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

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POPULAR COMMUNICATIONS

MAY 2006

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ICOM

R75

Universal Radio is pleased to continue to offer the **Icom R75** 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 of innovative features of the R75 include: Synchronous AM Detection, 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 #0175* **Call for price.**

ICOM

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 98SE/ME/2000/XP™ CD.

The **Icom R1500** is similar to the above, but also includes a controller head for additional operation independent of a PC. **Call for prices.**

R3

The **R3** tunes 500 kHz to 2450 MHz (less cellular) in AM, FM-W, FM-N and TV via a 2 inch TFT color TV screen. You can receive regular TV [NTSC], and you may be able to see certain video feeds and ham radio Fast Scan TV. A second mono LCD display that can be used to conserve battery life. You get: 450 alpha memories, 4-step attenuator, bandscope, video and audio outputs and auto power-off. Comes with Li-Ion battery, charger, belt clip and ENC antenna. **Call**

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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 1, 2 or 4 hours of reception! This radio comes with charger, Li-ion battery, belt clip and wrist strap. More info on website. **Call**

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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.**

ICOM

IC-7000

The **Icom 7000** represents the next generation in all-mode HF/VHF/UHF transceivers. DSP at the IF level is the cornerstone of this impressive new multi-bander. In fact, the 7000 employs two DSP chips to work its magic. Imagine having 41 bandwidths available - standard! You can even select sharp or soft filter shape. And variable twin PBT allows you to either narrow the IF passband, or shift the entire passband to eliminate QRM. The IC-7000 has an incredibly versatile and capable **shortwave receiver**. It would be difficult to find a more impressive receiver in such a small package. Yes, there is tremendous power "under the hood", but the radio is also downright gorgeous. The 2.5 inch (diagonal) color TFT presents numbers and indicators in bright, concentrated colors for easy recognition. You can choose from three background colors and two font styles. Not only does this display provide radio status, but it also supports a two-mode band scope. In the Center Mode the scope is centered on the receiving frequency. In the Fixed Mode the scope sweeps a fixed range. The Digital Voice Recorder (DVR) function has a front panel REC control that allows you to record incoming signals for up to 25 minutes. Other features include: a detachable control head (requires optional separation cable), 503 memories, S/PWR/SWR meter, RIT, Preamp, RTTY Demodulator, Attenuator, Bass & Treble, adjustable SSB bandwidth, DTMF memory, VOX, full break-in and adjustable CW pitch. Requires 12 VDC at 22 amps for transmit but only 2 amps for receiving. *Order #0700* **$1499.99**

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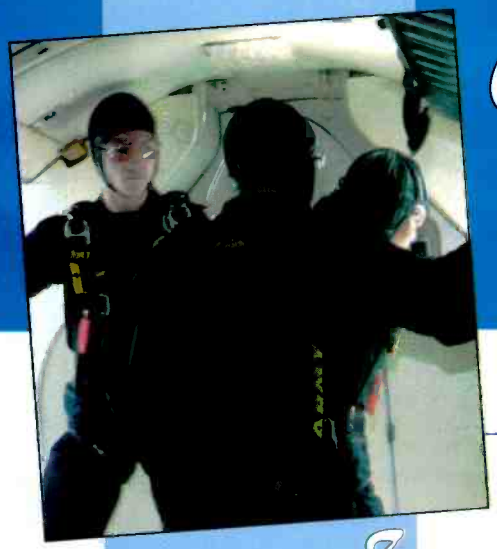

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On The Cover

This month Steve Douglass takes us through Uncle Sam's maze of Black Projects and gives us specific details on these projects that they actually want you to know about! Be sure to check out Utility Communications Digest beginning on page 22.

Tap into secret Shortwave Signals

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

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.

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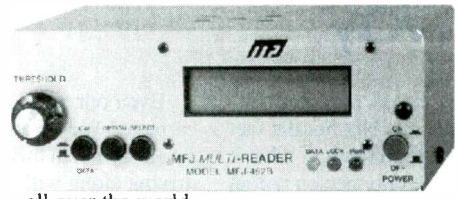
Listen to maritime users, diplomats and amateurs send and receive *error-free* messages using various forms of TOR (Telex-Over-Radio).

Monitor Morse code from hams, military, commercial, aeronautical, diplomatic, maritime



-- all over the world -- Australia, Russia, Japan, etc.

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Printer Monitors 24 Hours a Day

MFJ's exclusive *TelePrinterPort*™ lets you monitor any station 24 hours a day by printing transmissions on an Epson compatible printer.

Printer cable, **MFJ-5412**, $9.95.

MFJ MessageSaver™

You can save several pages of text in an 8K of memory for re-reading or later review.

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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.

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Try it for 30 Days

If you're not completely satisfied, simply return it within 30 days for a prompt and courteous refund (less shipping). Customer must retain dated proof-of-purchase direct from MFJ.

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, $12.95.

MFJ-1024 **$139.95**

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MFJ-1020C **$79.95**

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, $12.95.

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, $12.95. 3⅛x1¼x4 in.

MFJ-1022 **$49.95**

Eliminate power line noise!

MFJ-1026 **$179.95**

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 **$99.95**

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, $12.95.

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MFJ-1045C **$99.95**

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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.

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MFJ Shortwave Headphones

MFJ-392B **$19.95** New!

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.

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MFJ-956 **$49.95**

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 **$99.95**

MFJ Shortwave Speaker

This MFJ *ClearTone*™ New! 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.

New!

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

MFJ Antenna Switches

MFJ-1704 **$69.95**

MFJ-1702C **$24.95**

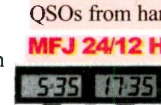
MFJ-1704 heavy duty antenna switch lets you select 4 antennas or ground them for static and lightning protection. Unused antennas automatically grounded. Replaceable lightning surge protection. Good to 500 MHz. 60 dB isolation at 30 MHz. **MFJ-1702C** for 2 antennas.

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 **$79.95** New!

MFJ 24/12 Hour Station Clock



MFJ-108B, $19.95. 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 Harold Ort, N2RLL

We Did It Our Way

The other day I stopped in the coffee shop for my hazelnut "hit" and all-too-frequent muffin when it struck me. No, not the fact that I could brew the same coffee at home for a tenth of what it costs at "the shop," but that I was—probably—the only person within some distance with what consumers call a "police scanner" or "walkie-talkie" strapped to my belt. This coffee shop happens to be where three towns intersect (those early town planners must have been smoking something funny when drawing community boundaries), so the listening is usually pretty interesting with plenty of on-air discussions about where one agency's responsibility ends and another's begins.

As I stood there adding one-too-many of those brown-packet sugars to the brew, a young fellow of about 80 walked up chatting away like there was no tomorrow. "I can't understand why Al just doesn't work with her and help out on the weekend with kids," he mumbled. I was thinking that with the *extra* jolt from the coffee he was about to have he'd not only going to be talking louder, but might start up a conversation with me; "Don't you think Al should be a better husband, sonny?"

But no, I'm sure he didn't even see me or anyone else in the shop, for that matter. Pop was on the cell phone. And so was the woman ordering a dozen bagels for her office, as was the student using the laptop in the corner over the shop's WiFi system.

The CTIA (Cellular Telecommunications & Internet Association) estimates there are a whopping 201,661,519 wireless subscribers, give or take a few hundred, and that three-fourths of America's teens are wireless! Compare that to only about 675,274 licensed hams (which doesn't take into account *inactive* hams, depending, of course, on what "active" is these days), probably a few thousand more scanner users, shortwave enthusiasts, CBers, and an assortment of FRS and GMRS users. What comes into focus is the fact that the average American non-radio-hobbyist is just as high tech and wireless as we radio enthusiasts, probably more so.

Take, for example, that senior fellow getting his coffee—even *he* had the latest and greatest Star Trek-looking flip-type camera phone, complete with a slick-looking custom-molded earpiece that I'd like to have for my HT! Darn, I'll bet he can shoot text messages anywhere, take pictures and send them to his PC or a friend in Paris, check the time (that's one feature I'd personally like to see on every single piece radio gear with a display window!), store a hundred or more numbers and e-mail addresses, watch the news, and use the calendar/reminder feature. As if that weren't enough, add to that other cool things like streaming video playback, video capture, stereo FM radio, an internal antenna, dual color displays, touch screen, SD memory card slot, voice dialing, vibrate and audio alerts, lights that flash in sync to music, five zillion ring tones or songs, MP3 player, calculator, flashlight, and probably a few things I've missed.

But that's okay; I can handle the fact that his phone has more features than Captain Picard's comm console. I can handle it. It's okay that my HT is larger and can't do all those things. It's okay that some of these new cell phones and related gizmos do more than all of my radios combined.

Or is it? Fact is, we don't have a lot of the same neat features built into *our* transceivers. Sure, we can use our VHF/UHF dual-band radios to talk to other licensed folks through repeaters, or in the simplex mode radio-to-radio, and even talk to hams on the Space Shuttle or hams on the other side of the world using VoIP (Voice Over Internet Protocol) for long-distance communications using the Internet as a sort of relay between a base station, handheld, and mobile.

But wouldn't it be neat if my 2-meter HT would play *Born to Run* or *Blue Suede Shoes* when George or Steve calls me either on the repeater or on 52 simplex? How cool would that be when I'm sitting there having a coffee and bagel?

Even our small boom mics aren't as cool as ol' Pops' cell phone earpiece! We've got all these dangling cords, and even with a mobile rig (imagine, in this day and age of hands-free technology!) we're still driving along with that mic cord getting in our way.

Don't get me wrong; indeed, we've got some phenomenal radios. I like the fact that many can now scan much of the radio spectrum, receive broadcast stations, and even monitor NOAA weather broadcasts and alerts. The size and weight of these great radios have come *way* down in recent years, and now we can enter frequencies from our PC, clone other similar radios, talk for hours on a single battery charge, and change the color of the display (a display even *I* can see with the newer, brighter display lamps). And the things fit in our shirt pockets!

Our scanners are in another category altogether, though. Oh, to be sure, they hear all there is to hear—digital, trunked, and conventional systems like military, federal, state, local cops and firefighters, trains, planes, taxis, boats, and a multitude of things in between. But they're still—in *2006*—just plain tough to use in most cases.

Remember the "good old days" when our major scanning concern was procuring dozens of $5 plug-in crystals, one for each frequency we wanted to monitor? Then along came programmable scanners with 50 or 100 channels that required us to manually enter each frequency. Boy, what a pain in the posterior! But that was really the extent of our gripe, along with awkward programming steps. But at least the manual was only five pages long!

But today, our mega-channel scanners with all that clever software (some of which seem to take more time to set up and use than they should!) should be a breeze to set up and use, right? Wrong. I've spoken to numerous RadioShack folks and other scanner dealers who've lost track of the number of scanners people return because they're just too darned complicated! Cumbersome is probably a better description; the operating manuals are the size of the Federal Register (translated *to* English). But never fear—you can always go to the company website or an online group (the 21st Century version of the age-old "support group") for help. Imagine having the latest and greatest radio on the planet, yet you've got to clear your personal calendar for a week to learn how to use the darned thing! Get out the highlighter and notepad, folks!

Now, I'm all for learning because I know that that's a part of our hobby, along with occasionally building an antenna, researching frequency information, and pushing a few buttons. But common sense tells me that, while the rest of the world is in the plug-n-play mode, it's strange that we've got to spend hours with a simple radio receiver and an five-ton operating manual. And not because we really *want* to, but because we *have* to if we want to listen to those frequencies! Pretty weird, wouldn't you say, especially in an age when your daughter and grandkids are downloading hundreds of tunes into an iPod and even Pops' cell phone is playing the Lawrence Welk tune of his choice when his wife calls him!

Then there's us huddled over our software and keypads, like mad scientists pouring the latest potion from test tube to test tube. A fellow scanner enthusiast once told me that we radio nuts sometimes *like* to make things difficult for ourselves, that without our little radio "aches and pains" we'd wouldn't be able to share (when we *do* share)—for better or worse—those things that keep our hobby close-knit, yet forever mysterious and sometimes unwelcoming to the uninitiated.

Now that I think about it years later, there just might be some twisted logic and truth to his words. Meanwhile, my friend George told me he's making a list of some of the tunes he'd like his HT to play when his friends call, just in case our manufacturers ever decide to give us that option someday. We're in agreement that if they don't get it together soon, the No. 1 title could be *Only the Lonely*. At least *our* airtime is still free! ■

by Harold Ort, N2RLL, Editor, and D. Prabakaran

News, Trends, And Short Takes

WRN's DRM Services Go Live

WRN, the London-based international transmission service company, announced the launch of its two Digital Radio Mondiale (DRM) services. The first service is a London-wide 24-hour-a-day DRM trial broadcast at 26 MHz. The second service offers DRM transmissions that can target any major European radio market via directional antennas. Initially this second service will cover all of the UK and Ireland.

Both services' programming is from respected international and UK radio broadcasters. WRN's test and development trial for London will assess the potential coverage of DRM transmissions, generating important data about the penetration of the signals into various types of buildings and other urban situations as well as gauge audience reaction to the broadcasts.

The transmission site is the world-famous Croydon broadcast tower, situated in South London and operated by Arqiva, WRN's DRM transmission partner for this project. Arqiva provides transmission services for most UK commercial radio stations.

WRN will eventually offer services that can cover Europe using DRM skywave transmission and directional antennas that will reach specific European radio markets with frequencies that provide higher reliability in urban areas from the transmitter site located in Bulgaria.

Baltic Waves Radio To Broadcast EU Programs To Belarus

Baltic Waves Radio, which has been broadcasting from Lithuania to Belarus for six years, will enter the European Commission's international consortium to spread the free word to Belarus.

Benita Ferrero-Waldner, the European Union's commissioner for External Relations and European Neighborhood Policy, announced that 2 million euros would be allocated for independent news broadcasts in the country run by authoritarian Alexander Lukashenko. The money will be granted to a consortium headed by Germany's Media Consult. The winning consortium also includes European Radio for Belarus from Poland, Baltic Waves Radio from Lithuania, Russian TV Company RTVi, independent journalists and representatives of Belarusian civil and non-governmental organizations.

WorldSpace Adds Two South African Channels

WorldSpace Satellite Radio has announced that it has launched two new channels on its satellite radio network. The channels, East Coast Radio and Jacaranda, are available on the company's AfriStar satellite and are accessible to subscribers across southern Africa. Jacaranda is a leading South African brand, is predominately a music station that broadcasts in both English and Afrikaans, and is aimed at a mature, sophisticated audience. East Coast Radio targets its commercial music service to a cross-cultural audience and focuses heavily on regional news and sports. Both channels are now available to a potential audience of more than 500 million listeners in a satellite footprint that covers 26 countries.

Indonesia To Push Ahead With New Broadcasting Rules

Defying opposition from lawmakers and media groups, the Indonesian government says it will enforce a new regulation that bans local broadcasters from directly relaying news from foreign TV and radio stations.

Several legislators and broadcasting associations have criticized the regulation as "repressive," saying it could be misused to curb press freedom in Indonesia. Many radio and TV stations in the country broadcast news and current affairs programs from a range of international sources, including the BBC, Voice of America, Radio Australia, Deutsche Welle, and Radio Netherlands. Shortwave programming will not be affected by the ban, nor will it affect foreign content on satellite news and cable channels or the Internet.

New Somali Radio Station Starts From Ethiopia

A new radio station, Voice of the Somali People, has begun broadcasting twice weekly. Voice of the Somali People broadcasts twice on Wednesdays: at 1 p.m. east African time and Saturdays at 8:30 p.m. east African time. Voice of the Somali People can be heard on 8037 and 7175 kHz shortwave.

World DAB Stages DAB/DMB Road Show In India

The World DAB Forum has started a series of events in India, demonstrating the latest Digital Audio Broadcasting (DAB) and multimedia technology to broadcasters, network providers, and manufacturers. This is the first time the international promotional and lobbying body for DAB hosted events in India. DAB audio trials are already underway in New Delhi by AIR-India. A further rollout of DAB services is expected once spectrum allocation has been determined by the Indian government, possibly by the end of this year.

BBG Releases Budget Proposal For Fiscal Year 2007

The Broadcasting Board of Governors, which controls U.S. government international broadcasting, has released its budget proposal for fiscal year 2007. The proposed budget calls for an overall increase of 4.3 percent from fiscal year 2006, targeted to the war on terror and new technology. In recent years, the Bush Administration and Congress have wiped out the 40-percent cut in spending for international broadcasting during the 1990s following the end of the Cold War. For fiscal year 2007, the budget proposal calls for a 13-percent increase for Middle East Broadcasting Networks and a 5.3-percent increase for Voice of America.

(Continued on page 82)

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: Harold Ort, N2RLL, SSB-596, Editor, Popular Communications, *25 Newbridge Road, Hicksville, NY 11801-2909, or send e-mail via the Internet to popularcom@aol.com.*

K1STB's atomic clocks.

Mr. Time

Dear Editor:

I was reading in the January issue of *Pop'Comm* about "Ahead Of His Time," the gent with the three atomic clocks. He did not understand why he bought so many. Well, here's a picture of the clocks in my shack. I have three, and this is how they're set: 12-hour local time, 24-hour local time, and UTC time.

In case anyone picks up on the fact that the 12 and 24 hour clocks are reading the same time, it's because I took the picture in the a.m.; 24 hours and 12 hours are all the same until 1 p.m. when it becomes 1300 hours. One of the clocks is set for giving the temperatures in Fahrenheit, while another clock is set for Centigrade, which is very handy when I am on my ham radio with European countries as they use Centigrade readings.

All is not lost to Marvin Breen—just utilize all three to the max and you will have all that data at your fingertips. You can also see a picture of my shack on my website at http://members.aol.com/k1stb.

Denis Dandeneau, K1STB
Winthrop, ME, via e-mail

Your Tax Dollars At Work!

Dear Editor:

First, I know this letter is rather late for usual responses regarding your January issue, but I receive mine in Braille so it is delayed a bit behind the regular newsstand version. I read the "Washington Beat" piece on the APCO man's visit to communications centers following the hurricanes. I was the ham radio contact with the world for LSU Medical Center and Charity Hospital in New Orleans during Katrina.

I found it strange that the mobile command post acquired by the Federal Emergency Management Agency through Homeland Security funds sat in a parking lot and flooded. It was equipped with HF, VHF, and UHF ham radio as well as regular public safety comms equipment, a generator, and all other facilities it needed to be a self-contained operation.

Meanwhile the EOC for Orleans Parish was housed in a regular glass and steel office building in the central business district. The EOC lost all HF access and all other capabilities as they had to evacuate and abandon their posts. Had the mobile command and communications post been used effectively, it would have returned after the storm passed through, already manned, and pretty much ready to go. Your tax dollars and mine at work.

Now about the article on the signal corps folks in the Philippines: The article would have been better than a rah-rah piece for those of us who are truly radio nuts if you would have spent some time and effort on what those ops were using for stealthy operation, what freqs they found effective, etc.—not that I don't admire what those folks did, but a little more actual radio stuff in that piece would have sure been neat.

Richard Webb, NF5B
Via e-mail

Reginald Fessenden Beat AT&T!

Dear Editor:

A gentleman by the name of Reginald Fessenden, also known as the voice of radio, sent voice across the Atlantic before the AT&T engineers did. Mr. Fessenden sent a message purely by accident to an associate in Scotland. One leaned on the mic while the group was discussing something; the associate in Scotland was in bed and woke up when he heard voices in the room. Seeing no one in the room he then heard voices coming over the receiver's speaker. The associate then sent a telegram to Reginald quoting what was discussed. Reginald was doing voice while Marconi was still playing around with CQ.

My daughter did a history project on Reginald Fessenden with the assistance of Tom Domalkas of Niagara Falls, Ontario, who was nominated to the Canadian Amateur Radio Hall Of Fame. Mr. Fessenden was a Canadian who moved to the United States and did experimenting there.

Richard Appleyard, VE3YAG/VEØRCN
Via e-mail

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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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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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One Giant Leap

Grab That Scanner And Stand At The Open Door With The Army's Golden Knights

By Gary Palamara

Specialist Sean Sweeney bringing in the National Colors. (Photo by Gary Palamara)

Sixty-two years ago, the youngest man ever to enlist as a Navy pilot was shot down over the South Pacific during World War II. As the burning wreckage of his A-6 Avenger broke up in mid air, the pilot watched as his three-man crew bailed out, before he himself escaped from the stricken plane.

While the four helplessly floated down to the sea, below their life-saving canopies, Japanese gunners from the island of Chi Chi Jima continued to target the men. A nearby U.S. submarine soon rescued the 20 year-old pilot. He was the only one to survive the ordeal. For his heroic attempts to save both men and machine, he would later be awarded the Distinguished Flying Cross, just two years into his naval career. The date was September 2, 1944, and this was George Bush's first experience with skydiving. He vowed some day to try another jump under less hostile circumstances.

Former President George H. W. Bush flies through the air with members of the Golden Knights. (US Army Photo)

Almost 60 years after that infamous flight, former President George H. W. Bush again found himself poised at the open door of a military aircraft and about to jump out. Although his first attempt at skydiving was made from a crippled, out-of-control machine, this jump would be made from a perfectly good airplane and was totally voluntary. As he had done to commemorate his 70th and 75th birthdays, in 2004 George Bush wanted to mark the occasion of his 80th birthday with a skydive. So, on June 6, at 1:20 CT, the 41st President of the United States was airborne over the campus of Texas A&M University and traveling at nearly 150 miles per hour.

At 5,500 feet, the main chute opened and the president drifted safely back to Earth to the applause and cheers of the thousands who had gathered to watch the spectacle. The event which became known as "41@80," was planned as a fundraiser for charity and raised nearly $50 million for cancer research and for the university.

Former President George Bush talks with Staff Sergeant Bryan Schnell after completing his 80th birthday skydive. (US Army Photo)

Joined By A Golden Knights Veteran!

Unlike his previous solo jumps, because of strong crosswinds at the landing site, this birthday dive would be a tandem leap. Harnessed to the back of the president was a veteran of more than 4,000 skydives, Army Staff Sergeant Bryan Schnell of the world famous Army Golden Knights. When you talk about precision skydiving, the Golden Knights are the best in the business and even though George Bush was an old Navy man, the Army's Official Parachute team, were the logical choice to safeguard the former president.

To the members of the Golden Knights, parachuting is not just a sport or a means to safely exit a crippled aircraft—to the Army's elite team parachuting is a way of life. In the late 1950s several state-sponsored Iron Curtain teams dominated the then-fledgling sport of international skydiving. All of that was to change in 1959 when 13 Americans came together to form the Strategic Army Corps Sport Parachute Team. Right from the start, the members performed well in international competition and received many awards. Because of that success, on June 1, 1961, the Army activated the group as the official Parachute Team of the U.S. Army. Later that same year, they adopted the name the Golden Knights.

Fourteen Thousand Shows... And Counting!

Each year, the Golden Knights complete more than 27,000 jumps before an estimated 12 million people. In addition to air shows they have appeared at other events, such as NASCAR and major league baseball games. To date, they have performed more than 14,000 shows in all 50 states and 48 countries around the globe.

But while the public thinks of the Knights as one large team, the organization is actually made up of several smaller groups. Each group has a distinct purpose, but they all live up to the Knights three-fold mission: To perform aerial demonstrations for the public and to promote the Army and its recruitment effort; to compete in national and international parachuting competitions; and to test and evaluate new equipment and techniques for improved operations and safety.

From their home base of Fort Bragg, North Carolina, a total of 90 men and women make up the Army Golden Knights organization. Within that structure, there are six different groups. For the most part, each group is separate, but depending upon need, some members of the Knights will perform with more than one team.

