at 1742Z. (MC/SC)

9121.5: Link-11 data transmission at 1340Z. (MC/SC)

11175.0: HF-GCS Station ANDREWS wkg JW670 (C-130T, Brunwick NAS VR-62) for phone patch; rqsts WX for Navy NGU (Norfolk NAS) at 0230Z and for Navy NHZ (Brunswick NAS) at 0530Z, in USB at 2350Z; ANDREWS wkg REACH 6155 (C-17A #06-6155, Travis AFB 60AMW) for radio check in USB at 2218Z. (ALS)

11175.0: USB 0529Z: HF-GCS Station MCCLELLAN wkg "Radio Maintenance" for radio check in USB at 0529Z; McCCLELLAN wkg Barksdale AFB B-52 bomber DDOM 93 for phone patch to Barksdale "Red Ops"; acft is told that tanker HOIST 93 will be on AR-116 East (KS) at 0045Z, in USB at 2330Z. (ALS)

11175.0: HF-GCS Station SIGONELLA wkg TRUMPCARD 06 (73rd EACS overseas callsign) for M&W phone patch to Arlington, TX in USB at 0445Z; HF-GCS Station LAJES wkg unk acft in USB at 0650Z; HF-GCS Station HICKAM wkg SPAR 55 for phone patch to Hickam AFB CP, in USB at 0056Z. (ALS)

11175.0: HF-GCS Station PUERTO RICO wkg KING 91 for DSN phone patch in USB at 2159Z; PUERTO RICO wkg JOJO 68 for radio check in USB at 2201Z; PUERTO RICO wkg "BD 590" (Willow Grove VR-64 C-130T) for radio check only in USB at 1945Z. (ALS)

11175.0: HF-GCS Station PUERTO RICO wkg CAMERAMAN (US MIL) for patch to MUSHMELON (US MIL): "Give me a call on the Orderwire." in USB at 2340Z; PUERTO RICO wkg acft "N315" for radio check in USB at 2144Z; PUERTO RICO wkg "RL 999" (NP-3D acft, Patuxent River, VXS-1 Sqdn) for radio check in USB at 0113Z. (ALS)

11175.0: HF-GCS station PUERTO RICO wkg TUFF 45 (B-52H, Barksdale 2BW) for phone patch to Barksdale CP, then to DSN number for Pittsburgh CP, in USB at 0045Z; PUERTO RICO wkg TUFF 45 for p/p to DSN number for Barksdale SOF "Foxtrot"; rqsts WX at the field; advises Foxtrot that TUFF 45 and TUFF 47 have lost their tanker and must RTB, in USB at 0124Z. (ALS)

11175.0: HF-GCS Station OFFUTT wkg RUDY 35, who asks for current traffic, preamble only, in USB at 2008Z; X1A (US MIL) calling HICKAM GLOBAL and raising OFFUTT for radio check, in USB at 2045Z; OFFUTT wkg KING 30 for phone patches via DSN then commercial number, both Barksdale Metro, to get 2200Z landing WX at Barksdale at 2200Z, in USB at 2124Z. (ALS).

11175.0: RAID 40 (KC-135R, Grand Forks AFB, 319ARW) via HF-GCS for for phone patch to DSN number for Grand Forks AFB "Nordic Control" in USB at 2100Z. (ALS)

11175.0: DOOM 91 (B-52H, 2 BW) clg RAYMOND 06 in USB at 1657Z. (MC/SC)

11220.0: PLY BOARD wkg Offutt HF-GCS with request for HF data training, in USB at 1611Z. (MC/SC)

11232.0: Canforce "Trenton Military" wkg SENTRY 06 (USAF E-3 AWACS, Tinker AFB) for phone patch to pass multiline formatted report in USB at 2150Z. (ALS)

11232.0: CANFORCE 3667 (CC-177 #177701) p/p via TRENTON MILITARY to TRENTON OPS, in USB at 1839Z; ATLAS 39 (CC-130H) opening watch with TRENTON MILITARY in USB at 1859Z. (MC/SC)

12479.0: 9HIR5, *TROPICAL LAND*, 10,973-ton Malta-registered refrigerated cargo carrier w/AMVER/SP for departure from Panama Canal en route to Gibraltar Pilot

Station, to arrive in 11 days, in SITOR-A at 1619Z. (SJ/KY)

12490.0: PHEO, *VEENDAM*, 6.604-ton Netherlands-registered passenger/ cruise ship w/callsign, MMSI and HELP command in SITOR-A at 1445Z; S6AA9, *TORM SARA*, 72,718-ton Singapore-registered oil products tanker w/AMVER/ PR, 1,000 miles east of Jacksonville, FL, MMSI and abbreviated ID "TORM," in SITOR-A at 1735Z. (SJ/KY)

13927.0: USAF MARS Operator AFA1YV (Binghamton, NY) wkg SENTRY 61 (E-3 AWACS, Tinker AFB 552ACW, over W Texas) for phone patch to DSN number for RAYMOND 24 (Tinker AFB CP), then M&W phone patch, in USB at 2121Z; AFA1YV wkg SENTRY 51 (Tinker AFB 552ACW AWACS E-3); QSYs to MARS freq 7633.5, in USB at 2155Z. (ALS)