The Gold team and the Black team each have between 10 and 12 members, and they perform the bulk of the public demon-

Golfer Tiger Woods takes to the air with members of the Knights Tandem Team. (US Army Photo)

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- Internally recharges Ni-MH batteries
- Station name input
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- Weight: 12.2 oz.

† Features are subject to change

E10 $130*

AM/FM/Shortwave Radio

Intelligence meets performance in the E10. With 550 programmable memories, manual and auto scan, precision tuning and alarm clock features, the E10 provides the sophisticated tools for listening to news, sports, and music from around the world. The E10 even allows internal recharging of its Ni-MH batteries (charger and batteries included). With excellent AM, FM, and Shortwave reception, intermediate frequency shift and shortwave antenna trimmer—the E10 gives you the performance you want with the digital ease you deserve.

Features

- Shortwave range of 1711 – 29,999 KHz
- 550 programmable memories with memory page customization
- Manual and auto scan, direct keypad frequency entry, ATS
- Clock with alarm, sleep timer, and snooze functions
- Earphones
- Supplementary wire antenna
- Power Source: 4 AA Batteries (included) or AC Adapter/Charger (included)
- Dimensions: 7-1/2"W x 4-1/2"H x 1-1/2"D
- Weight: 1 lb. 1oz.

E100 $100*

AM/FM/Shortwave Radio

The E100 fits full-sized features into your palm or pocket. This little marvel is packed with all the latest radio features you want: digital tuning, 200 programmable memories, digital clock and alarm, plus AM/FM and Shortwave reception. And, it is small enough to fit in your coat pocket.

Features

- Shortwave range of 1711 – 29,999 KHz
- 200 programmable memories
- Memory page customization
- Manual and auto scan, direct keypad frequency entry
- Earphones
- Power Source: 2 AA Batteries (included) or AC Adapter (not included)
- Dimensions: 5"W x 3"H x 1-1/4"D
- Weight: 7 oz.

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strations throughout the air show season. Each weekend, they wow air show audiences throughout North America. In addition, there is a Style and Accuracy team, a Freefall Formation team, and a Tandem jump team.

The Tandem jump team promotes Army skill and professionalism by arranging high-profile jumps with political dignitaries and famous celebrities from the worlds of sports, movies, and television. In spite of what some might consider a risky exercise, there seems to be an ever-growing list of famous celebrities willing to take that giant leap.

Team Six is comprised of the Aviation and administrative group and is responsible for team logistics, team transport, and public relations. Together, all of these separate groups make up the world famous Army Golden Knights.

From A Venetian Tower To High-Tech Ram Air Chutes!

While, parachuting as a sport is only a few decades old, the idea of floating down to earth from a high location on a cushion of air has been around in one form or another for centuries. As far back as 1495, Leonardo da Vinci sketched detailed drawings of a manned parachute composed of fabric and a rigid frame for support.

From the height of a Venetian tower, the Italian Fauste Veranzio made the first successful parachute jump in 1617. The first successful emergency skydive was made by Frenchman Jean Pierre Blanchard when he separated from his burning hot air balloon in 1785. Twelve years later, in 1797, Andrew Garnerin, using the world's first non-rigid parachute, successfully jumped from his hot air balloon at an altitude of 8,000 feet. Throughout the decades that followed, work continued on parachute design and safety. But it was not until the beginning of the 20th century that necessity and invention came together.

In the 1930s, advances in aviation met up with the invention of synthetic fibers like Nylon, and the union proved a perfect marriage. In the early days of aviation, parachute manufacturers had been looking for a lightweight, yet strong fabric to withstand the increasing demands for strength, safety, and comfort. The advent of mass-produced, lightweight fabrics streamlined parachute design and eventually gave birth to what we now know as modern-day sport of skydiving.

The Golden Knights demand a level of performance and control not found with the standard-issue Army Airborne parachute. For that reason, the Knights use a chute that was invented and perfected in the 1960s and '70s. This rectangular, all-nylon design is called a Para foil or Ram Air parachute. The unique design is extremely safe and lightweight, yet allows the user greater control over direction and descent speed. This level of sophistication improves accuracy during international competitions and air shows. In addition, the Ram Air canopy may be deployed over a wide range of altitude, from 2,000 to 30,000 feet, and provides approximately 350 square feet of surface area, which makes it perfect for Tandem jumping.

At The Show

The Golden Knights normally arrive at the air show site at least one or two days prior to the first scheduled show. Like all air show performers, the Knights use that time to become familiar with the surrounding area and make themselves available for personal appearances and media interviews.

From time to time, the Knights even allow reporters like me to tag along and watch their show from a more up-close perspective. In June of 2005 it was my pleasure to get a bird's-eye view of the Knights' Gold skydiving team when they performed at the McGuire Air Force Base (New Jersey) open house weekend.

The Golden Knights aircraft is a Fokker Friendship C-31. (Photo by Gary Palamara)

For team transport and airshow lift, the Knights ride aboard a Fokker Friendship C-31 twin-engine turbo-prop. The plane is painted white and is accented with the team colors of Black and Gold. Inside, the Fokker has room for approximately 30 passengers and equipment. Up front in the cockpit, the pilots can either be military or civilian contractors. During each performance, one of the pilot's jobs is to coordinate via radio with a ground-based member of the Knight team about the wind conditions at field level. In addition, the pilots communicate with the show's Air Boss and the tower, and also keep an eye out on the weather conditions at flight level.

An inside look at the cockpit of the C-31. (Photo by Gary Palamara)

Golden Knights Frequencies

Note: These frequencies are generally used by the teams at all airshows, but we also advise you to check the FRS (Family Radio Service) channels. Bring along an FRS radio instead of programming your scanner, as some readers have reported hearing Knights comms on them as well.

32.200 Operations
32.300 Operations
45.350 Primary
122.925
123.000 Air to ground support
123.400 Air coordination
123.450 Air to ground support
123.475 Air to ground support
123.500 Air to ground support
124.000

Just prior to take-off, the Gold team goes through every aspect of the show during the Dirt Dive, an on-the-ground rehearsal. (Photo by Gary Palamara)

Just prior to take-off the Gold team assembles alongside their Fokker aircraft to perform what the Knights call a "Dirt Dive." This is where each part of their performance is checked and rechecked in the exact show order. Any last minute details are worked out during the dirt dive.

No Doors, And Temps Near 20 Degrees

Once off the ground, the turbo-prop circles overhead at an altitude of nearly 13,000 feet. The mood inside the aircraft is professional and definitely upbeat. Each team member has checked and then rechecked not only his, but also his buddy's equipment, making sure that everything is ready for another safe and flawless show. Toward the rear of the aircraft, the doors on either side of the plane have been removed to allow for easy access out of the plane. With the engines running outside at about 70 percent of their maximum, the wind rushes by the open doors at around 200 miles per hour.

The temperature inside the aircraft drops on this sunny June day, to a wintry 10 to 20 degrees as the deafening noise makes verbal communications all but impossible. A well-rehearsed series of hand signals allows the lead jumpers, seated near the open doors, to communicate with the crew chief, stationed up front near the pilots.

Just prior to the first jumper's exiting the aircraft, a colored streamer is thrown out of the aircraft over show center. Being buffeted by the 200 mile-per-hour slipstream, one of the Knights hangs his head outside of the aircraft and watches as the streamer falls to earth. The purpose of this exercise is to estimate how the prevailing winds will interact with the jumpers upon their exit from the plane. By calculating the amount of streamer drift, a point in the sky is chosen for the first jumper to exit.

As the team prepares for another show the mood is upbeat and professional. (Photo by Gary Palamara)

At most air show sites, the Goldens normally perform at least two shows. The first performance opens the air show

Re_Inventing Radio through Design and Necessity

FR250 $50*
Multi-Purpose

Stay informed and prepared for emergencies with this self-powered 3-in-1 radio, flashlight and cell-phone charger — no batteries required.

- AM/FM/Shortwave Radio Reception
- Built-in power generator recharges the internal rechargeable Ni-MH battery (Included)
- Cell-phone charger output jack 3.5mm (various cell phone plug tips included)
- Built-in 2 white LED light source and one flashing red LED
- Dimensions: 6-1/2"W x 6"H x 2-1/2"D
- Weight: 1 lb. 3 oz.
- Power Source: Built-In Rechargeable Ni-MH Battery Pack; 3 AA Batteries (not included); Crank power alone; AC Adapter (not included); AC Adapter recharges built-in Ni-MH battery pack

FR200 $40*
Crank it Up

Without the need for batteries, this self-powered 2-in-1 radio and flashlight helps you stay informed and prepared for emergencies.

- AM/FM/Shortwave Radio Reception
- Built-in power generator recharges the internal rechargeable Ni-MH battery (Included)
- Built-in white LED light source
- 12 international bands
- Dimensions: 6-1/2"W x 5-3/4"H x 2-1/4"D
- Weight: 1 lb. 2 oz.
- Power Source: Built-In Rechargeable Ni-MH Battery Pack; 3 AA Batteries (not included); Crank power alone; AC Adapter (not included); AC Adapter recharges built-in Ni-MH battery pack
- Available colors: Metallic Blue, Metallic Red, Sand, Yellow

FR300 $50*
All-in-One

This all-in-one unit offers functionality and versatility that makes it ideal for emergencies.

- AM/FM/TV-VHF/NOAA Radio Reception
- Built-in power generator recharges the internal rechargeable Ni-MH battery (Included)
- Can be powered from four different sources:
  1. The built-in rechargeable Ni-MH battery that takes charge from the dynamo crank and from an AC adapter (AC adapter not included)
  2. 3 AA batteries (Not included)
  3. The AC adapter alone (AC adapter not included)
  4. The dynamo crank alone, even with no battery pack installed
- Cell-phone charger output jack 3.5mm (various cell phone plug tips included)
- Built-in 2 white LED light source and one flashing red LED
- Weather alert
- Dimensions: 6-1/2"W x 6"H x 2-1/2"D
- Weight: 1 lb. 3 oz.

S350 Deluxe $100*

High-Performance Field Radio

For S350 Deluxe devotees the deluxe model combines a sporty new exterior with the same unrivalled functionality.

- Highly sensitive analog tuner with digital display
- Large, full range speaker with bass & treble control
- Clock, alarm and sleep timer
- Built-in antennas and connections for external antennas
- AM/SW Frequency Lock
- Set clock and alarm while radio plays
- Dimensions: 12-1/2"W x 7"H x 3-1/2"D
- Weight: 3 lb. 4 oz.
- Power Source: 4 D or AA Batteries (not included) or AC Adapter (included)
- Available colors: Metallic Red, Black

NEW YB550PE $80*

Digital Expertise

Offering high-tech digital performance and portability, the YB550PE packs performance into a small radio. Palm-sized and only 11oz, the YB550PE can receive AM, FM, and continuous Shortwave across all 14 international bands.

- Shortwave range of 1711 – 29,995 Khz
- Autoscan, direct keypad, and scroll wheel tuning
- 200 customizable station presets
- Alarm and sleep timer functions
- AC adaptor and supplementary antenna inputs
- Dimensions: 3-1/2"W x 5-3/4"H x 1-1/2"D
- Weight: 10.5 oz.
- Power Source: 3 AA Batteries (included) or AC Adapter (not included)

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around 9 or 10 a.m. The second series of jumps come later in the day, when the team takes center stage among the featured performers. Most military air shows open with a member of the Golden Knights team bringing in the "Colors." With the National Anthem playing in the background, flying the American Flag into show center is a great honor and not something that a member of the Golden Knights team takes lightly. Once on the ground, the color person coordinates with a ground-based Knight before taking on the duties of narrator for the rest of the show. The actual wind conditions are relayed up to the C-31 so the remaining jumpers can make any last minute corrections.

Specialist Sean Sweeney and Sergeant First Class Karen Vessels confer about the wind conditions at ground level. (Photo by Gary Palamara)

Don't Try This At Home!

While the main focus of the Golden Knights is to help promote the Army, the team is also tasked with the job of instructing the crowd in the ways of skyjumping. One of the most breathtaking jumps during any Golden Knights show comes when a solo Knight performs what is known as the cut-away maneuver. Exiting the aircraft at 13,000 feet, the jumper heads earthward at a high speed and then deploys his chute at approximately 10,000 feet. After hanging in the air for a minute or so, this jumper purposely cuts the chute away and then once again rapidly falls to earth.

This demonstration is to simulate what might happen in the unlikely event that a jumper's chute failed. Traveling down for another thousand feet or so, the jumper once more deploys his canopy and all is right with the world again. While this maneuver is instructional, the logical thought might be "What if the second chute fails?" Well, not to worry, as the Knights leave nothing to chance. Every breakaway diver carries a total of three chutes.

The last three members of the Gold team prepare to exit over the skies of McGuire Air Force Base. (Photo by Gary Palamara)

With smoke trailing, two members of the Golden Knights spiral down to another perfect landing. (Photo by Gary Palamara)

A Note Of Thanks

On September 15 and 16, 2001, the Golden Knights were scheduled to perform for an open house weekend at McGuire Air Force Base in southern New Jersey. Those air shows were naturally cancelled because of the events of September 11th. For a short while after the attacks, it looked as though military air shows might a thing of the past, but within weeks public Open Houses were rescheduled with heightened security.

But for McGuire Air Force Base, however, it was a different story. Because McGuire's mission is so vital to the support of our men and women overseas, it was officially off the air show list until 2005. On June 4 and 5 of that year, it was my pleasure to be at the base when the Navy Blue Angels and the Army Golden Knights once again returned to the skies over New Jersey.

Special thanks to the following: The 2005 Army Golden Knights organization and especially the members of the Gold Team, Captain Renita Menchion, Lieutenant Catherine Wallace, Staff Sergeant Vann Miller, and the entire McGuire Air Force Base Public Affairs Office. Without their help, this article would not have been possible.

To assist the crowd in visualizing the team's maneuvers, each jumper ignites a smoke flare that is attached to his boot. This flare most often emits red smoke, but can also come in other colors, such as blue or green.

Best Of The Best

Becoming a member of the Golden Knights is the dream of many, both in and out of the Army. For any soldier who enjoys the thrill of free-fall skydiving, what could be better than making up to an estimated 400 jumps a year, while getting paid for the privilege? But to become a member of this elite organization, the selection process is both detailed and exacting. Just for starters, all applicants who volunteer for the Knights must have a minimum of 150 free-fall jumps, they must have a spotless military and civilian record, and although being a member of the Army Airborne is not mandatory, they must be willing to attend the Airborne school if necessary.

The team selection process takes place during the winter months of each year. Once an applicant is picked for the team, he or she enters a six-week period of testing before actually becoming a member. During that time the Knights will naturally evaluate the recruit's parachuting skills, but they also concentrate on his or her physical, mental, and emotional states. How well an applicant works with the rest of the team is as important to the Army's mission as a flawless performance.

Once the final selections are made, a new member will be knighted as an official member of the Golden Knights team and will serve for approximately three years. They receive no extra pay for their duties. When talking to these young men and women, they'll tell you that it's an honor to serve the team, the Army, and the United States of America.

41@85?

When former President George Bush found out that the Army would award him a medal for completing only five freefall skydives he was definitely excited. But there was one small problem. Counting up all of the president's chute time, including his unscheduled 1944 leap to safety, his 80th birthday jump would only make four, not five skydives. With that in mind, on the morning of his last historic jump, President Bush then only 79 years of age, decided to do a practice jump to help qualify for the award. Sure enough, later that same day, upon completing his fifth skydive, the Army awarded him the Basic skydive medal at the afternoon fundraiser.

When a former president of the United States makes up his mind to go skydiving, at 80 years of age, there is only one person who has the ability to stand in his way and say "no."

Just prior to jump number five, when someone in the crowd asked former First Lady Barbara Bush if her husband, the ex-president, would ever take another skydive, she nervously looked towards the heavens and replied "One way or another, this will be George's last jump."

Time will tell if George Bush jumps again on birthday number 85, but one thing is certain: If and when the former president does take another giant leap, the Army's elite parachuting team, the Golden Knights, will be right beside him making sure everything goes as planned. ■

For the Golden Knights complete show schedule, please visit the Knight's website at www.armygoldenknights.com.

Gary Palamara is a freelance writer with a love of aviation. From 1968 to 1972, he worked with the Armed Forces Radio & Television Service while serving with the United States Air Force. For the past 30 years, he has been a freelance broadcast engineer. Gary is also an amateur radio operator with the callsign AF1US. Reach him via his website, www.garypalamara.com.

by Gordon West, WB6NOA, WB6NOA@arrl.net

New And Improved Technician Class Ham Radio License Test

All current 35-question, entry-level Element 2 Technician class examinations get trashed at 11:59 p.m., June 30, 2006. The current Element 2 entry-level Technician class question pool, made up of 511 total questions for the brand new applicant, will be summarily discharged to the dumpster at that time.

None Too Soon

The present Tech examination and pool is a hodgepodge of old *Novice* class questions, very old *Technician* questions, some newer questions submitted by an outer-space engineer, plus a handful of *General* questions. And it's totally off base with encouraging newcomers to really learn the material, rather than speed read for 511 rote memory answers.

The current Technician class examination got a hasty patch-and-add job in July 2003, after the ham radio restructuring in 2000. New questions were added (actually old, tired questions) from the deleted Novice test, and few current questions were subtracted to make up for the addition, causing the pool to swell from 384 to a staggering 511 total questions!

Statistics compiled by one testing group revealed a downward trend in test-taking and a downward trend in test-passing. I think this is likely associated with people opening up an Element 2 question pool book and quickly realizing it required the skill of memorization, rather than true question research and understanding.

The Fix Is In

To give you an idea of the problems I'm referring to, here's an old question example:

T0DO4 In the far field, as the distance from the source increases, how does power density vary?

A. The power density is proportional to the square of the distance

B. The power density is proportional to the square root of the distance

C. The power density is proportional to the inverse square of the distance

D. The power density is proportional to the inverse cube of the distance

So how did *you* do on this entry-level question? Here's another to test your knowledge:

T1B07 What are the frequency limits of the 13 cm band in ITU Region 2?

A. 2300–2310 MHz and 2390–2450 MHz

B. 2300–2350 MHz and 2400–2450 MHz

C. 2350–2380 MHz and 2390–2450 MHz

D. 2300–2350 MHz and 2380–2450 MHz

How did you do on this non-technical question for beginners? How many beginners would actually operate on the 13-centimeter band, homebrewing their equipment from a cannibalized analog 2.4-GHz cordless telephone, anyway?

Kids and scouts will better understand the new Tech tests; no more memory games!

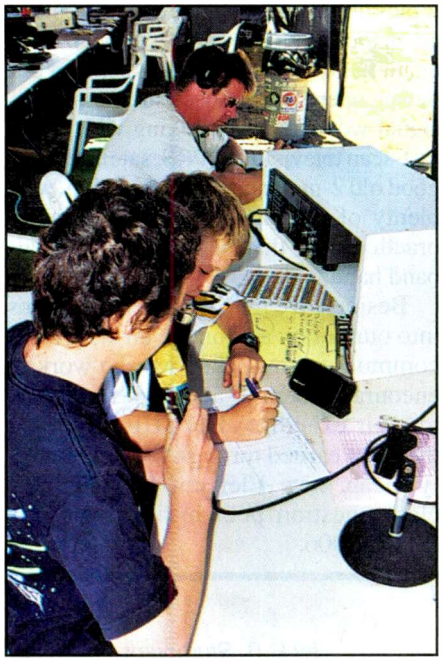
Ham exam coordinators who meet yearly in Gettysburg, Pennsylvania, representing their volunteer examiner coordination group, agreed that the entry-level Technician class examination needed to be "fixed," and soon. Instead of waiting until June 2007, the scrapping of the current question pool for a new pool was set for July 1, 2006.

"The National Conference of Volunteer Examiner Coordinators (NCVEC) announces that the Question Pool Committee (QPC) has adjusted the schedule for revising question pools used in the amateur radio service," says Jim Wiley, KL7CC, the Chairman of the Coordinator's Council. "The QPC anticipates that the new questions will be released to the public in early 2006, AND BECOME EFFECTIVE ON JULY 1," adds Wiley, realizing the tall order to completely redesign the new Technician class examination based on the following criteria:

- Question level should be on a high school reading level
- Approximately 10 main topics
- Avoid questions with negative answers or "all of the above," or "none of the above" answers
- No existing questions based on obsolete technology
- Need for questions on digital communications, APRS, IRLP/Echo Link, and satellite
- Questions should be written to a level that a middle school student would be expected to be able to handle
- Pull all of this off in 90 DAYS, seeking a minimum of 385 questions for the new Element 2 pool!

They Did It!

The QPC pulled it off! Wiley, along with Perry Green, WY1O, of the ARRL, and Larry Pollock, NB5X, of the W5YI



Gordo thinks there is more to getting the first ham ticket than just memorizing test questions. Hands-on learning works!

Group took specific areas of question topics and divided them out among groups like AMSAT, TAPR, Weak Signal Societies, digital user groups, Internet linking experts. They also issued an open invitation for everyone in ham radio to come up with at least one new, fresh question for the entry-level Element 2 Technician class question pool.

Plenty of fresh questions were developed by these team leaders of the QPC, thanks to short-notice offerings from the ham community and multiple forums. The QPC members worked throughout the Thanksgiving and December holiday weeks, meeting their scheduled release date of early January for the new pool. And to give credit where it's due, QPC assistants for additional question input were:

Roland Anders, K3RA; Dave DeFebo, WB9BWP; Tom Fuszard, KF9PU; Fred Maia, W5YI; Steve Sternitzke, NS5I; and Gordon West, WB6NOA.

Some things *are* still the same, however. It's still 35 questions, multiple choice on the test, with 74 percent passing grade.

Gordo is ready for more weekend video conferences to prepare students to pass their tests.

Fresh Air

This was not a facelift, not a redo, and not a rewrite! Rather these are fresh, new questions to encourage applicants to really apply some study time in preparation for the new Element 2 examination. Again, here are some new question examples to show you what I'm talking about:

Q. What does it mean when you are using an amateur satellite operating in mode V/u?

A. You are transmitting a special code for satellites launched in Asia.

B. You are transmitting to the satellite on VHF and receiving the satellite on UHF.

C. You receive the satellite on VHF and transmit back on UHF.

D. The satellite is storing your message for transmission at a later time.

Q. What is the normal bandwidth required for a conventional fast-scan TV transmission using combined video and audio on the 70 cm band?

A. More than 10 MHz

B. About 6 MHz

C. About 3 MHz

D. About 1 MHz

Q. What technology do Echo Link and IRLP have in common?

A. Ionospheric propagation

B. AC power lines

C. Voice over Internet protocol

D. PSK 31

Q. What can happen if a rechargeable nickel metal hydride

battery pack is charged or discharged too quickly?

A. The battery pack could overheat, give off dangerous gases, and explode.

B. The terminal voltage will oscillate rapidly.

C. The voltage will be reversed.

D. It is difficult to overcharge the common battery pack.

The new Technician class Element 2 entry-level question pool is available for inspection online at numerous websites. As you read over the entire pool, it may remind you of when you took *your* FCC-administered examination years ago—short, concise questions with short answer choices, with two choices absolutely wrong, one answer plausible, but incorrect, and one answer absolutely correct.

Notice the various areas to encourage the applicant to do plenty of home study *without* rote memorization before the big exam. Furthermore, none of the older questions were "dumbed down," but rather sharpened in how the material is presented to the test applicant. Also notice that General-class type questions, such as dealing with F_2-layer ionospheric skip, have been pulled from the Technician class question pool and will go into the new General class question pool being developed later this year. (For you 6-meter buffs, we can revisit the F_2 ionosphere question in a few more years as we climb back up to solar cycle 24!)

Beginning this July 1, candidates for the ham radio test will now study those topics that have relevance to getting started on their privileges above 50 MHz. The examination subtly promotes some of our newer operating modes, such as weak-signal work, Internet linking with radio, fast-scan television, APRS, satellites, and good old 2-meter repeater operation, with plenty of questions on good operating practice with that new single- or dual-band handheld.

Besides, we must first get new hams into our hobby and on the air with local communications. Then we can work to encourage them to add high frequency to their existing VHF/UHF privileges they just earned through the refreshingly clean, new Element 2 Technician class question pool hitting town this July 1, 2006. ■

THE POP'COMM TRIVIA CORNER

by R.B. Sturtevant, KD7KTS

Radio Fun And Going Back In Time

Q. How did World War I wireless and telegraph operators power their equipment? Conditions in the trenches certainly didn't favor the batteries of the day.

A. So right you are. About the year 1906, both Germany and Great Britain independently came up with bicycle-powered generators. Both countries' versions were capable of generating 100 watts. This was enough to send a telegraph signal 50 miles over landlines or 150 by submarine cable. It was also enough power for the wireless sets of the day.

Q. What kind of problems and social changes came with the beginning of color TV transmission?

A. Well, in Israel they started transmitting TV in color full time only in January 1981, although there had been a few imported color programs shown before that date. The public loved the new color programs. So naturally everyone went out and bought color sets. The government, fearing too much stimulation on Israel's sensitive economy, ordered the Israel Broadcasting Authority (a government agency) to suppress the color signal. This was done immediately, but enterprising electronics geeks developed devices to remove the suppression from the color signal. The government, now fearing voter backlash, relented and allowed the color signal to be transmitted without suppression. The government had the last word, however—it put heavy taxes on the color sets.

Q. You've mentioned before that one of the first police radio stations carried the callsign KOP in Detroit. Great callsign for the police. Did they keep it?

A. No they didn't. The Federal Radio Commission wasn't able to distinguish between a broadcast station and a utility station. The FRC refused several times to renew the Detroit Police Department's license because they felt the police had not lived up to their responsibilities as broadcasters. KOP was located on the high end of the standard AM broadcast band and was picked up by the standard receivers of the day. The FRC wanted to broadcast "entertainment during regular hours, with police calls interspersed as required."

Police Commissioner Rutledge loved that programming idea. He was heard to say, "Do we have to play a violin solo before we dispatch the police to catch a criminal?" The city council was also reluctant to back the station with the necessary funding and the license was allowed to lapse.

Police radio, luckily for everyone, did not die there. In March 1922, the Detroit Police Department asked WWJ, the *Detroit News*' radio station, to broadcast a description of a missing boy. The boy was found safe in Ohio. This gave the police department enough backing to continue its radio experiments on its own frequencies. These, of course, lead to radio becoming the mainstay of police work it is today.

Q. How did soldiers on the ground call for artillery or air support in combat during the Vietnam War?

A. General Tommy Franks, in his book *American Soldier*, tells how he did it when acting as a Forward Artillery Observer in Vietnam. Then-Lieutenant Franks flew in a small command and control helicopter. The helicopter's frequency was tuned to the troops on the ground maneuvering frequency. On the floor, between his feet, was a military PRC-25 radio. He fed the signal from the helicopter's radio into one side of his headset inside the flight helmet. In that side of the headset he could hear the ground commanders and talk to them through the helmet mic. The PRC-25, tuned to the artillery battery's frequencies, fed the other side of the helmet's headset. When he needed to call in a fire mission he used the PRC-25 hand mic to speak to the artillery. Franks said the system took a little getting used to, but it enabled him to call down some hurt on the bad guys.

Q. How do military pilots flying in poor visibility keep from running into each other? Are they all glued to their radar screens? Doesn't that interfere with their ability to carry out their missions?

A. No, it isn't always the radar. Aircraft flying in formation today, particularly helicopters, are in danger of running into each other at night, during storms, or heavy fog. Running lights aren't always visible or even used, particularly during combat operations. Radar can sometimes be used, but is often aimed down to pick up threats on the ground.

What keeps helicopters and other military aircraft from going bump in the night is TACAN. TACAN is a transmitter/receiver unit that gives aircraft a digital readout on the exact distance two TACAN-equipped aircraft are from each other, even with zero visibility. The system is particularly useful during rescue operations or heavy combat when pilots don't always have the ability to watch their radar screens—and the M-1 Threat Detector, aka the human eye, can't see anything at all. ■

by Richard Fisher, KI6SN

Capitol Hill And FCC Actions Affecting Communications

New ARRL President To Push Bandwidth Initiative

The American Radio Relay League, representing radio amateurs across the United States, named Joel Harrison, W5ZN, of Judsonia, Arkansas, its 14th president in January. Harrison, 47, succeeds Jim Haynie, W5JBP, who chose not to run for a fourth term, the League announced.

In an ARRL announcement, Harrison said he "believes amateur radio is looking at a different society—and pool of potential licensees—in the 21st century than the past."

"One of the things we need to do over the next few years is realize that Main Street USA is not the Main Street USA it was years ago," Harrison said. "We all remember those days when we became interested in radio and the magic it provided to us. The magic is still there, but Main Street has changed."

Harrison said that among his priorities will be the promotion of the League's Petition for Rule Making (RM-11306), which calls upon the FCC to regulate amateur radio allocations by bandwidth. "Right now we do that by mode, and we're one of the few countries in the world that does that," Harrison said. "We need to change that and move forward with this initiative of regulation by bandwidth instead of mode."

According to the *ARRL Letter*, the League is asking the FCC to replace the table at FCC Part 97.305(c) with one that parses bands by bandwidths "ranging from 200 Hz to 100 kHz. Unaffected by the ARRL's recommendations, if they're adopted, would be 160 and 60 meters. Other bands below 29 MHz would be segmented into subbands allowing maximum emission bandwidths of 200 or 500 Hz or 3.5 kHz with an exception for AM phone."

Specifically, 200 Hz would permit CW "at all speeds that human operators can decode" as well as PSK31; 500-Hz bandwidth would accommodate RTTY and data modes and possibly some new image modes; 2.8 kHz would remain the bandwidth for 60-meter operation on USB; 3.5 kHz would accommodate SSB and digital telephony, image, high-speed data, and multimedia; 9 kHz would be the ARRL's recommendation for double-sideband AM; 16 kHz is "a reasonable compromise bandwidth" to continue to permit analog FM voice, data, digital voice and multimedia at 29.0 to 29.7 MHz; 100 kHz, now permitted for RTTY data in bands above 420 MHz, should be allowed starting at 50 MHz, with the exception of 50.0 to 50.3 MHz and 144.0 to 144.3 MHz to allow digital multimedia and high-speed meteor scatter work.

A copy of the ARRL petition is available at www.arrl.org/announce/regulatory/bandwidth/Bandwidth-Minute-64-Petition-FINAL.pdf.

Harrison, previously an ARRL first vice president, will serve for the next two years. He was selected by the ARRL Board of Directors in a 10 to 5 vote.

Changes Announced In Leadership Of Army MARS

Major Gregory Harris was named new head of the Army Military Affiliate Radio System (MARS) in January, succeeding Bob Sutton, N7UZY, who stepped down to recuperate from illness. Harris, who had been assistant chief of Army MARS and executive agent of the program, inherits the AAA9A MARS callsign.

"I look forward to continuing in this proud tradition and working with as many of you as possible over the coming year as Army MARS continues to be 'proud, professional and ready,'" Harris said in an announcement to Army MARS members and stations. He will "continue to fill in" upon Sutton's return and to "begin reconstructing the MARS program that will better support our members."

For more information about Army MARS, visit www.asc.army.mil/mars/.

Congressional Action On DTV Lauded By New APCO President

The Association of Public-Safety Communications Officials (APCO) International praised Congress in February for its establishment of "a hard date to end the digital television (DTV) transition and clear broadcasters off the 24 MHz of public safety spectrum in the 700 MHz band."

In a statement on APCO's website, the organization reported that the "House of Representatives approved the Senate's changes to 'The Budget Reduction Act (S. 1932)' (Feb. 1) by a vote of 216 to 214," establishing February 17, 2009, as the hard date and establishes a $1 billion Public Safety Interoperable Communications Grant Program.

Upon hearing the news, newly named APCO President Wanda McCarley said, "This will allow state and local public safety agencies to move forward towards planning, funding, and deployment of new state of the art, interoperable communications systems. Although we still wish the clearing of the spectrum could occur as close to 2006 as possible, our main goal was the establishment of a hard date."

McCarley was sworn in as APCO International president in January.

White House Announces Nominee For FCC Commissioner

Robert M. McDowell has been nominated by the White House to fill a vacant spot on the Federal Communications Commission. In a statement of support, FCC Commissioner Michael J. Copps said McDowell "has a wide-ranging knowledge for the communications issues which the commission must deal with in the months ahead. If confirmed he will bring the commission back to full complement for the first time in almost a year. I look forward to the opportunity of working with him."

President Proposes $300 Million FCC Budget

President George W. Bush has submitted a budget to Congress that includes a proposal for $302,542,000 in funding for the Federal Communications Commission in Fiscal Year 2007.

"The requested FY 2007 funding level would provide sufficient funds to cover mandatory increases in salaries and benefits and inflationary increases for office space rental, supplies, printing, postage, and contractual services," an FCC news release announced. "The requested funding level would also provide for funding to conduct an outreach campaign to educate consumers about the impact and benefits of the transition to Digital Television (DTV).

It continued, "In addition, the requested funding level would allow the commission to replace Mobile Digital Direction Finding (MDDF) vehicles that are used to support public safety entities (e.g. emergency responders, police, fire departments) in the resolution of harmful interference to their communications systems and to expand its oversight of the Universal Service Fund (USF)."

For more details on the FY 2007 FCC budget submission, visit www.fcc.gov.

by Steve Douglass, webbfeat@gmail.com

Out Of The Black—Top Secret Projects They *Want* Us To Know About

Every year I like to dedicate an entire column concerning revelations and rumors surrounding black projects, or Special Access Programs, as they are known in the Pentagon. Although some utility monitors say that the chances of actually monitoring "something black" is remote at best, it's the intrigue surrounding covert operations and possibly intercepting communications involved that has drawn some (like me) to the hobby of military monitoring.

To be sure, top secret programs and their communications are well protected, and it is true that if they don't want you to hear about something, you probably won't, but that's where the intrigue comes in. What if they *do* want you to hear about it? But then *why* would they want you to hear about it?

Case in point: Since the invention of radar it's been nearly impossible for any aircraft to fly through the skies unnoticed. Radar makes it possible to track any flying machine, whether it's a small one-seat private aircraft or a huge 747 passenger liner. In the late 1970s, the geniuses at the secret Lockheed Skunk Works made an amazing discovery. They found the formula for determining how to shape an aircraft in a way that reflects radar beams away from and not back to their source. That formula came from a pretty unlikely place—a complicated mathematical equation written by an obscure Russian scientist.

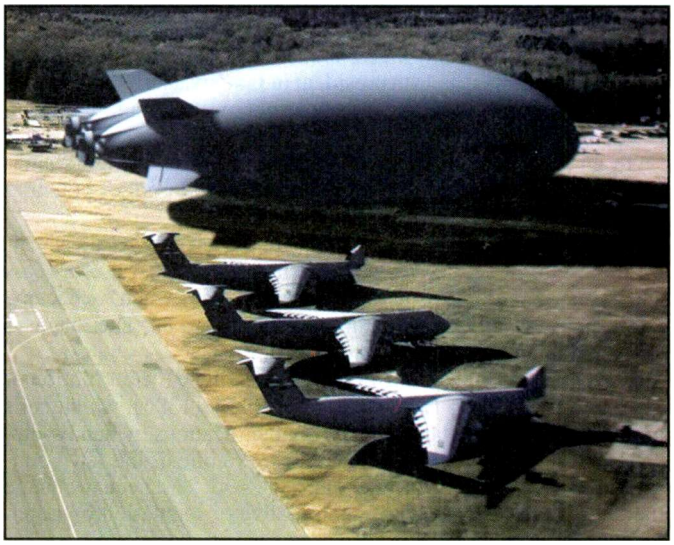
This is very ironic because, at the time, Russia (then called the Soviet Union) was considered the main threat to the United States. And with good reason since the Soviet Union had thousands of nuclear missiles aimed at the United States. If the Soviets had realized they had at their fingertips one of the keys of stealth technology, they could have designed their own stealth fighters and bombers, which would have tipped the military weapons scale heavily in Russia's favor. By mastering stealth technology first, the United States was able to render useless billions of dollars of Soviet military hardware, forcing them to spend billions more trying to counter stealth technology.

This was a nightmare for Soviet military planners who realized it meant American stealth bombers could destroy Russia's nuclear missile sites and bomber bases virtually without warning. But it cost much more money to counter stealth technology then to invent it, and the already-suffering Soviet economy could not cope with its own bloated military machine, which was stealing assets from people who were already on the verge of starvation. This eventually lead to an economical collapse in the late 1980s and as a result to the end of the Soviet Union.

Without Firing A Shot...

That's how important stealth technology turned out to be. Without firing a shot, stealth helped bring about the end of the Cold War. Since then, stealth technology has been a very closely guarded secret, but at the same time a *not-so guarded secret*.

Confusing? Let me explain. The technical specifications, the nuts and bolts, of stealth technology are guarded as closely as the plans for nuclear weapons, but the *fact* that the United States has stealth aircraft is *not* a secret. If Russia never knew the U.S. military had invented stealth aircraft then it wouldn't have had the effect it did on the Cold War.



Concept art depicting the scale of a full-sized cargo/troop carrying airship. Notice that it dwarfs the C-5s parked next to it. (Artwork courtesy ATG)

The same goes for the war on terrorism. Knowing that the United States is building stealthy, silent, and impossible to detect spy planes, unmanned aerial vehicles (UAVs), and bombers that can strike anyone anywhere without warning, keeps our enemies on edge and worried, and that's exactly where we want them to be—always looking over their shoulder, uncomfortable and off balance.

Skunk Works Airship Revealed

Very recently, residents of Palmdale, California, noticed a strange airship tooling around the skies near the Lockheed Plant. Looking somewhat like three Goodyear blimps squashed together, this airship moved quite nimbly around the plant for a few hours and then landed. A passerby snapped a few pictures of this flying oddity and posted them at www.abovetopsecret.com/forum/thread194074/pg1, but for copyright reasons I cannot post them here.

However, I can publish artist renderings of "Skycat," a "white world" airship project that was obviously the basis of the Skunk Works aircraft. Officially designated the P-791 airship, its maiden flight occurred on January 31 with Chief Test Pilot Eric P. Hansen at the controls.

One observer saw the craft performing very tight circles while taxiing. Then it made a brief take-off roll, climbed to a few hundred feet, made a few banks and then landed. Observers noted that this craft also moved very nimbly for an airship, with the landing approach marked by a nose-down body attitude that leveled off for a flare. Top speeds were estimated at about 20

Artist rendering of the "Skycat" airship on which the Lockheed airship design is obviously based. (Art courtesy ATG)

knots. Its overall length seems to be in excess of 200 feet, but the P-791 is thought to be only a quarter-scale test vehicle, with an operational craft possibly exceeding 800 feet.

If you're a regular reader of *Pop'Comm*, you might recall the issue where we took a look at secret airships being developed for the military. I won't rehash the entire story here, but the three main reasons for the military's rekindled interest in airships is for their potential as heavy transport vehicles, reconnaissance platforms, and communications relay platforms.

The Lockheed airship—possibly a joint venture between Lockheed and Advanced Technologies Group (ATG)—appears to be the prototype for a heavy lifter capable of moving thousands of troops and many tons of equipment to military operations areas, although it will not fly into hostile areas. While not a fast flyer, it can literally move mountains of men and materiel, dwarfing what dozens of Air Force C-5 Galaxy's can do. The goal is to be able to lift over 200,000 soldiers (and their equipment) in just a few days.

Undoubtedly as the test flights go into full gear, West Coast MILCOM and aviation monitors will be able to intercept communications concerning "The Walrus" on both VHF and UHF aviation frequencies.

The New Black Budget: Bigger Than Ever!

Troop carrying blimps aren't the only covert projects the Pentagon has in the wings. According to an article in the defense journal, *Jane's*, the classified 2007 budget has grown even larger.

As outlined in the article ("US continues to increase spending on classified programmes," February 10, 2006) by Bill Sweetman, IDR Technology and Aerospace Editor, increases in the classified or "black" portion of the Pentagon budget continue in Fiscal Year 2007 (FY07), with some allocations steady and others spectacular, as follows:

For example, the Navy effort known as Chalk Eagle has jumped from USD46 million to USD139 million between FY05 and FY07. The Retract Maple program has risen by USD41 million in a single year and now stands at USD344 million—bigger than the V-22 or unmanned combat aerial vehicle (UCAV) R&D programs. Both Chalk Eagle and Retract Maple are listed as "advanced component development and prototypes."

Under "advanced technology development" in the US Air Force (USAF) R&D budget is the Special Programs line item 0603801F. This gets a USD40 million boost to USD316 million in FY07 and is now three times its FY03 value. Listed as "operational systems development" are three programs that add up to USD1.28 billion. Funding listed under Special Evaluation Program—a veteran of the classified world, descended from a line item that covered the F-117 in its black-world days—is nearly doubled in FY07 compared to the previous year to USD530 million. Advanced Program Evaluation (formerly Omega) is USD437 million—more than twice what it was in 1999. The Evaluation & Analysis Program has risen slightly, to USD313 million.

So what do all these cryptic program names refer to? Well, for one, the Pentagon has announced it has put into effect a plan to retire the F-117 Stealth Fighter and the U-2 spy plane by 2010. This could mean that they are being replaced by the F-22 and Predator UAV, or that there are other replacements still in the black being developed at test facilities, such as the infamous Area 51.

Another hint at a U-2 replacement came in February and appeared on *Aerospace Daily's* website in a short piece written by William B.A. Scott:

Military personnel stationed at Yokota AB, Japan, have spotted what may be highly classified "black" aircraft that could be flying spy missions over North Korea. Two or three of the unknown aircraft appeared at Yokota periodically over the last year, flying night missions for 2–3 weeks at a time, then departing. USAF C-5 Galaxy transports may have accompanied the "black" aircraft. The latter were kept in special hangars, appearing only during night hours, and were described as "very fast." The unknown aircraft were smaller and more sleek than now-retired SR-71 Blackbirds, one observer said.

Another aircraft the Pentagon has scheduled for retirement is the venerable B-52 Stratofortress, first flown in 1955. Although a tried and true workhorse, the BUFF has gone about as far as it can go (and then some), having flown thousands of sorties ranging from Vietnam to the War On Terror as well as being Strategic Air Command's big stick during the entire Cold War.

There was a joke circulating through B-52 squadrons that went something like, "When they retire the last B-2 Stealth, the pilots will hitch a ride home from the boneyard on a B-52!"

According to an article at Military.com by Jack Sherman (www.military.com/features/0,15240,85361,00.html?ESRC=topstories.RSS), it looks like the Pentagon, it looks like the Pentagon is not going to let that happen, and has sped up development of the next generation heavy bomber:

The Defense Department will begin work this year on a next-generation long-range strike aircraft, accelerating its bomber modernization plans by nearly two decades in an effort to quickly enhance the Air Force's effectiveness across the Asia-Pacific region.

The Quadrennial Defense Review, set to be delivered to Congress next month, will call for the Air Force to move up the date to field a new bomber from 2037 to 2018, according to Pentagon sources familiar with the recommendation.

As part of this effort, sources said, Deputy Defense Secretary Gordon England has terminated the Joint Unmanned Combat Air Systems program, which was aimed at developing a similar aircraft for both Navy aircraft carriers and Air Force air-to-ground strike missions. This action, spelled out in a classified budget memo last month, directs each service to pursue independent unmanned aircraft programs, according to sources familiar with the document.

Part of the follow-on Air Force effort could be integrated in the new bomber program, sources said.

Sources familiar with Air Force plans, who spoke on the condition they not be identified because the Pentagon has not released its QDR findings, said the service this year will conduct a study of the issue and launch an analysis to produce a set of alternative approaches for a Next Generation Long Range Strike Aircraft program.

"It will be in the QDR," said one source familiar with the review's recommendation on accelerating work on a new bomber.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Chinese JX stealth fighter as revealed in a Chinese newspaper.

The Air Force's long-range strike aircraft fleet currently includes B-52s, some of which have been in service since 1962; the stealthy B-2s; and the B-1 fleet. In total, the service has approximately 160 bombers. The Air Force, however, is advancing a new plan in the fiscal year 2007 budget request to trim its B-52 fleet from 96 to 54 aircraft.

No Corner On Stealth— The Chinese Stealth Fighter

Although the United States was the first to discover LO (low observable) technology, it was inevitable that other nations would develop their own stealth systems. While the United States has been in the lead for over 30 years, other industrial nations are playing catch-up at an alarming rate.

It was recently discovered that China is close to fielding its first stealth fighter. Tentatively called the "J-X," and possibly to receive the service designation J-13A, this craft has a plan form similar to Lockheed Martin's F/A-22 Raptor, including low-radar-observable contours and internally carried weaponry. However the wings are more conventional, and the aircraft uses a single vertical tail fin.

With help from Russia's aerospace industry, China has produced many planes of Soviet design, and it can be predicted that the J-XX would include some, if not many Russian technologies and designs. A cash-strapped Russia has been struggling to develop its own stealth aircraft, such as the MiG 1.42/1.44, but it had not succeeded in producing an operational aircraft. An infusion of funds from China, however, may be the shot in the arm the struggling Russian military industrial machine needs to get its stealth projects in the air.

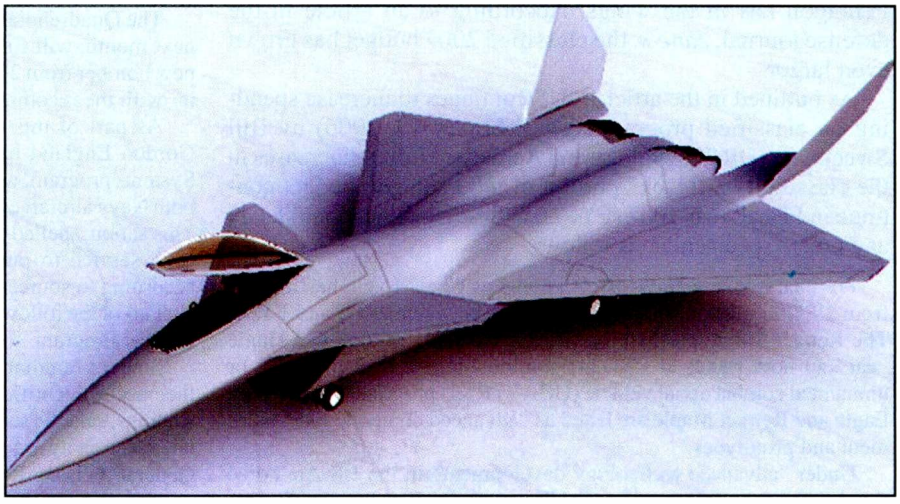
Russia has offered China "joint development and production" of a new fifth-generation Russian fighter, the LFI. Russia has been trying to sell this concept both to China and India for some time, but neither country has committed fully yet. According to Russian resources, the LFI will be able to counter U.S. second fifth-generation Joint Strike Fighter (JSF).

Sources inside the U.S. intelligence community recently released photos purportedly showing the new Chinese "Cheng Du" stealth fighter in its hangar and an artist rendering of the "J-14," which bears striking resemblance to American F-22 and F-35 fighter designs. Although analysts say the Chinese design does not look as stealthy as its American counter parts, it is rumored that a new "plasma stealth system" developed by Russia could be employed to make the aircraft even harder to spot on radar then the American F-22.