13927.0: USAF MARS Operator AFA2MH (Waleska, GA) wkg REACH 087, over Northern AZ, for M&W phone patch, in USB at 1828Z; USAF MARS Operator AFA6PF (Los Angeles) wkg REACH 615 for M&W phone patch in USB at 1828Z. (ALS)

13927.0: SHARK 67 (Coronet Oak mission C-130) via USAF MARS, phone patch to DSN number for San Juan PR "Oak Ops"; passes ETA 2200z; Maintenance Status A-1, in USB at 2049Z; SPUD 01 (124W C-130, Boise Air Terminal-Gowen ANGB, Boise ID), north of Dallas TX, via USAF MARS, DSN phone patch, passes msg in USB at 2147Z. (ALS)

13927.0: REACH 167 via USA MARS for M&W patch, in USB at 1847Z; REACH 6158 (C-17A #06-6158, Travis AFB 60AMW, over Ohio) via USAF MARS for M&W phone patch; tells Dad they will be flying right over Kalamazoo, in USB at 1958Z. (ALS)

13993.0: USAF MARS Transcon Net Operator AFA4MP (NCS) wkg AFA1CC, AFA1HB, AFA2DT, AFA2ER, AFA2IM, AFA2OS, AFA3WU, AFA4CU, AFA4MP, AFA5BN, AFA6HS for rollcall in USB at 1830Z; USAF MARS Transcon Net Operator/NCS "AFA2DT" (Puerto Rico) wkg various stations for rollcall in USB at 1904Z. (ALS)

14606.0: USAF MARS Operator AFA6PF (Los Angeles) wkg HAWK 02 after QSY here from 13927.0, in USB at 1826Z. (ALS)

16685.5: 9VGD3, *ALAM PERMAI*, 87,052-ton Singapore-registered bulk carrier w/MMSI and abbreviated ID "PMAI" in SITOR-A at 2020Z. (SJ/KY)

16696.5: HOZL, *ACE BULKER*, 28,498-ton Panama-registered bulk carrier w/AMVER/DR for course diversion TO MINIMIZE HEAVY ROLLING, en route to Puerto Cabello, Venezuela, arrive in 7 days, in SITOR-A at 1711Z; WFKW, *OVERSEAS NEW ORLEANS*, 43,644-ton U.S.-registered oil products tanker w/BBXX format WX OBS, callsign and 5-digit SELCAL 11188, 100 miles ESE of Corpus Christi, TX, in SITOR-A at 1840Z. (SJ/KY) ■

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ADVERTISERS' INDEX

by Bill Price, N3AVY (and Son)

Friends Don't Let Friends Have Split Ends...

It's coming up on two years since I last saw Norm. Back when we worked together, we saw each other five days a week and at least one day on the weekend. I can't say that I miss working on "the bus,"* with him, but I do miss having Norm near enough for those casual visits. For the last 14 years or so, we're lucky to see each other once a year, and then it's always been for too short a time.

I do get to daydreaming about some of our escapades. I know I've written about most of them here. Not all of them, though. Discretion being the better part of avoiding lawsuits, staying out of jail and all that.

I don't believe that Norm and I ever spent a day of relaxation—something that good friends usually do together. Every time we went to a hamfest we were working, and were lucky to get a few minutes on our own to run through the flea markets to look for treasures. Even the great Dayton Hamvention found us scrambling to squeeze just a half hour roaming through the flea market during all those days spent there. We did have the advantage of being able to ship our treasures home in the "company truck"—something the folks who flew in and out couldn't do (imagine dragging a seven-hundred pound transmitter to the baggage check-in at Dayton).

I remember using Norm's chainsaw to clear away what seemed like an acre of undergrowth to make way for his guy wires at a tower-raising one cold Saturday morning. His saw was the only one I've ever handled which squirted gasoline onto the user at a faster rate than it used it to cut wood. I'm so thankful that no one in that crowd smoked. Moving his "Eisenhower" transmitter into his apartment probably caused me to have my hernia repaired a year or so earlier than I otherwise would have—and a word to the wise: A kW AM transmitter does *not* make for good neighbors in an apartment building. Of course, a concealed antenna in the attic of an apartment building is not recommended, either.

Installing that antenna during several lunch hours had us crawling through a trapdoor in a common hallway (while wearing jackets and ties, because we had come from work), and when a neighboring tenant wondered what kind of communication gear we were installing in the ceiling of the complex, I still wish Norm hadn't said, "FBI, ma'am—nothing to worry about."

And speaking of the FBI—something I'd like to forget—there was the night that Norm called me and told me he had some horrible guilt about something he'd done and asked me to come over right away, which I did.

When I got there, he looked as if he'd just come from the shower. He showed me the label on the back of a bottle of flea shampoo for dogs. I read it and said, "Yeah?"

"The bottom, old man. Read the bottom."

I read: "Warning. Use of this product in a manner inconsistent with its labeling is a violation of federal law. Yeah?"