According to an article at mosnews.com (www.mosnews.com/news/2005/10/19/stealth.shtml), the Russian aircraft industry has developed and will "soon start producing stealth aircraft which will radically differ from existing U.S. models." It continued:

> The Russian version uses plasma screens to cushion and disperse radar waves, the *Novye Izvestia* daily reports. The newspaper quoted Anatoly Koroteyev, the head of the Keddysh Research Center as saying that the plasma screen technology can be used on any vehicle—from automobiles to combat aircraft. However, it is most effective at high altitudes and thus is best used by the air force.
>
> Koroteyev said that the new technology employs a different physical principle than the one currently used by existing U.S. stealth aircraft—the F-117 and B-2. Instead of reflecting the radar wave the Russian technology completely disperses it by means of a plasma screen created by a mobile plasma generator.
>
> The generator is small and light. The device emits powerful electron beams that ionize the air around the aircraft effectively creating a plasma cloud around it. The head of the Russian research institute said that initially the plasma generator disrupted the work of on-board electronic systems and prevented radio communication with ground control, but the problems have been solved and the system has already passed tests set by a Russian governmental commission.
>
> Koroteyev added that the new technology can be used on any aircraft, including older models and that it is radically cheaper than the technology employed by U.S. stealth planes while being just as effective, if not more so. He said that the aircraft equipped with the Russian system will also be far superior to U.S. models in their flight and combat capabilities as the use of the plasma screen makes it unnecessary to alter the shape of the aircraft. The newspaper writes that similar research is being conducted in the U.S., but the Russian version is so far the only plasma screen technology in the world.

American defense analysts doubt the claims of the article and see it as most likely more Russian propaganda. According



Artist rendering of China's stealth fighter. (Courtesy GlobalSecurity.org)

British Corax UAV prototype (not yet wearing stealth material coatings) resembles the Lockheed Darkstar. (Photo courtesy BAE Systems)

to an article published in *Aviation Week and Space Technology* magazine ("Russians Eye Plasma Fields," Douglass, Barrie, October 2002), "Plasma is potentially a highly effective dissipater of RF energy; however, the generation of such a field requires considerable power in itself. Providing a plasma field for an entire platform has so far proved prohibitive in terms of power generation."

You can read more about plasma stealth at http://en.wikipedia.org/wiki/Plasma_stealth.

European Stealth Efforts

Not to be left out of the race for stealth technology, Germany has unveiled its "Barrakuda." Built for Germany, Spain, and Switzerland, it's a UAV of advanced design that underwent taxi tests in January, but has not flown yet.

Also recently unveiled was Britain's Corax, reportedly a stealthy UAV resembling the American (now canceled) Dark Star prototype.

According to a piece in *Aviation News*, titled "British Corax UAV revealed" (www.airpictorial.com/pages/news.html#Anchor-British-49575):

> While it has been known for some time that BAE Systems has been working with flying models of unmanned air vehicles (UAVs), the release of images of the Corax low-observable air vehicle in January finally confirmed the rumors. UAV development began a decade ago and has been centered at BAE's Warton facility and more specifically at the secure Advanced Technology Development Centre site on the airfield. Corax is a step along the way towards a future unmanned military aircraft capable of combat, attack and surveillance missions, which the UK Ministry of Defense is keen to pursue. The goal is that there will be no more manned, fast jet aircraft beyond Typhoon and the F-35 Joint Combat Aircraft.
>
> Although no dimensions have been released on Corax (covus corax is the biological name for the raven), it is believed to have a wingspan of around 5–6m and powered by a small commercially available jet engine. Flight trials have been conducted in Australia and an earlier system called HERTI, which is a modified powered glider, has been flown on a fully autonomous mission from Machrihanish, Scotland.

The Corax on its maiden flight. (Photo courtesy BAE Systems)

[Author's note: Machrihanish is legendary for possibly being a forward deployment base for the purported Aurora hypersonic aircraft.]

Corax is an early step towards a more advanced design, which will move the UK program forward towards a larger and more workable platform.

Britain recently canceled its FOAS (Future Offensive Air System) in favor of purchasing the American F-35 Joint Strike Fighter, which would have replaced aging British Tornadoes GR4 aircraft.

Meanwhile, Back At The Ranch...Revelations

You may recall that I wrote about a mysterious stealth UAV seen by U-2 crews in Iraq, dubbed by some as "Black Star" since it was revealed to be related to Lockheed's defunct Dark Star UAV. Since then new information has come to light that the real name of this stealthy communications interception platform proper name is "DistantStar" an LO long-endurance UAV not yet operational, but undergoing tests over Iraq and at Area 51 (aka "The Ranch") just north of the Nellis AFB ranges in Nevada. Built by Lockheed Martin, the purpose of the UAV is still a closely guarded secret, but it is thought to be a COMINT/SIGINT platform.

Flying Artichokes?

Many years ago I also wrote about a secret stealth aircraft with a unique design featuring a trailing edge composed of serrated triangular edges. Stealthies named it "the Flying Artichoke." This strange-looking aircraft was seen up close and in person by a civilian contractor at the RATSCAT radar cross-section measuring facility, located inside the White Sands Missile range in New Mexico.

As the secret history of stealth aircraft development is slowly being released, it turns out that the aircraft was a design created by (then) General Dynamics (now absorbed into Lockheed) as one of the entries vying for the Advanced Tactical Fighter contract that was ultimately won by Lockheed. The purpose of the saw-tooth trailing edge was to improve radar (LO) signatures from the rear to prevent radar-guided missiles from locking on.

According to an article on F-22 design evolution by Eric Hehs in *Code One* magazine (www.codeonemagazine.com/archives/1998/articles/apr_98/apra_98.html),

> The trailing edge of the wing and the control surfaces were cut into chevrons aligned with the leading edge, giving the wing a bat-like look. In the end, no acceptable location for the twin tails was found, and the design was submitted with a single centerline tail and a serrated trailing edge. The new final configuration was labeled T-333.

Unfortunately for General Dynamics, control of the aircraft was a problem and the final solution was to employ a large single-slab tail fin to help stabilize the aircraft. That had the oppo-

site, unwanted effect of increasing the aircraft's side-on radar signature making it well...not nearly as stealthy as the competition.

Dispatches

Larry Loeb writes us about using ARC396 (scanner control software for the BC396T) on a Macintosh:

I have some thoughts about the 396T and the Mac. I use the Uniden software for the 396 on my Powerbook G4 under virtual PC 7.02 along with a DB9-to-USB cable. You just plug the cable into the female DB9 cable Uniden provides, and VPC recognizes the USB as Comm3. Works like a charm. The program is not very intuitive about storing and modifying systems (there are function combinations that are very useful but hidden, for example), but it does work once you learn it. But that's a Uniden issue, not a Mac one. Also, I changed the splash screen with the program to have my name and telephone number show up every time it boots (you can change the first boot screen to anything you want it to be). It's more a loss deterrent than a theft deterrent, but it does give a return path if I ever set it down and forget it.

My retailer had a $20 neoprene-like case for the thing, which protects it just fine. Anyway, keep plugging the columns out so I can read them.

Thanks, Larry!

Although Katrina destroyed his house and monitoring gear, Richard Webb of Eads, Tennessee, keeps right on plugging! He writes:

I'm...a ham operator with the callsign NF5B, formerly residing in New Orleans, Louisiana. My wife and I handled emergency communications via ham radio for University and Charity hospitals after the storm.

Because of our inability to get back to our heavily damaged house it caught fire when they turned on the power and burned to the ground. Ham friends helped me replace some of my ham gear. For HF a friend sent me a Kenwood TS-440S transceiver, which again got me back into utility monitoring. I'd given my last general coverage receiver, an old DX-160, to a friend who was trying to get some code practice on the air. This friend wanted to upgrade, and listening to on-air code was the best way. My HF transceiver at the time didn't cover much outside the ham bands except maybe a little bit above 20 and 40 meters. Now, however, I've got good general coverage receive capability with a G5RV antenna out here in the woods near Memphis, Tennessee, where I now live.

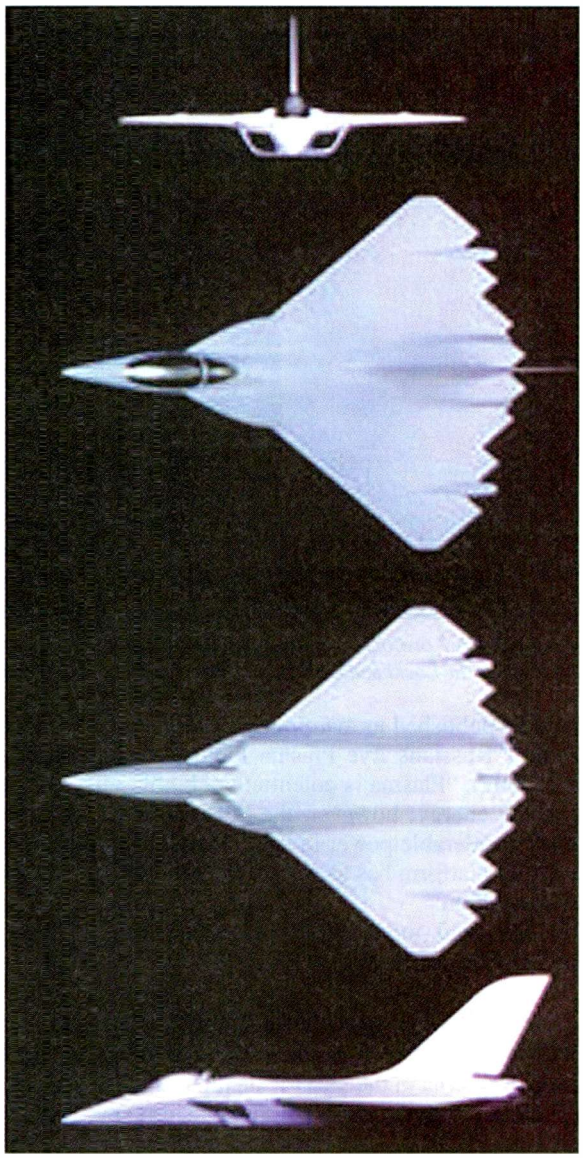
I'm mainly into maritime monitoring; of course I'm a net control for the maritime mobile service net on 14.300 MHz. However I entertained my son-in-law with some aero monitoring with commercial flights in and out of New York over Christmas day. Anyway watch for some loggings from me next month. What's your deadline for them for columns? I'll try to get loggings for the previous month to you.

Richard, thanks for your letter. To make the next month's column, ideally loggings should be here by the 10th of each month.

In Closing...A Brow Beating

I must say I'm a bit disheartened by what seems to be a strong streak of apathy running through the brains of utility monitors concerning sending in radio logs. If Richard (who is trying to recover from losing his gear to a hurricane) can promise to send in some logs, why can't you?

The argument seems to be that by the time the logs are printed in the pages of *Popular Communications* they are out-of-date. Not true. What they become is a printed reference that you can go back to years later and consult. They are also a printed record of what you were intercepting at that time in history. Plus you can't beat the thrill of seeing your name in print.



The "Artichoke" revealed. This is the General Dynamics ATF design that lost out to the Lockheed F-22. (Courtesy Lockheed Martin)

So, please take a little time, jot down (in the format below) what you are hearing and send those logs in. See you again next month!

Reader Logs

0000: (Frequency MHz): STATION, Anytown, USA, summary of traffic heard in MODE at 0000Z. (monitor/sometimes location)

419.0: WUN, Wunstorf, Germany NDB in CW at 1855Z. (CG)

490.0: VCO, Canadian Coast Guard, Sydney, NS w/NAVTEX ice bulletin, contact phone numbers in FF headed JA67, 0255-0258Z. VAR-3, Canadian CG Fundy Bay, Saint John, NB w/wx bulletin headed ZCZC VE79 in FF at 2335Z, VA40 navigation bulletin at 0337Z w/ice info and contact phone numbers. VCK, Canadian CG, Riviere-au-Renard, Sept Iles, Quebec w/ice bulletin in FF headed ZCZC DC84 at 0030Z, navigation warnings headed DA54 and DA42 at 0430-0437Z, wx forecast headed DE30 at 0835Z. SITOR-B. (SJ)

518.0: NMG. USCG New Orleans, LA w/NAVTEX meteorological forecasts, navigational warnings at 1105Z. NMA, USCG Miami, FL at 2020Z w/bulletin about sighting of group of Right Whales. NMB, USCG Savannah, GA w/standard bulletins at 0040 and 0840Z including notice of restrictions on catches of Loligo Squid, also

on gillnets and lobster traps to protect Right Whales off Portland, ME. XMJ, Canadian CG, Prescott, ON w/ice and shoal bulletin headed HA61 after NMB Savannah s/off at 0120Z, also at 1311Z headed HA67 on shipping channel traffic. NMN, USCG Portsmouth, VA w/standard bulletins at 0130 and 0530Z. XLJ 895, Canadian CG, Thunder Bay, ON w/wx forecast at 0230Z, good signal after NMR USCG San Juan signoff, also w/brief msg at 0631Z: ZCZC PZ01 NO MESSAGE ON HAND. VAR-3, Canadian CG Fundy Bay, Saint John, NB w/brief bulletin headed UB37 at 0653Z. (SJ)

2330.9: UNID with letter "P" rpted in CW at 1838Z. (CG)

2789.0: FUE, French Navy, Brest, France w/ITA2 marker, TESTING, 0-1 and 0-9 counts, RYRY and SGSG strings, INT ZBZ, 75 baud, 850 Hz, 0010Z. (SJ)

3228.2: UNID with 5-char grps, many chars not Int'l Morse CW at 1830Z. (CG)

3485.0: New York Radio with aviation wx in USB at 2245Z. (CG)

3485.0: VFG, Gander R., Newfoundland, Canada w/VOLMET wx obs, USB hearrd at 0025Z. (SJ)

4007.0: UNID with 5-fig grps (with cut 0), each twice. Ended with "41 41 48 48 000." CW at 2110Z. (CG)

4724.0: Andrews AFB with three 28-char EAMS in USB from1948–2005Z. (CG)

4724.0: Andrews AFB with a msg to Skyking, 6-char with two-ltr auth code. USB at 1934Z. (CG)

4850.0: S9BA with VVVs in hand-sent CW at 1800Z. (CG)

6389.0: CTP, NATO, Lisbon, Portugal w/modified ITA2 marker: NAWS NAWS DE CTP CTP DUE TO TECHNICAL PROBLEMS SERVICE UNAVAILABLE UFN AR, 75 baud, 850 Hz at 2250-0005Z. (SJ)

6526.0: Kingston R., Jamaica in simplex QSO w/unid. station, USB at 0009Z. (SJ)

6531.0: Several unid. stations in simplex QSO in Spanish in USB at 0020Z, sounds like a phone patch. (SJ)

6565.0: Unid. males in simplex QSO in Arabic, USB at 0028Z. (SJ)

6586.0: New York Radio working flight IBERIA 6400, primary freq. and Selcall confirmation, USB at 2159Z. (SJ)

6607.0: Two unid stations in QSO, stronger with unsteady, poor quality handsent CW, repeating 5232TT and VSA, 2205Z. (SJ)

6739.0: AFA, Andrews AFB, MD w/list of frequencies at 2003Z, alphanumeric string & multitransmitter echo at 0018Z, USB. (SJ)

6776.5: AFA2UK, USAF MARS station in AL w/ID as USAF MARS GATEWAY MESSAGE CENTER, in PACTOR, 2130Z. (SJ)

6790.0: Two unid weak stations in QSO w/rapid machine-sent CW in Spanish, one slightly stronger and about 100 Hz higher in freq., 2035–2059Z. Better sigs another day 2140–2154Z, second station 1 kHz higher. (SJ)

6854.0: UNID with 5-fig grps (all numbers cut) in CW at 2210Z. (CG)

6855.0: Cuban ENIGMA V2, YL w/5 number groups AM in SS under WYFR Family R. BC, 2102Z. (SJ)

6867.0: Cuban ENIGMA, YL w/5 number groups in SS, AM at 1602Z. Bad hum and horrible audio. (SJ)

6907.0: U.S. Army MARS net, several stations in simplex QSO, USB at 1943Z. (SJ)

6954.0: CHR, Canadian Forces Trenton R., ON w/wx obs, USB at 0048Z. (SJ)

6959.0: Lincolnshire Poacher ENIGMA E03, British MI-6 YL w/5 number groups x2, USB at 2235Z. (SJ)

7527.0: Cuban ENIGMA V2c, female w/5 number groups in Spanish, AM at 0910Z. (SJ)

7635.0: US Civil Air Patrol net, several stations in casual simplex QSO, USB at 1720Z. (SJ)

8021.7: Probable Egyptian Embassy w/tfc in Arabic, date Dec. 30, 2005 given as 03/21/5002, SITOR-A at 0018Z. (SJ)

8379.0: KAWM, *S/R AMERICAN PROGRESS*, 46,095 ton U.S.-registered crude oil tanker w/AMVER/PR at 1444Z, 20 mi SE of Key Largo, en-route to Beaumont, TX. C6FY2, *DOLE CALIFORNIA*, 11,800 ton Bahamas-registered container ship w/ AMVER/PR at 1620Z, 50 mi off S tip of Baja California, en route to San Diego. S6JO, *EAGLE BEAUMONT*, 99,448 ton Singapore-registered crude oil tanker w/AMVER/PR at 1631Z, 200 mi SE of Boston. SITOR-A. (SJ)

8381.0: 9VHG, *EAGLE BALTIMORE*, 99,405 ton Singapore-registered crude oil tanker w/AMVER/FR for arrival at Philadelphia Pilot Station, 1706Z. CBAR, *ARAUCARIA*, 25,357 ton Chile-registered bulk carrier w/AMVER/ PR at 1915Z, en route to Tampico, Mexico. All stations SITOR-A. (SJ)

8386.0: VRYI5, *PLEASE PLEASE ME*, 28,522 ton Hong Kong-registered bulk carrier w/AMVER/PR at 1836Z, 500 mi W of Tampa en route to Rio Haina, Dominican Republic, SITOR-A. (SJ)

8388.0: S6DU6, *PAC ALKAID*, 26,515-ton Singapore-registered general cargo ship w/AMVER/PR at 1614Z, 200 mi ENE of Jacksonville. VRXC3, *DARYA GYAN*, 50,150 ton Hong Kong-registered bulk carrier w/AMVER/SP at 1731Z for departure Wilmington, DE, en route to Morehead City, NC. C6FW6, *ASIAN SPIRIT*, 151,693 ton Bahamas-registered crude oil tanker w/AMVER/ SP at 2138Z, 200 mi ESE of Halifax, NS, no destination given. Same vessel next day at 1500Z, 250 mi SE of Boston. SITOR-A. (SJ)

8391.0: Unid vessel w/SELCAL MKCV (4360) for TAH, Istanbul R., Turkey on 8431.0, unsuccessful attempt to send direct telex at 2018Z, SITOR-A. (SJ)

8392.0: XCFJ, B.T. *FRANCISCO J. MUGICA*, 21,705 ton Mexico-registered oil products tanker w/telex and crew info in SS at 2205Z, SITOR-A. (SJ)

8419.5: PPR, Rio de Janeiro R., Brazil w/CW+SITOR marker mixing w/NOJ, USCG, Kodiak, AK w/same at 2235Z. (SJ)

8421.5: LZW, Varna R., Bulgaria w/CQ CQ DE LZW LZW, into tfc list w/Bulgarian vessel callsigns x2 at 2245Z, SITOR-B, then into standard CW marker. (SJ)

8431.0: TAH, Istanbul R., Turkey w/wx in EE and Turkish at 2008-2017Z, ID as DEVLET METEOROLOJI ISLERI GENEL MUDURLUGU (Turkish State Meteorological Service), SITOR-B, also in QSO w/unid vessel on 8391.0 monitored at 2018Z, SITOR-A. (SJ)

8918.0: New York Radio working WEST INDIAN 770, USAIR 816 and USAIR 261 in USB at 1508Z. (SJ)

8992.0: Andrews AFB with two 6-char EAMs in USB at1910Z. Also on 4724. (CG)

9041.0: 5YE, Nairobi Meteo, Nairobi, Kenya w/marker, "CQ CQ CQ DE 5YE 5YE 5YE" plus long RYRY strings, ITA2, 100 baud, 850 Hz, reverse mode at 2125Z. (SJ)

10167.0: UNID OM/EE with 5-fig grps, each twice. USB at 1615Z. (CG)

10268.5: USAF MARS net w/tfc re Geophysical Alert Message, PACTOR at 2215Z. (SJ)

10365.0: WPUC469, Sailmail R., South Daytona, FL w/packet tfc & CW ID heard at 2146Z. (SJ)

10555.0: VMW, Wiluna Meteo, Wiluna, West Australia w/chart, FAX at 2155Z. (SJ)

11175.0: AFS, Offut AFB, NE, female working unid. aircraft in USB at 2000Z. AFA, Andrews AFB, MD, male w/ alphanumeric string, USB at 2218Z. (SJ)

12479.0: V7IM6, M/V *BARKALD*, 49,463 ton Marshall Islands-registered bulk carrier w/test msg at 1718Z. 3FPS9, *CARNIVAL GLORY*, 11,100 ton Panama-registered passenger cruise ship in QSO w/WLO, Mobile R. at 1758Z. S6TE, *EAGLE ATLANTA*, 107,160 Singapore-registered crude oil tanker w/AMVER/ SP at 2006Z, departing Puerto La Cruz, Venezuela, en route to Nederland, TX. All stations SITOR-A. (SJ)

12482.0: 3FHG5, *NEW NIKKI*, 26,428 ton Panama-registered bulk carrier attempting to contact WLO, Mobile R. at 2021Z, SITOR-A. (SJ)

12490.0: VRXC3, *DARYA GYAN*, 50,150 ton Hong Kong-registered bulk carrier w/AMVER/PR at 1946Z, 200 mi ESE of Halifax, en route to Wilmington, DE, SITOR-A. (SJ)

12500.0: Unid vessel w/SELCAL QVYV (2070) for IAR, Rome R., Italy at 1510Z, no contact, SITOR-A. (SJ)

13339.0: Unid AEROMEXICO flight in QSO w/Mexico City ATC at 2030Z, USB. (SJ)

14355: UNID YL/EE with 5-fig grps, each twice. USB at 1235Z. (CG)

16084.0: UNID YL/EE with 5-fig grps, each twice in USB at 1325Z. (CG)

16699.0: XCGV, *GUADALUPE VICTORIA II*, 43,350 ton Mexico-registered PEMEX oil products tanker w/telex on crew info to unid. coast station on 16822.0 at 1931Z, SITOR-A. (SJ)

16822.0: Unid coast station in QSO w/PEMEX vessel on 16699.0 at 1936Z, "EL MEDIO DE LAS ONDAS HERTZ HERTZIANAS COMO EL SIETE MARES" and msg re repairs, permit, SITOR-A. (SJ)

This month's star contributors are Steven Jones (SJ) and Chris Gay (CG) ■

by Ken Reiss, radioken@earthlink.net

Antennas On The Move!

Antennas in general present an interesting challenge for the scanner listener. The frequencies we listen to cover such a broad range that there is little hope of designing an antenna to cover them all well. Still, most scanner manufacturers want to include some kind of antenna with most scanners, particularly handhelds, so they come up with a solution that works equally poorly on all bands.

Remember that VHF/UHF communications are "line of sight," meaning that the taller your antenna, the further it can "see" signals. But before you go out and spend a large chunk of change for a tower to put a scanner antenna at 2,000 feet, you should be aware of a potential problem. Your antenna can be a double-edged sword. The idea of an antenna is to hear more stuff, right? And if everything were perfect, and in a perfect world, raising the height of the antenna, or increasing its effective gain would result in hearing more signals. In the perfect world, that's true, but ours is, alas, not quite perfect.

The problem is that increasing the height or gain of the antenna increases the amount of signal gathered at the antenna. Two things can happen to that signal to cause reception to actually *deteriorate* rather than increase when compared with the factory-mounted antenna on the back (or top) of the radio.

The first is that you can experience signal losses in transmission lines (usually coax) that can be severe enough to defeat any gain you might have gotten from the better antenna. This is especially true above 400 MHz, and acute over 800 MHz. This can be largely overcome, or at least greatly reduced, by using very high-quality and very expensive transmission lines. Unfortunately, for those of us in the real world, neither the high-quality transmission line, nor the 2,000-foot tower will be an option. Besides, at 2,000 feet, there are birds and airplanes to deal with as well.

The other problem that may occur is that the antenna can actually deliver more signal to the radio, but the radio can't process it correctly. This effect is technically called many things, depending on where in the radio the breakdown occurs, but we'll call it overload for brevity. I won't go into a lengthy discussion here, but I do want to point it out so that if you make antenna changes and then believe you're not hearing as much as you did, you could be quite right. Don't panic: you can always put things back the way they were, if you take small steps and make modifications progressively, rather than all at once.

Understanding Wavelength

First off, let's make the point that anything that will conduct electricity (or, more specifically, radio frequency signals) will work as an antenna. The old coat hanger bent in some funny shape and connected to your radio will receive. Likewise, a spool of wire from RadioShack with one end stripped and stuffed into the antenna connector will work, too. But, of course, the question is always: "How well?" Sometimes you can be surprised. If you're in a situation where outside antennas are not possible, you might do some experimenting with these two methods (neither one costs much!) and see what you get. I'm not much of a fan of the coat hanger method, but the spool of wire trick can be a lot of fun and it's quite portable.

One of these handy telescoping antennas should be in your arsenal. Those that tilt and swivel like this are nice for laying the radio down while keeping the antenna vertical. There's quite a signal penalty for "cross polarizing"—that is, a horizontal antenna with a signal that was sent with a vertical one.

It's difficult to talk about antennas for any length (no pun intended) of time without understanding wavelength. So we'll take a few minutes here and get that out of the way. If you're already comfortable with this stuff, you can skip to the next section and save some time. See how accommodating we are here at *Pop'Comm*?

We're all familiar with frequency, which is how many times per second the signal that we're interested in is oscillating. Radio waves travel at a constant speed of 300,000 kilometers per second (or 186,000 miles per second, if you prefer, but all of the calculations are done based on the metric system). If it has to oscillate (change directions) more times per second, then there's less time and, therefore, space or distance between each of the waves.

The distance between waves, or more specifically between a point on one wave and the same point on the next, is the wavelength. You can measure from peak to peak or from start to start. It really makes no difference as long as you pick the same spot on both waves.

If you're familiar with ham radio, you know particular bands are referred to by meter. The 40-meter band for instance is just over 7 MHz, which makes the wave just over 40 meters long. There is a considerable rounding that occurs when naming the band, but when we get to antenna length, we'll want to be a bit closer. To calculate this, you can divide the frequency in MHz into 300. The result will be the length of the frequency in meters.

It was common in the 1930s and '40s for shortwave broadcasters to give their schedule in meters. I remember one Radio Moscow announcement stating that they were transmitting in the 11-, 13-, 16-, 19-, 25-, 31-, 41-, 49- and 50-meter bands.

That's a lot of transmitters! You might have heard a BBC announcement that they were transmitting at 50.209 meters. That's 5.975 MHz. In reality, the frequency was rounded to 50.2, or just 50 meters; sometimes, just "the 49-meter band"—happy hunting!

Most of the tuners were pretty coarse in those days, so some fiddling with the dials was common. And it was *dials*—this was in the good old days before digital was even possible, much less common. So the meter band might have been as close as you could really get before you had to start hunting. Once you got in the right meter band, you had to dig a bit to find the exact station you were interested in hearing. In these days of digital readout receivers and synthesized tuners, the exact frequency is preferred, and much easier to find. There is, however, no reason that a receiver's readout couldn't be in meters rather than megahertz.

The 2-meter band is at 144–148 MHz. This is that rounding I referred to earlier. According to our formula, 150 MHz is 2 meters; 146 MHz, the center of the band, is actually 2.05479 meters. That might be interesting if you were calculating the exact frequency, or if you wanted to build a transmitting antenna, but for our purposes, it's more information than we need.

Notice that as we have gone from 7 MHz to 150 MHz, the wavelength has gone from 40 meters to 2 meters (about half a football field to about the length of a couch or bed). As we go higher into the range of scanner frequencies, the waves continue to get *shorter*. At 850 MHz, we're down to 35 centimeters—just a little longer than the length of a letter-size piece of paper.

So how does all this figure into antenna design? The efficiency of the antenna is directly related to the wavelength of the frequency versus the physical length of the antenna. An antenna cut to exactly one half the wavelength (a half-wave dipole) is one of the references for antenna performance, and a relatively simple one to build. So our 146-MHz antenna should be 38 inches long, or 19 inches per side of the dipole.

As a shortcut, you can use a formula that will convert the length of the antenna elements directly to inches. Depending on which book you read, 2800 to 2808 divided by the frequency in MHz will give you the length per side for a dipole; 2800/146 gives you 19.17 inches, while 2808/146 gives you 19.23. Not much difference, but my philosophy is to start longer and trim as necessary. Remember that none of this is critical for *receive* antennas, and in practice either one would probably be just fine.

A dipole is a kind of T-shaped antenna, so if you had one 19.23-inch piece of wire coming out of the center connector and another coming from the outside of the antenna connector, you'd have a dipole that would work fairly well at that frequency! Try it!

This brings us to another critical point: bandwidth. Many antennas are frequency specific. Some of them drop off considerably the further you move away from that optimum frequency, while others are fairly "broad banded." If you stop and think about it for a second, we're asking the scanner and the antenna to perform across many hundreds of megahertz, while many antennas were designed for *one* frequency. Yikes!

The good news is that for receive applications, this is not nearly as critical as it is for those who are transmitting through these things. While a transmitter will require adjustment every few hundred *kilohertz* of frequency change even on a

Getting the antenna high and out of the way is more than a function of distance for this impressive array of ship antennas. The salt water sea makes a great ground plane, but the ship itself would shield just about anything that tried to get out if it wasn't high and outside the main structure.

dipole, a receiver will work several megahertz away just fine. Sure, it won't be quite as efficient as an antenna just for the new frequency, but it's a lot easier than trying to put up an antenna for every frequency you want to listen to!

Starting Simple

The simplest antenna is a half-wave dipole. In English, this is a wire one-half wavelength (the length of the radio wave from peak to peak) that is split at the center. This antenna has to be cut for a particular wavelength, although it will perform reasonably well for 20 to 30 MHz on either side of center. Remember that we're talking entirely about receive antennas here. If you're licensed to transmit, all the rules change, and you should probably ignore this column completely!

The half-wave dipole comes in many variations; the most common for scanner users is the quarter-wave ground plane. What? You just said it was one-half, now it's one-quarter? Yep. The active, or main, element of the antenna is one-half of the half-wave, or one-quarter. Each leg of a dipole is one-quarter wave, too.

What makes the *ground plane*-type antenna different is that the active element is vertical in the center of a "plane," or number of elements that form the other leg. The ultimate ground plane is a metal disk with a radius equal to one-quarter wavelength. However, you can get almost as much performance, and save a lot of wind resistance, with just a few metal elements (three or four are common). By having the elements spread out over 360 degrees, you'll get a very omnidirectional pattern: it will receive signals from any direction.

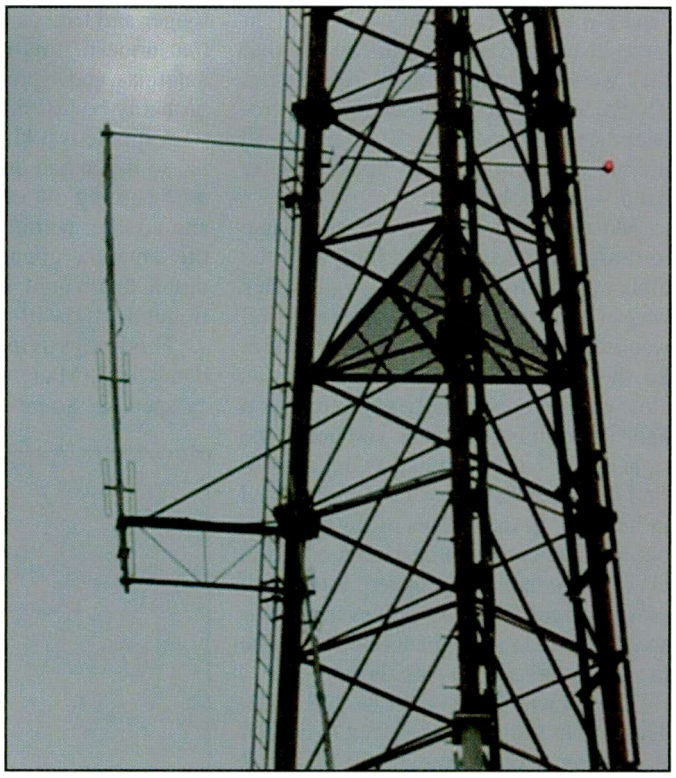
If you think about a typical base station antenna, this is exactly the effect they're creating. The center single element stands straight up, and there's usually three or four radials sticking out, at more or less a right angle to it, that form a circle around the bottom of the single center piece. Those elements sticking out form the ground plane.

The antenna that comes with your radio is probably based on this principle. By winding coils or other tricks, they are sometimes shorter than the quarter-wave normally required for the vertical element. Handheld antennas are based on this idea. And where are the other elements for the ground plane? It can use your radio itself, a car body, or just about anything else that's available. It's not exactly the right size, and not quite as efficient as it could be, but it's much cheaper to manufacture, and probably easier to fit in the box or carry than a quarter-wave ground plane disk for 40 MHz, or even 150 MHz.

Back To Scanning

The antenna that comes with your scanner is a good place to start. It's easy, costs nothing, and was probably tested by the manufacturer to provide good performance (sometimes just good, not great, and sometimes not even good) over the range of the receiver. Once you've established the performance of the radio with this antenna, you can start to experiment and see what improves performance and what doesn't.

You don't need sophisticated test equipment to do this, although that helps if you know how to use it. Otherwise, use your ears and see what you're hearing! It might be useful to punch in frequencies for a few "just in range"-type channels so you'll be able to hear a difference in the static level. It also helps to have a second receiver handy so you can know for sure when one of them is talking, but it's not essential. If you can hear dispatcher



Standoffs like this one are often used on towers to get away from the metal tower when antennas are mounted someplace lower than the top. Many communications antennas hang off the sides of larger towers, as it's a convenient way to get lots of height with not much around to block the signal.

X on frequency Y with one antenna but not the other, you'll get a pretty good indication of what works and what doesn't.

Remember that the length of the antenna directly affects its best frequency. If you listen primarily to frequencies in the 800-MHz range, you may get better performance with the antenna collapsed to its shortest length (assuming that it has that capability). If you listen mostly to 150-MHz traffic, you'll want it fully extended in most cases.

Notice that I said "*may*" get better performance with the antenna shorter. Often, particularly in the higher frequencies, it happens that a fully extended antenna works out to another ratio of the wavelength, and more metal to catch the signal. Experimentation is necessary here—you won't hurt anything.

The next thing to try is a half-wave dipole or quarter-wave ground plane-type antenna. Both are easy to build or relatively cheap to purchase. RadioShack makes a ground plane antenna (20-176) that actually works on two bands. From the factory, it's set for about 140 MHz and 440 MHz. Cutting a bit off the ends might help fine tune those frequencies, but in practice, most people find they work pretty well right out of the box. The most notable exception is trying to use this antenna in the military airband (220–400 MHz) means that the elements do need to be cut for those bands. Remember the formula; 2808/300 is about 9.3 inches for the longer elements.

Many scanner listeners find that this simple arrangement in an attic or outside works just fine for all the signals they care to hear. However, this antenna isn't particularly broad banded, so if you wander too far away from those frequencies that it's cut for, you'll find reduced performance, quite possibly to the point of unacceptability.

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.*

Let's give **154.815** a listen this month and see what you hear! Send your results into me and we'll enter you into the drawing for a one-year subscription to *Popular Communications*! Please mark your e-mail or envelope with the frequency so it can be entered correctly!

You can reach me via e-mail at radioken@earthlink, or via regular mail at 9051 Watson Rd. #309, St. Louis, MO 63126.

Here's where the scanner favorite discone antenna comes into play. Most of us want to be able to listen to signals over the full range of the receiver, and for scanners that's roughly 30 MHz to something around 1000 MHz, maybe higher. But if you go much above that, all sorts of things start to change and you really need a different antenna. The same thing applies *below* 30 MHz; there just isn't one antenna that will go the whole distance.

The discone, however, does do a decent job throughout most of the range. Not a great job, mind you. It, like all antennas, is a compromise. To get great performance in one spot, you give up bandwidth, that is performance across a wide range of frequencies. To get bandwidth, you give up performance, or gain, on any particular frequency. The discone is probably about equal to maybe slightly worse than a dipole on any given frequency. But a discone will maintain that performance for a few hundred megahertz on either side of center.

The discone does have a center frequency, just like the ground plane. Many military monitors cut discones to center around 300 MHz, but still get acceptable performance on most of the public safety bands. The disk radials should be 2008/freqency and the longer "cone" radials should be 2953/frequency.

Most discones are manufactured for the VHF-Hi and UHF ranges, so you'll have to modify your own if you choose to do this. A standard discone will receive signals in the VHF-Lo range, although it is helped tremendously by the addition of a whip on top of the disc. The new RadioShack discone (20-043) has this addition, as do many discones by Diamond and Comet. Remember that any antenna built for ham applications will work reasonably well for your scanner.

By the same token, the standard discone will receive some signals at 800 MHz, but not perform very well. Max Systems makes an 800-MHz discone (as well as the quarter-wave ground plane shown), or you might be better off with a dedicated antenna if 800-MHz performance is a factor for you. Experimentation, as always, is the key here.

Looking For Direction?

Up until now, we've been discussing omnidirectional antennas—those antennas that receive equally well (or poorly) from all directions. Under most circumstances, that's exactly what you're looking for with a scanner antenna: you want to hear things all around you.

There are times, however, when you would like to concentrate on a particular signal, or perhaps you're looking for maximum distance. For that, there are antennas that are directional.

Directional antennas, or beams, come in all shapes and sizes, too. And they all have one major factor in common that separates them from the omni crowd. They give up bandwidth and omnidirectional performance for high performance (gain) in one direction. Often these antennas are mounted on a rotor so they can be turned towards whatever signal is of interest. Many transmitting operations use beam antennas for all sorts of reasons, but for receive applications, they're somewhat specialized.

One feature of beam antennas, by their very design, is that while they emphasize performance in one direction, they de-emphasize performance in another (sometimes many others). This feature can be useful in helping to eliminate an interfering signal in favor of the one you're after. If you're located in an outlying area and want to hear signals from a particular transmitter or city, a beam antenna mounted high might be your only option.

Beams come in many shapes and sizes, but they tend to be a bit larger than omnidirectional antennas. The higher the frequency of the beam, the smaller physically it will be, but even 800-MHz antennas with many elements can become quite large. In addition, they may need to be mounted on a mast with a rotor so you can vary their direction.

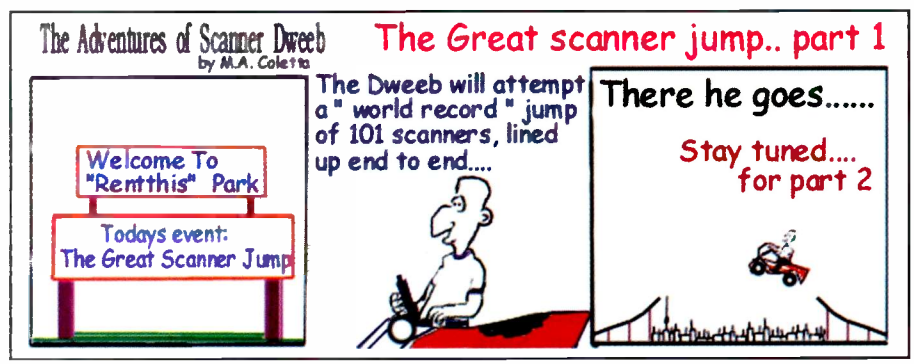
So Try Something!

Experimentation, as I've already mentioned, is the key. What works great in one situation may fall apart in another. One of the great things about antennas is that you can build many of them out of relatively low-cost materials, and it doesn't take too much to experiment, so that's the thing to do. Keep careful notes so you can put things back if something doesn't work.

Be careful if you're working outdoors to stay a safe distance from power lines and other structures, and always wear a safety belt if you're climbing a tower or other structure. Never work alone.

If you're working on a mobile installation, remember that the car is powered all the time; be careful making connections and drilling (if you choose to do that). Try not to do anything permanent until you're sure it will work, lest you have a nice hole to fill in and explain to your spouse. And try not to take anything apart that you don't know how to put back together. It's embarrassing to have to explain to a mechanic how you got the fuse box out of the car trying to install a scanner.

Remember this is a hobby, and you'll want to be around for next month's exciting issue of *Popular Communications*! Write in and let me know what's working in your situation. See you in June! ■



by Ron McCracken, KG4CVL / WPZX486

Katrina Effects Linger, So Does REACT—Plus Other Efforts

REACTer Keith Hosman, KC8TCQ, of Henry County REACT, Ohio, can tell you that the Gulf Coast is far from being out of the woods. Keith is also an American Red Cross (ARC) volunteer. He has been using his REACT skills and his radio equipment during his Red Cross deployment, keeping other volunteers in touch with one another and those back home. In fact, Keith has worn out one radio already and is breaking in a brand new one.

The devastation is such that he estimates he could be there for another two years. He traveled 8,000 miles throughout Mississippi and Alabama in the first three weeks he was deployed. His role was to visit ARC shelters to ensure that they had adequate supplies. A network of General Mobile Radio Service (GMRS) and ham repeaters made it all possible.

Currently, Hosman is busy with preparations for the 2006 hurricane season. Yes, you read that right. Huge stocks of disaster supplies are already being amassed. Meanwhile, he has to contend with tornadoes—it's that time of year already. He serves as Skywarn net control for the National Weather Service, using "Mobile Threat Net." This amazing new technology enables him to keep track of both the tornado and his spotters so they'll be safe. Spotters use CB, GMRS, and ham radio to supplement police and fire unit reports. "It uses GPS [Global Positioning System] and is as precise as the storm mapping on your local TV weather reports," Hosman explains.

Scanner enthusiasts would enjoy monitoring 47.420 MHz for ARC activity in their area, Hosman says. Try to get a peek at a new ARC Emergency Communications Response Vehicle (ECRV) when one is nearby, too. It has every type of comms you can imagine. A powerful generator will operate all those, plus 20 more external comms rigs as well, for 48 hours. Four ECRVs are positioned across the United States for our safety.

Hazardous Spill

When a train wreck spilled hazardous materials in Ohio, Massillon Stark County REACT was activated by the county's Emergency Management Director. The Team was assigned to restrict access to the spill area to authorized personnel at two checkpoints.

Spills take time to clean up, and reinforcements were soon needed to man the checkpoints around the clock. Flag City REACT, Great Lakes REACT, Wayne County REACT, Chagrin Valley REACT, Medina REACT, Tri-City REACT, and Summit County REACT all responded to the mutual aid call and did themselves proud.

Before they were released, REACTers had contributed 500 man-hours to the assignment! They have the thank-you letters from authorities to show for their untiring efforts!

Gun Safety

Ramsey County REACT helped make the fun safe for gun lovers in Minnesota. Working with Dakota County Emergency Communications and the Southeast Metro Amateur Radio Club, REACT helped the Dakota County Gun Club with its "Family Fun Shoot."

Over 200 visitors from the Minneapolis area tried firing various types of rifles. Skeet shooting and musket reenactments added to the day's enjoyment. Most importantly, the gun club offered gun safety classes during the event. People with no previous gun experience had the opportunity to get acquainted with guns safely under the supervision of gun club experts. What a great exam-

Every radio imaginable played a vital role in Katrina's aftermath. Here, radio operators check their station log at an American Red Cross facility in Biloxi, Mississippi. Now, tornado season has arrived to add to survivors' woes. (Photograph by Jerad Hoff)

Ramsey County REACT president Paul Oby "shadows" the coordinator for the "Family Fun Shoot," an annual event hosted by the Dakota County Gun Club. Three radio groups shared comms duties for the occasion. (Photo by John Harvard)

ple of cooperation among the radio fraternity to help make it all happen!

REACT Stalks "SuitSat"

NASA's request to monitor SuitSat's travels and broadcasts found several REACT Teams up for the challenge. No one imagined just what a challenge tracking SuitSat (the empty spacesuit "satellite" recently launched by the International Space Station) would prove to be.

Grand Island REACT (Nebraska) put together a display station at Stuhr Museum on very short notice. With support from Best Buy, KDS Internet, local media, and the museum, REACT provided children and their families the chance to listen for SuitSat. Hamilton County REACT and Pawnee REACT helped make the SuitSat project a success, although "he" eluded their efforts to monitor his very weak signals.

REACT Don Valley (Ontario) member Ward Kennedy, VE3WGK, manned the demonstration ham radio station at the Ontario Science Center in Toronto. Again, visitors young and old could listen for SuitSat's faint signals as "he" passed overhead. Unfortunately, like Grand Island, they had no luck, but they learned what an interesting hobby radio can be.

Success did come big time when Flagler County REACT (Florida) member Bill Sturidge, KI4MMZ, struck gold. Bill made what may prove to be the very first contact with SuitSat just 25 minutes after "he" was launched. The contact was reported to www.suitsat.org and verified. Thus REACT was certainly one of the earliest to monitor SuitSat, and perhaps first in the United States.

All the participating REACT Teams learned valuable lessons from the exercise. They will serve those Teams well down the road in emergency situations when it counts.

REACT Month Showcases Roles—There's Room For You!

May is REACT Month and it's a great time to learn more about REACT. Visit www.reactintl.org for an overview. Check the "Team Directory" there for your nearest REACT Team. Use that contact information to reach your local Team. They will be able to tell you what events or activities are on deck that you could attend. You can even arrange for a REACT speaker to address a group on safety topics. Ask about membership information, too. You could put your radio interest and equipment to work for the benefit of your community. REACT service can be very personally satisfying as you help others.

REACT Teams serve communities not only across the United States and Canada, but all around the world. The REACT Team Directory will show you Teams in Trinidad and Tobago, the United Kingdom, and the Philippines. By the time you take a look, more countries may be included, so spend a few moments touring the website.