"I'm gonna call the FBI," he said.

"For what?

"I got fleas from the dog and I used it on my hair. Then I read the label. I'm just sick about this," he said.

"Norm," I said. "You're gonna call the duty desk at a district FBI office and tell them you want to confess and they're gonna trace your call and send the local police here to surround the place before you can tell them you're an illegal shampooer! We could be killed! If you don't remember the last two times you've been in trouble with the law, and the difficulty you had explaining your way out of a perfectly honest situation, imagine how it's gonna go when they get you for some charge of wasting their time with a phony confession about *dog shampoo!*"

"But I violated a federal law! This isn't like tearing a tag off a mattress, y'know!"

"You're right; it's not nearly that serous," I said.

"What if I have a reaction and have to go to the emergency room and tell them what I did and then the doctor is required by law to tell them I used the product in a manner inconsistent with it's labeling, which is a federal offense?" he asked.

"Tell the doc you don't remember what you used and you threw away the bottle."

Norm just stared at the bottle for a while, and then he threw it in the trashcan and said, "Thanks. You probably saved me a whole lot of trouble."

I still wonder just what would have happened if he'd have made the call.

I remember letting him talk me into a lot of things that I normally would never have even tried. The absolute pinnacle was when he convinced me that I could repair an enormous diesel engine—and I actually *did!* Never did a few Taiwanese ratchet wrenches accomplish so much in the hands of such a perfect idiot! (okay—I take that back—no one's perfect). There were limits, though; at about two degrees below zero and a stinging wind, even Norm's enthusiastic cheerleading could not help me solder 12-gauge copper antenna wire on a rooftop with a tiny, propane-heated soldering iron.

I only wish that there weren't so many other innocent people involved in so many of the great events that I shared with Norm. Even changing some of the names and cities and states would not disguise them sufficiently. The times he's had me hanging from rooftops and slipping from ladders and grasping at falling antennas and seeing my life flash before my eyes all pale when compared to some of the things he's done with others whose identity must be protected.

At least I can say that the only time I've been involved with Norm and the police at the same time was with an officer who is a friend of ours who helped us teach a novice class. Norm's other involvements with law enforcement officers has been something that cops will be talking about over coffee for years to come. His tales of mistaken identity, mistaken intent, and just looking like someone who has just committed a crime are the stuff of future legends.

Excuse me while I grab this phone call.

"Sergeant who? What police department was that? Yes—I can be there but it'll take a few hours. Yes sir."

*The "bus" had once been a municipal bus, later converted to a "motor-home/mobile office" for the gubernatorial campaign of a person who would later run a failed presidential campaign. Anyone seeing the "bus," would have known immediately not to contribute funds to this candidate or vote for him. Norm ignored this omen, and though we were successful in making the "bus" run, it too was defeated, and is enjoying retirement somewhere in New England, having been replaced by a younger and more reliable candidate. ■

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The AR5000A+3 is another example of why AOR is the Authority On Radio!

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**Cellular blocked. Unblocked version available for qualified users. Documentation required.*

Expanding your world of possibilities!

IC-R9500 Icom's Ultimate Wide Band Receiver

We've raised the bar with our super performance, multiple function wide band "measuring" receiver. The IC-R9500 has normal and wide spectrum scope functions. With five roofing filters before the first amp, two independent 32 bit floating point DSP processors, and 7-inch wide color TFT LCD, this is something to get excited about!

Features:

- 0.005 - 3335.000 MHz*
- USB, LSB, CW, FSK, FM, WFM, AM
- 1020 Alphanumeric Memories
- P25 (Option UT-122)
- Five Roofing Filters
- Dual DSP
- Digital IF Filter
- Multi-function Spectrum Scope
- 7-inch TFT LCD Display
- Noise Blanker
- Noise Reduction
- Multi-scan Functions
- Voice Synthesizer
- Digital Voice Recorder
- USB Connector
- Receive Assist Functions

IC-R20

ADVANCED
WIDE-BAND RECEIVER

0.150 - 3304.0 MHz*
AM, FM, WFM, SSB, CW
1000 Memory Channels
Dual Watch Receiver
4 Hour Digital Recorder

IC-R5

COMPACT
WIDE-BAND RECEIVER

0.5 - 1300.0 MHz*
AM, FM, WFM
1250 Memory Channels
CTCSS/DTCS Decode
Weather Alert

IC-R1500 IC-R2500

MOBILE OR PC CONTROLLED WIDE BAND RECEIVERS

IC-R1500	IC-R2500
0.01 - 3299.99 MHz*	0.01 - 3299.99 MHz*
AM, FM, WFM, USB, LSB, CW	AM, FM, WFM, SSB, CW (Main)
1000 Memory Channels	AM, FM and WFM (Sub)
Fast Scan	1000 Memory Channels
Optional DSP (UT-102)	D-STAR Compatible (Option UT-118)
PCR Software Included	P25 (Option UT-122)

IC-R75

WIDE-BAND RECEIVER

0.03 - 60.0 MHz*
Triple Conversion
Twin Passband Tuning
Digital Signal Processing (DSP)

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

ICOM