What you've been reading about here this month could have involved you! REACT Teams help their communities with radio in many ways. REACT Month spotlights some of their activities in the hope that you will "catch the bug" or "get hooked' on REACT. You and two friends can begin a REACT Team for your town. Visit the REACT website today for more details, or call 866-REACT-9-9 for a Team Charter application. Remember we welcome your feedback. Has a REACT Team helped you in the past? Let us know about it. E-mail a note to popularcom@aol.com or send mail to the *Pop'Comm* office at 25 Newbridge Rd, Hicksville, NY 11801. ■

Popular Communications May 2006 Survey

DXing and listening to the AM broadcast band is part of my radio activities:

Yes 1
No 2
Sometimes, about once a week 3
Not in several months 4
Not in several years 5

The AM broadcast band is one of my favorite DXing and listening bands, and my antenna is:

The same antenna I use for SWLing and DXing because of space limitations 6
My ham antenna 7
My CB antenna 8
A longwire specifically for broadcast band use 9
A wire antenna in the attic because of space limitations 10
An indoor active antenna 11
An outdoor active antenna 12

The major factor affecting my broadcast band DXing and listening is:

Listening at night and during the early morning hours is difficult for me because it disturbs other family members 13
Noise problems 14
Scheduling time away from other activities 15
The need for a longwire antenna 16
Lack of a good, current frequency database 17
The fact that I need a better receiver 18

I find the Broadcast Technology column:

A very good source of broadcast DXing information 19
A good source of broadcast DX information 20
A fair source of broadcast DX information 21
I don't read the column because broadcast DXing doesn't interest me 22

by Bruce A. Conti, BAConti@aol.com

Microbroadcasting Revisited

It appears that microbroadcasting and low-power FM are very popular endeavors among radio enthusiasts. Coverage in the February 2006 edition of "Broadcast Technology" drew enough reader response to warrant a second look. So once again low-power broadcasting takes control of the airwaves with the rules of the game, transmitter tips, and more radio activity.

Unlicensed Broadcast Range

Popular Communications columnist and contributing editor Pete Bertini writes,

I enjoyed your column on microbroadcasters and wanted to share a few observations. While the operating range for FM Part 15 devices is severely restricted, a properly designed 3-meter AM BCB antenna is capable of achieving a surprisingly decent coverage area on the higher end of the AM broadcast band where such antennas are the most efficient. The [SSTRAN, see below] www.sstran.com website shows construction details for a high-efficiency, Part 15-compliant antenna system for their Part 15 AM transmitter kit. Several folks on the rec.antique.radio+phono newsgroup have constructed these transmitters and antennas and verified the claimed coverage areas are indeed legally achievable.

Pete is absolutely correct in stating that the coverage of unlicensed FM broadcasters is "severely restricted" by Part 15 of the FCC rules. FM is not limited by output power, but instead limited to a maximum signal strength of 250 microvolts measured at a distance of three meters. This essentially limits broadcast range to a couple thousand feet at best, just enough to provide reliable coverage of a neighborhood, school campus, or community center.

Nice Sticks! The www.sstran.com site shows construction details for a high-efficiency Part 15 compliant AM antenna system with loading coil and transmitter mounted at the base (www.sstran.com)

Here's the stick for 102.1 WRCI Brockton, Massachusetts.

Making Waves

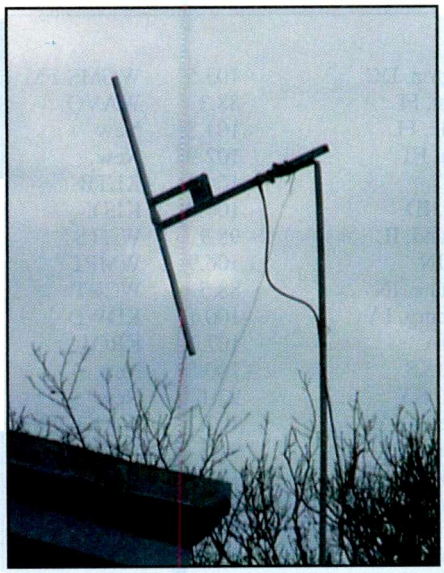
On the other hand, a well-designed *AM* transmitter is capable of covering long distances, limited only by the laws of propagation. While daytime coverage area is limited to 100 milliwatts maximum transmitter input power via groundwave (similar to FM coverage), that same low-power signal has the potential to be carried hundreds of miles at night by skywave. In fact, nighttime DXers have received low-power highway advisory AM radio stations from thousands of miles away; two unlicensed broadcasters on 1710 kHz, Chabad-Lubavitch Radio from New York City and Radio Top Inter from Boston, are widely received, although it's suspected that they're operating at powers above the legal limit.

"Any microbroadcasters operating at 1710 kHz are not governed by the same Part 15 power regulations (100-mW power) as those operating at 1700 kHz or below, and at this frequency instead fall under more restrictive Part 15 regulations that limit field intensity instead of transmitter input power," adds Pete, "I would question their legality."

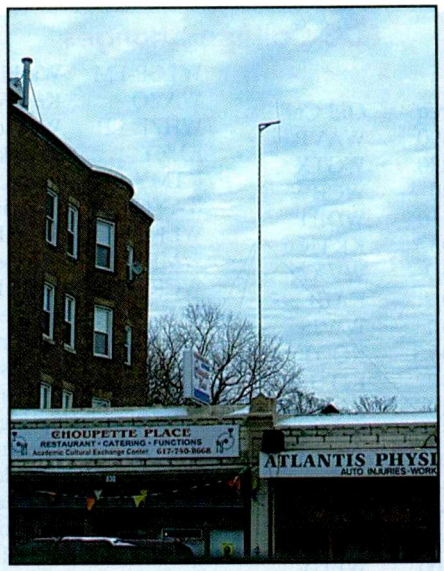
Inside the AM broadcast band, 530 to 1705 kilohertz, Part 15 of the FCC rules for unlicensed transmitters limits the length of the antenna and transmission line to a maximum of 3 meters (9.8 feet) in total. This physical limitation in itself is enough to severely limit coverage area due to the long wavelengths of the AM frequencies.

To calculate wavelength in meters, simply divide 300,000 by the frequency in kilohertz. The wavelength for 530 kHz at the bottom of the band is extremely long at 566 meters (1856.6 feet), and at 1700 kHz is 176.5 meters (578.8 feet). An ideal 1/8-wave antenna at 530 kHz would be 232 feet long, while a 1/8-wave at 1700 kHz is a much more manageable 22 feet. Therefore, the shorter wavelength at the top end of the AM band makes it easier to achieve top performance than at lower frequencies due to the FCC limit on antenna length, which is why so many microbroadcasters are found in the range of 1610 to 1700 kHz.

Additionally, to achieve top performance the transmitter should be mounted directly at the base of the antenna, thus elim-



102.9 Choice FM in Boston uses this antenna.



The antenna for 107.5 FM in the Dorchester/ Mattapan, Massachusetts neighborhood.

The 1690 Adventist Radio transmitter box is shown here with whip antenna mounted on a tower.

inating the transmission line so the antenna can be as long as possible without breaking FCC rules. Instead of having a transmission cable run from the broadcast studio to the antenna, electric power and audio cables are wired from the studio to the transmitter at the base of the antenna. Use of a loading coil and trimming the length of the antenna will further optimize efficiency, similar to the methods in which CB radio mobile antennas are fine tuned or "matched" to reduce SWR.

Transmitters that do the trick are available from the following sources:

SSTRAN (www.sstran.com)

The SSTRAN AMT-3000 AM broadcast transmitter was featured in the February 2004 edition of *Popular Communications*. This is a well-engineered transmitter that takes into account several problems typically encountered by microbroadcasters. The power supply is designed to eliminate 60-cycle hum and other issues related to unwanted ground currents. Crystal control prevents frequency drift. Extensive technical support via its website includes high-efficiency transmitter site construction plans with detailed antenna matching instructions. The AMT-3000 is available as a kit or fully assembled.

Ramsey Electronics (www.ramseyelectronics.com)

A favorite among electronics do-it-yourself hobbyists, Ramsey offers a complete line of AM and FM broadcast transmitters and accessories. The website includes a dissertation about unlicensed microbroadcasting, with links to FCC rules and guidelines. The company's professional broadcast-grade equipment includes its "Radio Station in a Box," an FM stereo radio station kit, and a 5/8-wave tunable FM broadcast antenna.

Kenneke Communications (www.kenneke.com)

Offering a line of professional broadcast equipment for AM, SW, FM, and TV, Kenneke also serves microbroadcasters with low-power AM and FM transmitter models. Its AM Stereo transmitter broadcasts with a full 14 kHz bandwidth, perfect for antique radio enthusiasts to demonstrate the high fidelity of vintage receivers. An RF power amp designed for laboratory applications can be used to boost transmitter power, where allowed, for installations outside the United States.

Progressive Concepts (www.progressive-concepts.com)

This company has a full array of FM antennas that might interest DXers as well as microbroadcasters. Its circular and dipole FM antennas will complement any low-power FM broadcast installation. Progressive features an FM transmitter specifically designed for microbroadcasting, specified with a signal strength of 250 microvolts at 3 meters to meet FCC Part 15 limits.

Not All Banned In Boston

Unlicensed broadcasting remains alive and well in Boston, despite the recent "Notification of Apparent Liability for Forfeiture" issued in the amount of $10,000 by the FCC's northeast region enforcement bureau to the operator of Radio Nouveaute on 1640 kHz. The fine was assessed for willful violation of Section 301 of the Communications Act of 1934, for operating radio transmission equipment without a license. This is a clear indication of the risk involved should one decide to broadcast beyond FCC limits, yet many are still on the air today.

Amateur radio operator and FM DXer Jeff Lehmann, N1ZZN, decided to go on an old-fashioned transmitter hunt for unlicensed broadcasters in the Boston metro area. Jeff writes,

> Take a look at the pictures that a couple friends and me were able to get of some of the pirates' antennas. FM 89.3 is Planet Compas in Randolph, 98.9, 102.9, and 107.5 are in Dorchester/Mattapan. 1690 and 102.1 are the ones in Brockton. We were able to find them first by using the signal meter on a DX-398 receiver, then once we got close, we took the antenna off my Kenwood TH-F6A ham HT, which covers the broadcast band. Once we could hear them with no antenna, we knew we were close, so we just looked, and as you'll see, we found them!

The following are some Bean Town-area microbroadcasters you just might catch sending out their low-power signals. See how many you can log.

530 Radio Planet Compas, Randolph, French Caribbean (www.planetcompas.com).

540 Radio Log, Dorchester, R&B/urban contemporary.

870, Classical music days, French Caribbean compas and zouk nights.

FCC Callsign Changes

Pending

New Call	Location	Freq.	Old Call
WFHT	Avon Park, FL	1390	WAVP
WDSP	DeFuniak Springs, FL	1280	WGTX
WIJR	Highland, IL	880	WCBW
WXOZ	Highland, IL	1510	WDID
KWHO	Victor, ID	103.7	KKTN
WRGZ	Rogers City, MI	96.7	WVXA
KQLR	Whitehall, MT	89.7	KAIB
WKWV	Watertown, NY	90.1	WWJS
KMLR	Gonzales, TX	106.3	KQQT
KZAR	Gonzales, TX	88.1	KITG
KYLR	Hutto, TX	92.1	KQJZ
WDKV	Fond Du Lac, WI	91.7	WLWR

Changes

New Call	Location	Freq.	Old Call
WPSB	Birmingham, AL	1320	WZZK
WEUP	Huntsville, AL	1700	WEUV
WEUV	Huntsville, AL	1600	WEUP
KBFP	Bakersfield, CA	800	KDFO
KHTY	Bakersfield, CA	970	KGET
KLHC	Bakersfield, CA	1350	KBID
KBSP	Bishop, CA	1340	New
KEZL	Visalia, CA	1400	KVBL
WAMS	Newark, DE	1260	WRJJ
WTWP	Washington, DC	1500	WTOP
WTPS	Coral Gables, FL	1080	WVCG
WJFA	Hilliard, FL	830	New
WIWA	St. Cloud, FL	1160	WOYE
WQYK	Seffner, FL	1010	WBZZ
WNGM	Hiawassee, GA	1230	New
WMRI	Marion, IN	860	WGOM
WTOP	Frederick, MD	820	WXTR
KCMY	Carson City, NV	1300	KPTL
KIFO	Hawthorne, NV	1450	New
KEIP	Las Vegas, NV	760	New
KCKN	Roswell, NM	1020	KINF
WZGM	Black Mountain, NC	1350	WZNN
KTKX	Sand Springs, OK	1340	KTFX
WANB	Waynesburg, PA	1580	WXXP
WALV	Dayton, TN	1280	WDNT
WCRT	Donelson, TN	1160	WAMB
WCOR	Lebanon, TN	1490	WCKD
WKDA	Lebanon, TN	900	WCOR
WAMB	Nashville, TN	1200	WKDA
WJYK	Chase City, VA	980	WMEK
WQXD-LP	Athens, AL	97.9	WGHE-LP
WPHC	Cordova, AL	92.5	WXJC-FM
WHPH	Jemison, AL	97.7	WEZZ-FM
WTID	Repton, AL	101.1	WFNU
WEZZ-FM	Thomaston, AL	97.7	WSMO
KSWD-FM	Seward, AK	105.9	KPFN
KHLR	Maumelle, AR	94.9	KMSX
KNLL	Nashville, AR	90.5	New
KHGG-FM	Waldron, AR	103.1	KRWA-FM
KPTG-LP	Adelanto, CA	101.5	New
KBFP-FM	Delano, CA	105.3	KKDJ
KALZ	Fowler, CA	96.7	KEZL
KHGE	Fresno, CA	102.7	KCTZ
KRDA	Hanford, CA	107.5	KVBE
KEXA	King City, CA	93.9	KHDV
KYZZ	Salina, CA	97.9	KEXA
KWLI	Broomfield, CO	92.5	KLWL
KUNC	Greeley, CO	91.5	KUNC-FM
KRNC	Steamboat Springs, CO	88.5	KTAH
WTOP-FM	Washington, DC	103.5	WGMS-FM
WAZQ	Key West, FL	88.3	WAVQ
WHZL-LP	Weirsdale, FL	104.5	New
KLZY	Honokaa, HI	102.9	New
KTMY	Boise, ID	104.3	KLTB
KAYN	Gooding, ID	100.7	KISY
WLKU	Rock Island, IL	98.9	WHTS
WMRI-FM	Marion, IN	106.9	WMRI
WCRT-FM	Terre Haute, IN	88.5	WCRT
KUYY	Emmetsburg, IA	100.1	KDWD
KRQN	Vinton, IA	107.1	KROJ
KPLN	Augusta, KS	100.5	New
WKEN	Fredonia, KY	92.1	New
WYSB	Springfield, KY	102.7	WAKY-FM
WYLK	Lacombe, LA	94.7	WOPR
WGYS	Braddock Heights, MD	103.9	WWVZ
WWZZ-LP	St. Leonard, MD	100.7	New
WGMS	Waldorf, MD	104.1	WWZZ
WSGW-FM	Carrollton, MI	100.5	WTBT
WCFG	Springfield, MI	90.9	New
KTLK-FM	Minneapolis, MN	100.3	KJZI
KQRW	Windom, MN	88.1	New
WSKM-LP	Brandon, MS	104.1	New
WMUW	Columbus, MS	88.5	New
WMTI	Picayune, MS	106.1	WKSY
KCKC	Kansas City, MO	102.1	KSRC
KHNK	Columbia Falls, MT	95.9	KKMT
KKFT	Gardnerville-Minden, NV	99.1	KCMY
WFNY-FM	New York, NY	92.3	WXRK
WBOE	Ravena, NY	94.5	WRCZ
WOOB	Scotia, NY	93.7	WEGQ
WZGO	Aurora, NC	91.1	New
WBOB-FM	Enfield, NC	107.3	New
WGTI	Windsor, NC	97.7	WURB
WXRK	Cleveland Heights, OH	92.3	WXTM
KOJK	Weatherford, OK	97.3	KWEY-FM
KTRO-FM	Astoria, OR	92.9	KAST-FM
KYON-LP	Canyonville, OR	97.7	New
KDPM	Cottage Grove, OR	100.5	KCGR
WGSM	Greensburg, PA	107.1	WJJJ
WGMF	Tunkhannock, PA	107.7	WBZR
WANB-FM	Waynesburg, PA	103.1	WANB
WOYE	Quebradillas, PR	98.3	WIDI
WRJI	East Greenwich, RI	91.5	New
WHJK	Cleveland, TN	95.3	WALV
KLGS	College Station, TX	89.9	New
KLLR	Dripping Springs, TX	91.9	KLOW
KKLY	El Paso, TX	89.5	KXCR
KHTL-LP	Killeen, TX	104.7	New
KAQQ	Midland, TX	90.9	New
KNAR	San Angelo, TX	89.3	KJJN
KJXK	San Antonio, TX	102.7	KSRX
WTWP-FM	Warrenton, VA	107.7	WTOP-FM
KAYO-LP	Aberdeen, WA	94.3	KYAH-LP
KJCF	Clarkston, WA	89.3	New
KAST-FM	Long Beach, WA	94.3	KAQX
KQQB-FM	Newport, WA	104.5	KMJY-FM
KYAO-LP	Ocean Shores, WA	100.1	KAYO-LP
KUOW-FM	Seattle, WA	94.9	KUOW
WIXL-LP	Madison, WI	97.1	New
KDAD	Douglas, WY	92.5	KBOG
KUSZ	Laramie, WY	98.7	KHIH
KWMY	Powell, WY	92.5	KLZY
KOCW	Hoisington, KS	14	KBDK
KUCW	Coos Bay, OR	23	KMTZ
KTCW	Roseburg, OR	46	KMTX-TV
WORO-TV	Fajardo, PR	13	WPRV-TV

This is 89.3 Radio Planet Compas' antenna.

Here's 98.9 Radio Top Inter's antenna.

1570 WKNM Radio Commercial, Lowell, off the air? Noted open carrier, driving by studio/xmtr site at 599 Central St.

1580 WRCB Radio Concorde, Mattapan, French Caribbean (www.radioconcorde.com).

1620 Radio Energy, Boston, French Caribbean (www.radioenergyboston.com).

1620 Radio Soleil International, Brockton, French Caribbean.

1620 WPRI268, Leominster, relays 162.525 MHz WNG575 Pack Monadnock, NOAA Weather.

1630 Zumix Radio, East Boston, 202 Maverick St.; free-format music; blues, jazz, rock, soul, urban contemporary.

1630 Variety AM, Marlborough (www.varietyam1630.com).

1640 WRNM Radio Nouveaute, Mattapan, shutdown and fined by FCC (www.radionouveaute.com).

1650 WQBE789/WQBQ732 East Boston, Logan Airport airline terminal assignments.

1670 WRVD Radio Voix Divine, Mattapan, French; formerly WRDI (www.radiovoixdivine.com).

1670 Radio Communautaire de Brockton, Brockton, French Caribbean.

1680 WRUI Radio Union International, Boston, Continuous French Caribbean zouk (www.radiounioninter.com).

1690 WRCI Radio Creole International, Lynn, French news/talk, AM Stereo (www.radiocreoleinter.com).

1690 Adventist Radio, Brockton, French, religion.

1700 Radio Bel Ayiti, Boston, French Caribbean (www.belayiti.com).

1700 Radio Luz/Palabra de Vida, Lawrence, Spanish contemporary Christian music and preaching.

1710 Radio Top Inter, Hyde Park, French Caribbean, same programming as 98.9 FM.

88.5 Radio Free Cambridge/Pandemonium, Cambridge.

88.7 Randolph, French.

89.3 Radio Planet Compas, Randolph, French news/talk, IDs as "Compas FM" (www.planetcompas.com).

91.3 Radio Superstars, Everett, French news/talk.

93.5 Radio Mercure Int'l, Boston, Musique compas, jazz, and gospel (www.radiomercureinter.com).

98.9 Radio Top Inter, Hyde Park, French Caribbean, same programming as 1710 AM.

101.3 WRCI Radio Continentale, Brockton, parallel on 102.1 Boston.

102.1 WRCI Radio Continentale, Boston, diverse programming for the Haitian community (www.radiocontinentale.com).

102.1 Radio Superstars, Brockton, French Caribbean (www.metrocompas.com).

102.9 Choice FM, Dorchester-Boston, "Number one in Boston for Caribbean music." <www.choice1029.com).

105.3 Boston, Brazilian jazz music. The website of the Brazil embassy in Washington, D.C., lists 105.3 Boston.

107.5 Dorchester/Mattapan, French Caribbean.

LPFM—Hobby Or Passion?

From Fred Compton, General Manager KPIE-LP,

A bunch of us "ham" operators gather to swap lies and so on about amateur radio every Monday morning in Dallas, Oregon. One of the guys brought a copy of your article on LPFM that was in *Popular Communications*. I just wanted to say it was a very good article, and thanks for the kind comments about KPIE from Eldon Luoma. LPFM can use all the help it can get.

One minor point, and I presume this came from the fact I'm retired (if you can call running a 24/7 radio station being retired), it's not "hobby" radio. We try to maintain a professional sound and operation. Many of the volunteers are ex-broadcasters, from an ABC booth announcer to small station announcers. We all have one common goal and take pride in it, and that is to provide our community and our area with radio for the people. You guys did a great job and I'll be sharing the article with our board of directors at our next meeting.

Thank you, Fred, for the kind comments. And thanks to all those who are passionate enough about radio to provide alternative community-based programming through LPFM and microbroadcast outlets. This, along with satellite radio, is challenging the big-time legacy AM/FM broadcasters to rethink the formula for successful radio.

Now it's your turn. Let us know what low-power radio stations you're hearing, then stay tuned right here for continuing coverage. 73 and Good DX! See you again next month! ■

by Kirk Kleinschmidt, NTØZ, kirk@cloudnet.com

You *CAN* Take It With You!

Despite the fact that the wind chill here in Minnesota was nearly 60 below zero for a time the other day, spring will have definitely sprung by the time you read this month's issue (readers at McMurdo Station can snicker appropriately). And Field Day—that annual trek to the woods and water to celebrate and practice emergency communication and portable operation—is just around the corner. If you're thinking about participating, keep the weekend of June 24–25 set aside for some radio fun.

Thanks to today's ever-shrinking radios, you can take your ham radio hobby just about anywhere: picnics, camping trips, road trips, a weekend at grandma's, a weekend in the Caribbean, whatever. And don't forget boat rides, hiking excursions, and that summer you've always wanted to spend at the lake cabin. Here are a few tips to get you started, whether you're practicing for FD 2006 or simply getting out of the house!

Getting Started

Choosing a place to operate depends on where you are and what you're doing. Try to remember that the basics of amateur radio still apply. The thing that's different is your location. Instead of being in your home shack you're out in the boonies somewhere.

Hilltops are pretty good for just about any radio activity, especially VHF/UHF. HF operators will want at least a few tall trees for stringing antennas, while VHF/UHF ops may have better luck if there are *only* a few trees (or even none) to absorb precious higher-frequency signals.

Remember to show the proper respect for the land (and the landowners) when you set up a portable station or campsite on property that's not your own. Don't break branches when stringing antennas, be sure to take down any antennas you put up, and don't leave *any* garbage or debris behind when you leave. Try to get permission ahead of time, if possible.

Teeny, Tiny Radios

Just about any rig will work from the field as long as you can supply the required power, but most hams who operate portable do so with compact commercial mobile rigs, commercial or kit QRP transceivers, or QRP gear they've built themselves.

Because most portable operation is done without access to the AC power mains, most ops opt for gear that runs on 12 VDC. Unless you're hiking or biking, you probably have a source of 12-volt power nearby (car alternators, automotive or marine batteries, and so on).

When relying on battery power, transceiver characteristics that can be ignored at home can be quite important in the field. One of the most important is power consumption. If you're operating from a battery that can't be recharged until you get home (common), your rig's power draw will determine your operating time. Reducing your transmitter power can make a big difference when you're *transmitting*, but will do nothing to save power while you're receiving, which accounts for the bulk of your operating time.

To address this situation, some manufacturers have produced rigs that are designed for minimal current consumption while receiving. For example, most Wilderness Radio portable QRP rigs consume very little power in receive mode, and Yaesu's FT-817—a pint-size, low-power, dc-to-daylight transceiver—offers amazing convenience and low power consumption. When it comes to the ultimate in HF performance in a field-friendly package, however, Elecraft's K2 kit transceiver still takes on all comers. Check out these tiny wonder radios at www.yaesu.com and www.elecraft.com. Nowadays, every ham radio manufacturer has jumped on the teeny, tiny radio bandwagon, so be sure to check out all the new gear.

Antennas

Antennas for field use should be lightweight and unobtrusive. You don't want to mar your (or anyone else's) scenic vistas with a rat's nest of wires, feed lines, or aluminum tubing.

Elecraft's pint-size HF radios have been a portable op's mainstay for many years running. And just when you thought it couldn't get any better, the company released the T1, a miniature autotuner for rigs such as the company's K1 and K2 transceivers, plus other similar rigs such as Yaesu's FT-817, etc. (that is any rig that puts out less than 20 watts). As you can see by the 9-volt battery in the photo, the T1 is astonishingly compact and is available as a kit or fully assembled! See it at www.electaft.com.

I've used two types of portable antennas over the years. One is a 40-meter dipole fed with 300-ohm TV twinlead. The elements are made from 20-gauge magnet wire, the center and end insulators are made from small, thin Plexiglas scraps, and the center and ends are held up with 30-pound-test monofilament fishing line. With a small tuner (with a built-in balun and an SWR meter), I can work all the bands from 40 meters on up. My second portable antenna is even easier to set up and use. I simply toss a 66-foot wire into (or over) a tree and connect the near side right to the business end of my antenna tuner. I then roll out one or two 66-foot counterpoise wires and connect them to my tuner's grounding post. This lazy vertical or inverted-L (depending on tree height, placement, and density) *starts at the tuner*, which eliminates any loss from feed line runs, etc. I can tune this antenna on all bands from 80 meters and up using a conventional tuner.

I haven't had any problems with "RF in the shack" while using the vertical wire at QRP levels, but it's occasionally troublesome at 50 watts or so (not to mention potential RF exposure issues at power levels above 50 watts). To make this antenna even easier to use I place an SGC (www.sgcworld.com) autocoupler at the base of the wire vertical and run a short coaxial feed line to my operating position. This is especially handy while operating from a mini camper.

Feel free to make a "portable" version of your favorite antenna. Remember to keep things simple, compact, and lightweight. Portable antennas don't have to last forever, and they don't have to survive hurricanes and winter storms, so don't be afraid to sacrifice ultimate survivability to achieve something that doesn't hog all the space in your backpack!

Feed Lines

TV twinlead has always been a favorite for portable use. It has very low SWR losses, it's lightweight, it can be rolled into a small, flat package, and it doesn't require special connectors. You'll need to use it with a tuner/balun, but you'll probably have that on hand anyway for multiband operation.

If you have the room and can stand the weight, conventional coax works in the field as it does at home. If you're thinking of using a mini coax, such as the teeny RG-174, confine your efforts to 80 and 40 meters and keep the coax run as short as possible. Mini cables are just too lossy at higher frequencies or with long cable runs.

DC Power

Providing power to our portable stations is the bane of many radio adventurers. If you're traveling by car or boat, you probably have a handy source of 12-volt power along for the ride. But if you're hiking, biking, or canoeing, for example, you'll have to carry batteries, a small generator, or a bulky solar panel—none of which are appealing prospects. When it comes to providing power there are no free lunches.

Basically, you have to scale your power requirements to match your available energy. For backpackers, hikers, and those "traveling light," a mini QRP rig designed for minimal (or micro) power consumption is a practical upper limit. Go beyond that and you'll exhaust your flashlight-size batteries in a jiffy. If you can manage to carry a larger NiCd pack or a gel cell, a less exotic low-power rig will work just fine. And if you can handle a medium- to full-size deep cycle marine battery—recharged by a vehicle alternator, a compact gasoline-powered generator, or a solar panel—the sky's the limit. That is, you can easily power your regular 100-watt base station rig in the field.

Test Run!

The best possible preparation for a portable operation is to assemble the *exact* station you'll be using and put it on the air in your backyard before you leave town. Use the same antenna, the same battery, the same tuner, so you'll know if you have everything you need when it's time to leave. When the station setup seems perfect, carefully make a checklist of your station's components and look it over while you pack items prior to departure.

A few additions to your barebones equipment list will accommodate an emergency or an unforeseen situation. As space and weight allow, consider bringing along a miniature logbook or notebook, a tiny digital multimeter, a pocketknife or multifunction Leatherman-style tool, electrical tape, extra wire, clipleads, a compact set of screwdrivers, a small wire cutter/stripper, a pair of Walkman-style headphones with an appropriate adapter, whatever you might need.

See you next month—and maybe I'll see you on Field Day 2006! ■

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

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

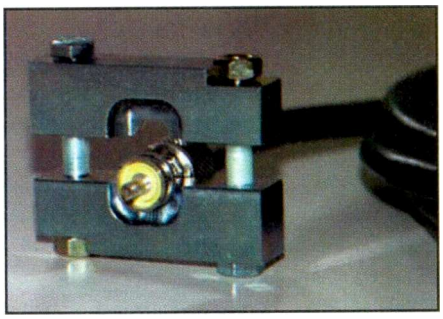
AA, FF, SS, GG, etc. are abbreviations for languages (Arabic, French, Spanish, German). Times given are in UTC, which is five hours ahead of EST, i.e. 0000 UTC equals 7 p.m. EST, 6 p.m. CST, 4 p.m. PST.

UTC	Freq.	Station/Country	Notes
0000	7325	Radio Austria Int.	
0000	7455	Radio Tirana, Albania	Albanian
0000	11665	Radio Prague, Czech Republic	SS
0000	6055	Radio Exterior Espana, Spain	
0030	7285	Voice of Croatia via Germany	EE/Croatian
0030	4845	Radio Mauritanie, Mauritania	AA
0030	6536	Radio Difusora Huancabamba, Peru	SS
0030	9745	China Radio Int., via Bonaire	SS
0030	11745	Voz Cristiana, Chile	PP
0030	9525	Radio Romania Int.	SS
0030	9605	Vatican Radio	PP
0100	5910	Radio Ukraine Int.	
0100	5045	Radio Guaruja Paulista, Brazil	PP
0100	7345	Radio Prague, Czech Republic	
0100	7545	Kol Israel	
0100	4800	Radio Buenas Nuevas, Guatemala	SS
0100	5910	Radio Ukraine Int.	
0100	4885	Radio Clube do Para, Brazil	SS
0130	4780	Radio Cultural Coatan, Guatemala	SS
0130	7125	Voice of Russia, via Moldova	
0130	6140	Radio Lider, Colombia	SS
0130	6120	VOIRI, Iran	
0130	6972	Galei Zahal, Israel	HH
0130	7230	Radio Slovakia Int., Slovakia	
0130	6175	Voice of Vietnam, via Canada	unid
0200	11710	RAE, Argentina	
0200	4052.5	Radio Verdad, Guatemala	SS
0200	9715	RDP Int., Portugal	PP
0200	4965	The Voice-Africa, Zambia	unid
0230	4919	Radio Quito, Ecuador	SS
0230	9500	Radio Bulgaria	SS
0230	5025	Radio Rebelde, Cuba	SS
0230	5054	Faro del Caribe, Costa Rica	SS
0230	9835	All India Radio	HH
0230	4990	Radio Apinte, Suriname	DD/EE
0230	9440	Radio Slovakia Int.	SS
0230	5950	Radio Taiwan Int., via Florida	
0300	4950	Radio Nacional, Angola	PP
0300	4780	RTV Djibouti	AA
0300	6940	Radio Fana, Ethiopia	Amharic
0300	9585	Radio Farda, USA, via Morocco	Farsi
0300	7120	Sudan Radio Service, England	
0300	6185	Radio Educacion, Mexico	SS
0300	9855	Radio Budapest, Hungary	HH
0300	3220	Radio Sondergrense, South Africa	Afrikaans
0300	7360	Vatican Radio	CC
0300	7270	Voice of Turkey	
0330	6100	Deutsche Welle, Germany, via Bonaire	GG
0330	9645	Radio Bandeirantes, Brazil	PP
0330	7600	Radio Varna, Bulgaria	BB; UTC Mon.
0330	3250	Radio Luz y Vida, Honduras	SS
0330	3340	Radio Misiones Int., Honduras	SS
0330	4775	Trans World Radio, Swaziland	GG/vern.
0330	7215	Trans World Radio, via South Africa	Amharic
0330	9780	Republic of Yemen Radio	AA
0400	7110	Radio Ethiopia	Amharic
0400	4976	Radio Uganda	
0400	5500	Voice of the Tigray Revolution	Tigrinya
0430	4890	Radio France In. Relay, Gabon	FF
0430	6120	RAI Int., Italy	
0500	5005	Radio Nacional, Equatorial Guinea	SS
0500	6045	Radio France Int.	PP
0500	4777	Radio Gabon	FF
0500	7255	Voice of Nigeria	
0500	6165	Radio Nederland, via Bonaire	
0500	4770	Radio Nigeria, Kaduna	
0500	6160	CKZN, Canada	
0500	7250	Vatican Radio	
0500	7275	RT Tunisienne, Tunisia	AA
0500	6010	Radio Mil, Mexico	SS
0600	15335	Voice International, Australia	
0600	7125	RTV Guineenne, Guinea	FF
0600	4915	Ghana Broadcasting Corp/Radio Ghana	
0600	4760	ELWA, Liberia	
0600	5030	Radio Burkina, Burkina Faso	FF
0830	3279	Radio Napo/LV de Maria, Ecuador	SS
0830	3291	Voice of Guyana	DD/EE
0900	4909v	Radio Chaskis, Ecuador	QQ
0930	9885	Radio New Zealand	
0930	5960	Radio Tikhy Okean, Russia	RR
1000	4775	Radio Tarma, Peru	SS
1000	4796	Radio Mallku, Bolivia	SS
1000	5952v	Radio Pio Doce, Bolivia	SS
1030	4746	Radio Huanta 2000, Peru	SS
1030	4939	Radio Amazonas, Venezuela	SS

UTC	Freq.	Station/Country	Notes
1030	4855v	Radio La Hora, Peru	QQ
1030	7285	Radio Thailand	TT
1100	9740	BC Relay, Singapore	
1100	6010	La Voz de su Concencia, Colombia	SS
1100	6350	AFN/AFRTS, Hawaii	
1100	2310	VL8A, Australia	
1130	9645	KNLS, Alaska	CC
1130	11670	Radio France Int.	FF
1130	11530	Voice of Mesopotamia	Kurdish
1130	9970	RTBF, Belgium	FF
1130	5860	Voice of Jinling, China	CC
1130	4819	La Voz Evangelica, Honduras	SS
1130	4605	RRI, Serui, Papua, Indonesia	II
1130	10330	All India Radio	HH
1130	9485	Radio Sweden, via Bonaire	Swedish
1130	7170	Mediacorp Radio, Singapore	Tamil
1130	3315	Radio Manus, Papua New Guinea	Pidgin
1130	3235	Radio West New Britain, Papua New Guinea	Pidgin
1200	7270	Radio Malaysia (Sarawak)	unid
1200	15700	Radio Bulgaria	
1200	9440	China Radio Int.	CC
1200	6080	Radio Singapore Int.	
1200	6165	Voice of Vietnam	H'mong
1200	4890	NBC, Papua New Guinea	
1230	6020	Radio Australia	
1230	6348	Echo of Hope	KK
1230	11515	Radio Liberty, USA via Sri Lanka	unid
1230	6285	Voice of Korea, North Korea	
1230	6070	CFRX/CFRB, Canada	
1230	9875	Voice of Russia	RR
1230	11555	KWHR, Hawaii	
1300	9580	Radio Australia	
1300	7470	Radio Free Asia, USA, via Mongolia	CC
1300	9525	Radio Polonia, Poland	
1300	9705	Radio Finland Int.	Finnish
1300	6065	China Business Radio	EE
1330	9920	Far East Broadcasting, Philippines	Tagalog
1330	15240	Radio Sweden	
1400	15155	Radio Cairo, Egypt	AA
1400	17515	Adventist World Radio, Guam	
1400	15140	Radio Sultanate of Oman	AA
1430	17495	Democratic voice of Burma via Madagascar	vern
1500	12105	Voice of Greece	Greek
1500	11690	Radio Jordan	
1500	9350	Adventist World Radio, via UAE	EE/unid
1500	13635	CVC International, Australia	
1530	21830	RDP Int., Portugal	PP
1600	13675	Radio Austria Int via Canada	
1600	9940	VOIRI, Iran	
1600	11570	Radio Pakistan	
1630	12005	RT Tunisienne, Tunisia	AA
1700	15475	Africa Number One, Gabon	FF
1700	15355	NHK/Radio Japan	
1700	11990	Radio Kuwait	AA
1700	15235	Channel Africa, South Africa	
1700	15285	Channel Africa, South Africa	
1730	17810	United Nations Radio, via Ascension Is.	
1730	15615	Radio Jamahiriya, Libya, via France	AA
1730	15345	RTV Marocaine, Morocco	AA
1800	15330	Radio Marti	CC
1800	11510	Voice of Russia	
1800	11925	Adventist World Radio, via South Africa	
1830	15120	Voice of Nigeria	
1830	11830	RAI Int., Italy	II
1830	9915	BBC Relay, Cyprus	
1830	9785	Voice of Turkey	
1900	12035	Radio Exterior Espana, Spain	FF
1900	15140	Adventist World Radio via South Africa	vern
1930	9965	Voice of Armenia	
1930	7590	AFN/AFRTS, Iceland	
1930	17760	Radio Taiwan Int., via Florida	CC
2000	13710	Voice of America Relay, Botswana	
2000	13630	China Radio Int., via Mali	
2000	11590	Kol Israel	
2000	11735	Voice of Tanzania, Zanzibar	Swahili
2030	17680	Voz Cristiana, Chile	SS
2030	9870	BSKSA, Saudi Arabia	AA
2030	13680	Radio Nacional Venezuela, via Cuba	SS
2100	15345	Radio Nacional, Argentina	SS
2130	9375	Voice of Greece	Greek
2130	9580	Africa Number One, Gabon	FF
2130	11965	Star Radio, Liberia, via Ascension	
2130	11715	All India Radio, Panaji, (Goa)	
2130	11940	Radio Romania Int.	
2130	9330	Radio Damascus, Syria	
2130	11975	Voice of America Relay, Sao Tome	
2200	7450	RS Makedonias, Greece	Greek
2200	6190	Deutschlandfunk, Germany	GG
2200	9615	Radio Cultura, Brazil	PP
2200	11830	Radio Anhanguera, Brazil	PP
2200	7313	Central People's Bc. Station, China	CC
2200	6165	Radiodiffusion Nationale Tchandienne, Chad	FF
2200	7210	Cyprus Bc Corp.	Greek
2200	9840	Voice of Turkey	TT
2230	9990	Radio Cairo, Egypt	
2230	9855	Radio Kuwait	AA
2230	11915	Radio Gaucha, Brazil	PP
2230	9825	Radio Budapest, Hungary	HH
2230	9805	KBS World Radio, South Korea	II
2230	9605	BBC Relay, Seychelles Is.	
2230	12133	AFN/AFRTS, Florida	
2230	5470	Radio Veritas, Liberia	
2300	7325	Radio Vilnius, Lithuania	LL
2300	7320	Radio Jamahiriya, Libya, via France	AA
2300	17680	RDP Int., Portugal	PP
2300	15290	Voice of America Relay, Philippines	
2300	11820	Radio Veritas Asia, Philippines	Indonesian
2300	9550	Radio Havana Cuba	
2300	9665	Radio Marumby, Brazil	PP
2330	6135	Radio Republica (Clandestine - anti Cuba)	SS
2330	15565	Radio Free Asia, USA, via Russia	CC
2330	9575	Radio Medi Un, Morocco	AA
2330	7325	Radio Belarus	
2330	9555	Deutsche Welle Relay, Rwanda	

by Harold Ort, N2RLL

New, Interesting, And Useful Communications Products



The new K4AVU solderless coax cable shield connector is designed for those who struggle with soldering PL-259 coax shields.

Solder-Free PL-259 Coax Cable Shield Connector

Now there's an alternative for those who struggle to solder the "shield" connections on standard PL-259 coax cable connectors. The K4AVU Coax Crimper fits around the part of the connector where the solder holes for the shield are located and crimps the body of the connector firmly in place. Simply solder the center pin connection, twist on the connector's coupling ring, and you're good to go.

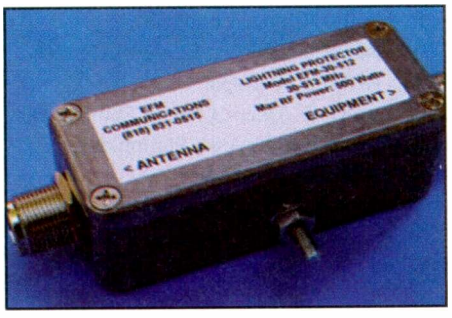
The K4AVU Coax Crimper works with nearly all varieties of half-inch-diameter coax cables, and also when using standard UG-175 and UG-176 reducers for smaller diameter coax cable types, such as RG-58, RG-59, and RG-8X. The price is $29 plus $2.55 for U.S. shipping.

For more information or to place your order, contact Paul Marsha, K4AVU, 200 Garden Trail Lane, Lexington, SC 29072; k4avu@yahoo.com. See it online at www. hamstation.com/coaxcrimper2.htm.

Coaxial Lightning Protector Utilizes Tuned Circuit

Using a tuned circuit, the EFM Communications Model EFM-30-512 coaxial lightning protector will pass RF frequencies from 30 to 512 MHz, while lightning frequencies (DC to 1 MHz) are attenuated and passed to ground. There is no gas tube to ever fail and replace. The protector presents a DC short between the center pin and shield on the antenna port, and a DC open between the center pins of the antenna and equipment ports. It is designed to be used in systems where there is no DC voltage on the coax to power tower mounted electronics.

For more information, contact EFM Communications at www.efmcommunications.com or phone them at 818-831-0515.



The EFM Communications Model EFM-30-512 coaxial lightning protector is available from the company at www.efmcommunications.com.

The new MFJ-9982 Continuous Carrier antenna tuner features MFJ's TrueActive circuit, which reads true peak or average power on all modes. The cross-needle meter reads SWR/forward/reflected power.

New MFJ-9982 Continuous Carrier Antenna Tuner

The MFJ-9982 Continuous Carrier antenna tuner handles 2500 watts continuous carrier output on all modes and all HF bands into most unbalanced antennas, even on 160 meters where the best antenna tuners fail. The MFJ-9982, priced at $699.95, gives you a wide matching range, 1.8- to 30-MHz coverage, six-position antenna switch, 4-core balun, dummy load, true peak/average lighted SWR/wattmeter, 6:1 reduction drives, detailed logging scales, three-digit counter, and large knobs.

MFJ's high-power, high-Q continuous current AirCore roller inductor is edge wound from thick .06-inch silver-plated solid copper strap, can carry huge circulating RF currents and withstand tremendous heat. The high-current, high-capacitance 1000-pF and 500-pF air variable capacitors have low minimum capacitance and are self-insulating and offer very high efficiency on 160/80 meters and extremely wide matching range on 10/12/15 meters at 2500 watts, according to the manufacturer.

The new MFJ-9982 Continuous Carrier antenna tuner features MFJ's new TrueActive circuit, which reads true peak or average power on all modes; the cross-needle meter reads SWR/forward/reflected power. The unit weighs in at 15 pounds and is protected by MFJ's No Matter What one-year limited warranty.

To order, get a free catalog, or for your nearest dealer, contact MFJ at 300 Industrial Park Road, Starkville, MS 39759; Web: www.mfjenterprises.com; Phone: 800-647-1800; Fax: 662-323-6551.

DeLorme's Color Digital Aerial Imagery Of Florida For In-Field Use With XMap

DeLorme, a provider of mapping, GIS, and GPS solutions, has announced the release of 1-meter resolution aerial imagery

for the state of Florida. Processed into DeLorme's XMap format, this imagery is available in a series of 12 seamless mosaics, each of which provides regional coverage on a single DVD or statewide coverage on a USB hard drive. Now it's possible to bring high-quality aerial imagery into the field without the need to download and manage dozens of individual files or to be connected to the Internet.

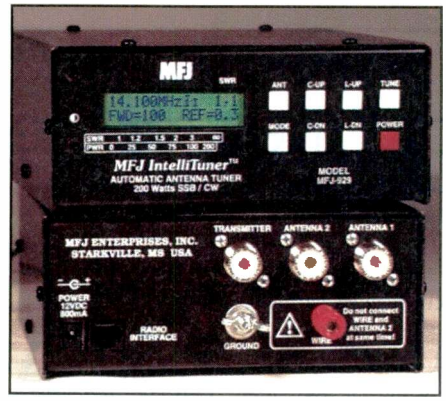
The processing of this imagery into XMap format was undertaken in response to numerous requests from XMap users in Florida. Geoffrey Ives, DeLorme's director of professional sales, says, "Because a significant percentage of our customers work in a mobile office setting, with no access to online mapping and imagery sites, it was important for us to offer them a readily available mobile alternative." The imagery was captured in 2004 and 2005 and represents the most up-to-date and complete aerial imagery currently available for the entire state, according to the company. In conjunction with XMap, this dataset is ideally suited for utility workers, insurance adjusters, realtors, first responders, law enforcement officers, and anyone who appreciates the value of high-quality aerial imagery and an easy-to use yet powerful mapping application while in the field. DeLorme plans to release additional sets of Xmap-formatted state imagery over the next year.

For more information or to download a sample section of imagery for use in XMap, go to www.delorme.com/professional/floridaimagery.

New MFJ IntelliTuner-Compact With 20,000 VirtualAntenna Memory System

The MFJ-929 IntelliTuner-Compact lets you automatically tune any coax fed or random wire antenna from 1.8–30 MHz at full 200 watts SSB/CW. It can match 6–1600 ohms (SWR up to 32:1)—a 50-percent wider matching range at a higher power level than other products. There's a digital SWR/wattmeter with backlit LCD, antenna switch for two antennas, built-in radio interface and built-in internal BiasTee for remote tuner operation.

MFJ's IntelliTunev, Adaptive Search and InstantRecall algorithms provide fast automatic tuning with over 20,000 VirtualAntenna Memories. Also, the company's new VirtualAntenna Memory



The new MFJ-929 IntelliTuner-Compact automatically tunes any antenna and matches 6–1600 ohms. It costs $219.95.

system provides four antenna memory banks for each of two antenna connectors, and you can select up to four antennas on each antenna connector. Each antenna has 2,500 memories.

The MFJ-929 gives you 256 values each of capacitance and inductance for 131,072 matching solutions that, according the manufacturer, is four times the 32,768 matching solutions of competing products with only 128 L/C values each.

An easy-to-read, two-line, 16-character backlit LCD displays SWR, peak or average forward/reflected power, frequency, antenna 1 or 2, L/C tuner values, on/off indicators and other info. A fast-response, high-resolution bargraph gives you an auto-ranging 20/200 watt power meter. You get 60 segments each for forward and reflected power and 36 segments for SWR. StickyTune mode gives you one-hand tuning by locking the TUNE button. There is also an audio SWR meter and audio feed back.

The MFJ-929 measures 2 2/4 x 61/2 x 71/2 inches (HWD) and weighs 2.4 pounds. The unit is powered by 12–15 VDC/1 amp or 110 VAC with optional adapter (MFJ-1316, $19.95).

Also available is the MFJ-928 ($199.95), which is like the MFJ-929, less LCD and manual tune buttons; and the MFJ-927 ($259.95) with weather protected remote auto tuner for coax/ wire antenna and including MFJ-4116 Power Injector. It has most MFJ-929 features, but no LCD/buttons.

All are protected by MFJ's No Matter What one-year limited warranty. To order, get a free catalog, or for your nearest dealer, contact MFJ at 300 Industrial Park Road, Starkville, MS 39759; Phone: 800-647-1800; Fax: 662-323-6551; Web: www.mfjenterprises.com. Please tell them you read about it in *Pop'Comm*! ■

by Rich Arland, K7SZ, richard.arland@verizon.net

Military Gear For Emergencies: What's The Hottest!

Welcome back to our on-going discussion of military communications (MilCom) radio gear and how it can be integrated into your Homeland Security communications plans. After all, MilCom gear is some of the most rugged and reliable comm gear ever designed and manufactured. By doing some basic homework, along with some advanced planning, it's possible to procure, restore, and use some of these MilCom radio sets in disaster relief communications.

A Work In Progress

Dave Carey, N3PBV, my next-door neighbor, came over about a year ago with a big green box—present from him to me, much to the consternation of my wife, Patricia, KB3MCT. All I needed was another radio sitting in the basement!

Dave's gift was an AN/GRC-9 (called an "Angry Nine"), a cast-off from a local university's engineering department, that covered 2 to 12 MHz continuously in three bands, with a power output of up to 15 watts on CW and 7 watts on AM phone. It had been overhauled by the Tobyhanna Army Depot in the early 1980s, and it still had all the tags from the Depot.

The radio cover was brand new and fit tightly over the front of the radio, offering some inclement weather protection. Removing the front cover revealed an almost mint condition GRC-9. The only "catch" was that there was no power supply available. It makes things a bit difficult to troubleshoot and use if you don't have the right power supply. Not only that, but there was no power cable, antenna insulator, or the host of ancillary gear one needed to put this puppy on the air. Enter eBay.

It took me about a month, but I found the proper power cord (with the correct cable ends on it) along with the T-17 microphone (you know, the old carbon mics from the 1950s Army movies) and antenna base, the latter two coming all the way from Italy!

Al Klase, N3FRP, MilCom guru and main player in the yearly MRCA (Military Radio Collectors Association) meet provided me with a DY-88 dynamotor supply at this year's meet so I could fire up my Angry Nine. Between the two of us, we managed to get the receiver on the GRC-9 up and running but, alas, nothing was coming out of the transmitter. Oh, well...more troubleshooting, as soon as I find my own DY-88 dynamotor supply. Like I said, real radios have motors!

Value For Money

The cost of much of this MilCom gear is extremely small compared to what it originally cost the American taxpayers to fund the research, development, and procurement of these radio sets. This huge taxpayer cost is directly related to the engineering and rugged designs incorporated in MilCom gear. After all, this stuff needs to work as well in the desert or jungle, while the operator is taking incoming fire, as it does on the depot or test bench! Think about that for a while.

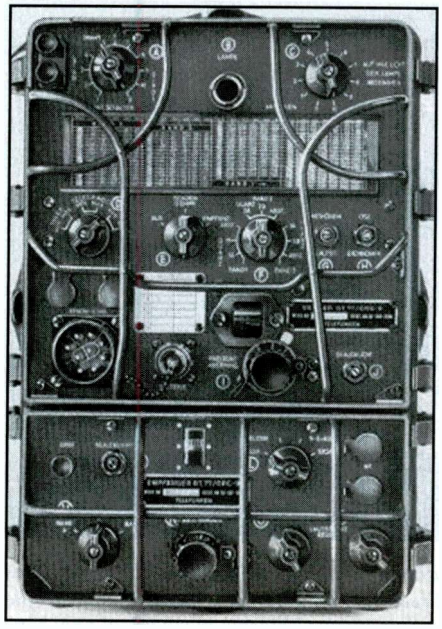
This is one place you can find a GRC-9—the back of a "flat-fendered" jeep. Notice the T-18 mic. The GRC-9 is a great piece of MilCom gear for CW and AM phone work. It's "cute" in a weird sorta way.

There are a number of radio sets that will easily fill the bill for emergency communications gear. These are loosely divided into several categories: "Squad Radio" equipment, HF man-pack equipment, and mobile/tactical equipment. We will be primarily interested in the squad radio and HF man-pack equipment in this installment.

While serious MilCom collectors measure their "wealth" by the *ton*, most of us merely count the number of radios we have in the shack (or, in my case, the basement). There are collectors/users out there who won't let anything get away from them, insisting that all MilCom gear must be procured, saved, tagged, and restored. This makes for a lot of gear, much more than I have room or time for. Therefore, as stated last month, I consider myself a serious user as opposed to a collector. I think many of us fit this description. My main goal is to obtain a small eclectic collection of useable MilCom gear that *I* like, and to heck with what anyone else thinks or says.

MilCom Gear At K7SZ

Today my collection sits at eight radios. Among them are an AN/GRC-109 HF CW spy set and a Radio Industries (Hallicrafters) HA-2 VHF AM Walkie-Talkie used in Vietnam by the indigenous personnel (Vietnamese villagers) to talk with



This line drawing of the GRC-9 graced the tech manuals of the day. It's an impressive radio. It even looks like a military rig!

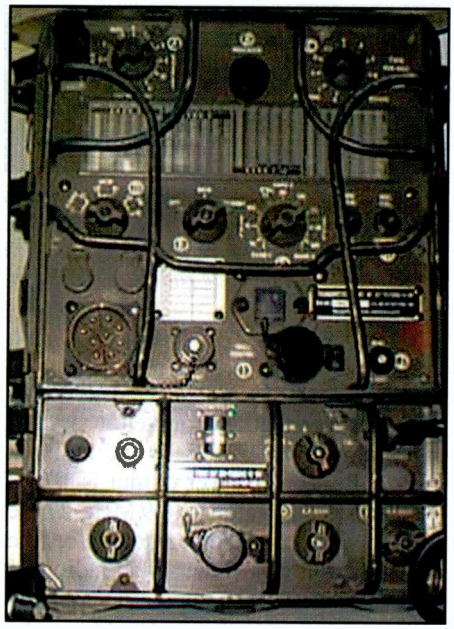
the Special Forces units in their area. The latter unit works on 29 to 45 MHz and has the VHF converter for air/ground comms on 108 to 136 MHz. One of my favorite HF rigs is the Angry Nine since it is fully tunable from 2 through 12 MHz and you can run CW and AM phone for the 3885-kHz Military Net each Sunday morning and the Old Military Radio Net (OMRN) using CW at 3570 kHz on Saturdays.

Since I like CW and low-power ham radio (QRP) once I read about one of these Vietnam-era rigs I just had to have one: the AN/TRC-77A (pronounced Track Seventy-Seven Alpha). This is about the last evolution of vacuum tube technology in a man-pack clandestine radio set. The 77A runs about 10- to 14-watts output on CW only, and has six preset crystal-controlled channels. The US Army Special Forces and USAF special ops used the 77A along with the Marines in long-range recon patrols (LRRPs) to send back information when the unit was too far out of range for tactical FM voice comms to be effective. The set was designed as a highly portable, low-power unit that would load into any conceivable antenna (including brass banisters in hotels) and provide clandestine communications when used with the GRA-71 Code Burst unit, which enables CW transmissions at up to 300 wpm! It's a great radio, even though it's crystal-controlled.

As I said, my 77A was in fair physical shape when I received it from a fellow in Maryland, and I have done very little in the way of "prettying it up." A pristine 77A just doesn't look right—better to have a few dings and nicks (just like its owner!). I have done a quick realignment to set the rocks on the exact frequencies and tune the LC circuits up for optimal performance. RF output is in excess of 10 watts on all frequencies, and the receiver is so sensitive that I have to run the RF gain control backed down at night on 40 meters to prevent receiver overload! My 77A works well as a QRP CW rig and I plan to using it for Field Day in 2006, possibly at Ft. Meade, Maryland, where my daughter, Gwen, KB4UNT, and her hubby, Kyle, KF4TIR, are currently stationed. There is a ton of red tape to cut through, but a "military" Field Day theme, especially done on Ft. Meade, would be interesting to say the least. Anyone want to tag along?

One For FM!

No MilCom collection would be complete without at least one tactical FM radio set. In 2005 I procured a set of AN/PRC-6 walkie-talkies, including the technical manual and information on fabricating a battery tray for this ultra compact tube-type HT. The defacto MilCom FM frequency for ham radio operators and their "squad radios" is 51.0 MHz, and this radio tunes that frequency directly once the proper crystal is plugged in. So, aside from installing the correct crystal and peaking the tuned circuits, there is virtually no "conversion" involved.



This rig is mounted in a mobile comm van and shows up each year at the MRCA (Military Radio Collector's Association) meet in Gilbert, Pennsylvania.

I procured a set of crystals (12 in all) from a Canadian ham via eBay, for a total cost of $23 including shipping and handling. After the addition of a simple fabricated battery tray (which uses ten 9-Volt batteries in series, three "C" cells in parallel for filaments, and three "AA" cells for bias voltages), applying the proper voltages and aligning the radio was a relatively simple matter. Now I have a "Prick-Six" on 6 meters. It's output power is 250 mW—that is definitely QRP!

A Green Radio Shortwave Receiver

My absolute favorite "green radio" is a GRR-5 (R-174/URR) shortwave receiver that cost me $10 at a local hamfest. This HF receiver covers 1.5 to 18 MHz in four bands, is very sensitive, and can be operated from 6, 12, or 24 VDC, an external dry battery pack, and 115 VAC, all thanks to an on-board power supply and DC-to-DC converters.

I regularly use this radio to listen to shortwave broadcasts on a nightly basis. The receiver can handle CW, AM, and SSB modes (although SSB takes some practice) and sounds pretty darned good for a 50-plus-year-old radio! "Auntie Beeb" (the BBC) and Radio Habana Cuba are always fun to tune with this set! I've also used this receiver to listen to 80-, 40-, 30-, and 20-meter QRP CW freqs with success, although the wide receiver filter takes some getting used to.

Recently a query on the Army radios newsgroup (armyradios@yahoo.groups.com) yielded two PRC-10s, 1-watt, man-pack tactical low-band VHF FM units, for a total cost of $95. Included in the deal were two short and long tactical antennas and two H-33 handsets along with their canvas carriers. One antenna set alone would get over $100 on eBay! Not bad, Arland. These two sets are in daily use between my friend Gunny Rake and me on 51.0-MHz FM. We've started a MilCom VHF net in our area and are always on the lookout for others who want to join us. Therefore, should you have a 6-meter FM radio that tunes 51.0 MHz, by all means, give a call and see whom you can scare out of the woodwork.

The PRC-10 was used as a portable squad radio in the late 1940s through the mid 1970s. They were also mounted in jeeps, trucks, command posts, etc. to function as a mobile/base station for tac-

Both of these shots show Ted Young, W3PWW, of Hanover, Pennsylvania, running the Old Military Radio Net using his GRC-19 set. This radio set consists of a T-195 200-watt transmitter, running AM/SSB/CW or RTTY, and an R-392 receiver. This HF set is massive and was the mainstay of battlefield comm gear from the 1950s through the 1980s. The transmitter has a very "innovative" electro-mechanical auto-tune antenna matching unit. It makes a lotta noise, and it is really cool!

tical VHF FM comms. These are tunable radio sets, so there is virtually nothing to buy to get them to play on 6 meters. These sets saw action in the Korean War and Vietnam. National Guard and Reserve units had these sets in their active inventories until the mid 1980s!

Future Favorites

Future additions to my "collection," if I have my way, will include a BC-611 Motorola walkie-talkie from World War II. This is an 80-meter AM set with 300 mW of RF output coupled to a 30-inch antenna! It was the first widely deployable squad level radio of the war and quite literally helped the Allies win the war in Europe and against Japan. Unfortunately these radios are getting extremely hard to find, and when you do locate one, be prepared for some serious sticker shock. At the September 2005 MRCA meet in Gilbert, Pennsylvania, a vendor had a set (as in two) of BC-611s in fair condition for $600, and he would not split the pair up and sell them separately!

I would also love to get my hands on a TRC-300 man-pack HF, SSB/CW set to play with the HF Pack folks (www.hfpack.com). Failing that, I will settle for a PRC-1099 or a PRC-74B or C, all of which are quite capable man-pack HF sets. Output is around 15 watts USB. All of these sets are synthesized and are extremely rugged—just the thing for a back-up, highly portable HF radio set for EmComm work, a "walk about" in the bush, or a "tactical" Field Day!

Shown here is the venerable GRC-109 "spy set" used by the CIA and the U.S. Special Forces (Green Berets) from the 1950s into the 1980s. The three boxes shown here comprise the basic radio set. This set can be powered from various sources of AC, 6 VDC, and a hand-cranked generator. The complete radio set weighs in at over 50 pounds and would be a real treat to jump with into a hostile drop zone.

Finally, a PRC-77 low-band VHF FM man-pack/vehicular-mounted synthesized transceiver would fill out my meager "collection." Power output is 1 to 2 watts between 30 and 74.999 MHz. These radios were the replacements for the PRC-25, which was the squad radio that many radio telephone operators humped in the jungles of Vietnam. The '77 can be procured from Fair Radio Sales (www.fairradio.com) for around $500. If that seems like a lot of money, remember these things cost over $15,000 each to produce when new! That's a lot of taxpayer dollars worth of gear, huh?

The PRC-25 and '77 have the same physical profile (overall size) and look virtually identical to the untrained eye. The '25 was a hybrid design and used a vacuum tube (2DF4) as a final amplifier, whereas the '77 was entirely solid-state and can be powered from some 12-volt gelled electrolyte batteries. Both sets are fully synthesized. The PRC-77 was in production until 1990, making it the longest continuously produced squad

radio in the U.S. inventory. Although they're big and heavy by today's standards, they are extremely rugged and are exceptionally reliable, making them good candidates for EmComm use where size and weight are not concerns. These sets will both tune 6 meters, offering great local area coverage. Either of these rigs would be a valuable collector's item, but the really neat thing is that you can tune them to 6 meters and enjoy operating them, too!

Uncle Sam Liked QRP—You Will, Too

As you can see, Uncle Sam was a big proponent of QRP. There is an entire world of MilCom radios out there for the enterprising ham radio operator (and the QRPer in particular) to procure, restore, and play with on the air. One thing is for certain: once you get these rigs running (and most of them are working when you get them) you have to work really hard to break them! The only drawback to MilCom gear is that it is extremely addictive! Seriously, my first MilCom acquisition was the GRC-109. Now I have green (and black) radios coming out my...basement door!

So why do I indulge in "collecting" MilCom gear? For starters, much of the equipment falls into the QRP category. Military electronics are some of the best-designed and rugged electronic apparatus ever built. Most of the time they're relatively easy to maintain, thanks to the explicit instructions found within the various technical manuals and technical orders (TMs and TOs) published by the U.S. Government Printing Office.

Then there is the living history of the radio. These rigs are part of our American heritage. They helped win wars, overthrow dictators, start/finish revolutions, and save the Free World. They all have a story to tell. By restoring and using these old rigs, you're participating in keeping the vintage legend of these sets alive. These sets, all of them, are finely manufactured pieces of electronic equipment that, at the time, were at the peak or slightly ahead of the state-of-the-art for electronics of the day. If you think that LDG Electronics came out with the first auto-tune antenna tuner, you obviously haven't seen the GRC-19 Radio Set (a T-195, 200-watt transmitter coupled to an R-392 receiver) go into the auto-tune mode! It is an amazing thing to witness. Oh, almost forgot: the GRC-19 was circa early-mid 1950s!

Might I be so bold as to suggest that you obtain Mark Francis, KIØPF's outstanding book *Mil Spec Radio Gear*. It's really a "must-have" for anyone interested in MilCom collecting and restoring. Mark has taken many of the post-World War II MilCom gear that you can readily lay your hands on, laid it out in a logical format, and offered his expertise and tune-up tips to ensure that you get your MilCom rig on the air posthaste. He is quite thorough in the coverage he gives the rigs, listing their frequency coverage, power requirements, accessories, tune-up hints, troubleshooting ideas, etc. Mark has an easy-to-read writing style and his in-depth knowledge of MilCom gear and accessories makes for an extremely readable manuscript on "green radios." *Mil Spec Radio Gear* is available from CQ Communications Inc., 25 Newbridge Road, Hicksville, NY 11801.

In the meantime, I'll be hanging out on 3560, 7040 QRP calling frequencies along with 3570, the Old Military Radio Net frequency, on CW with my TRC-77Alpha, GRC-9, or GRC-109 feeding my 40-meter Extended Double Zepp antenna. I hope to QSO you and infect you with the MilCom bug!

Until next month, remember, Preparedness Is Not Optional! See you in June. ■

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

It's All About The Noise

Last month, we began to explore the question of noise by addressing local noise sources and how to isolate them. Once the origin is found, it may be possible to cure the problem. There are many examples on the Internet of helpful resources for curing the problem of local noise. For instance, a short and sweet "checklist" is found at www.kvfcradio.com/ amtips.html, and a more exhaustive resource is found at www. arrl.org/tis/info/rfigen.html. A Google search using the search phrase, "radio reception and noise" yields a wealth of links that include resources focusing on AM broadcast reception and the problems of local noise, as well as VLF radio reception.

This month, let's look beyond local noise generation. After dealing with local noise problems, how does noise affect radio signals? Beyond man-made causes, we're left with two other sources of noise: atmospheric and cosmic noise. Cosmic noise, which originates at points outside of the Earth's atmosphere, doesn't contribute much to the problem of radio signal reception. Atmospheric noise, however, has a significant impact on the reception of a radio signal.

Atmospheric Noise

As we begin our look at atmospheric noise, it's most useful to look at the problem as an issue of effectiveness. Often, when people talk about radio reception, signal strength is touted as the most useful factor in the effort to get a signal from the transmitter to the receiver. However, since the problem of reception is more complex than a simple power issue (just pump more watts into the antenna), the better way to get a handle on the problem is to use the signal-to-noise ratio (SNR) measurement of a circuit (the path between, and including, the transmitter and receiver). The SNR is a real measure of effectiveness. With it, we can better understand how effectively a signal can get from point A to point B.

Take a look at the four sample radio circuit analysis graphs (**Figures 1, 2, 3,** and **4**). These are all modeled with isotropic antennas on both ends of the radio circuit, and the transmitter is running 100 watts. Each graph shows the SNR in dB, on each of the standard amateur radio HF bands, at 2000 UT, for February 2006, between Washington State and Alaska. **Figure 1** models the circuit with a man-made (MM) noise level of "remote" at the receiver (164 -dBW-Hz, for 1 Hertz bandwidth at 3 MHz). Note that "propagation" is possible on a

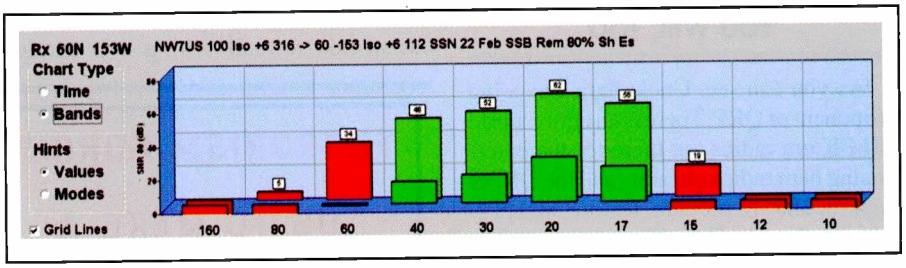


Figure 1. Signal-to-noise ratio (SNR) in dB on a sample radio circuit between Washington State and Alaska, on each of the amateur radio bands. The local man-made noise is "remote," or 164 -dBW-Hz.

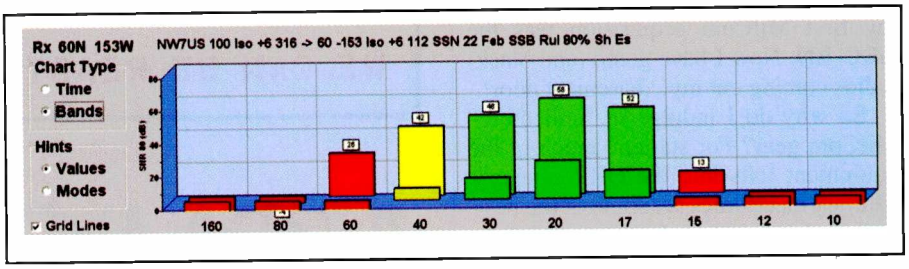


Figure 2. The same radio circuit SNR in dB with the local man-made noise increased by 10 dB ("rural").

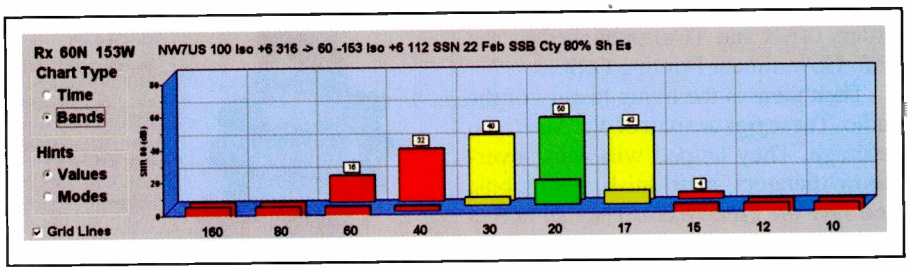


Figure 3. Using a man-made noise level in a city setting (an increase of 20 dB over the "remote" level), we can see how much impact noise really has on the usability of a radio circuit, with all other parameters staying the same.

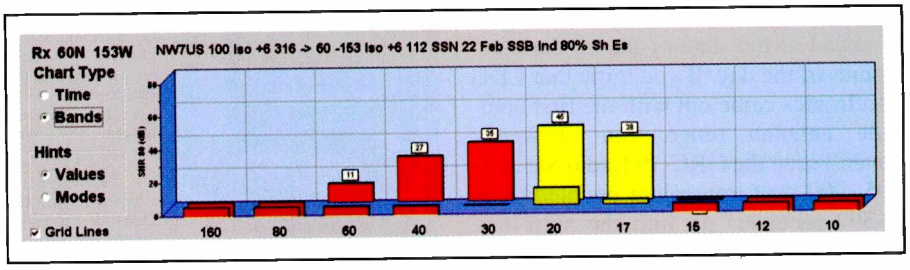


Figure 4. The worst noise level, that of "industrial" (30 dB over the "remote" level), really affects the usability of this example radio circuit.

number of bands. The green color for a frequency band indicates that the circuit reliability is at least 80 percent. This means that for 80 percent of the month, statistically, the signal will be reliably received on this circuit.

Finally, by increasing the noise level a full 24 dB over the remote level, as shown in **Figure 1**, you can see severely limited circuit usefulness on any band (**Figure 4**). This means that with all parameters except noise staying the same (power, antenna, solar activity, azimuth, time of day), MM noise makes a very large difference in the quality of a circuit. Be careful not to generalize from that finding, as different circuits and different seasons would yield different data, I'm sure. The noise factor in these examples was based on MM sources. The other source of noise also plays the same role in a circuit's usefulness.

The Culprit: Weather

All atmospheric noise is created by weather. More specifically, this noise comes from lightning flashes, with most of the noise caused by cloud-to-ground flashes because the currents in those strokes are much stronger than those of cloud-to-cloud flashes. However, some energy from horizontal flashes gets converted into vertically polarized energy and adds to the total at the ground receiver. (Horizontally polarized energy doesn't propagate well to the surface, but is an important factor with airborne radio reception, such as used in transoceanic flights.)

Worldwide, more than eight million lightning flashes occur daily. That's roughly 100 lightning flashes (with their resulting pulse of radio noise) per second. If your receiver is very far away from most of the storm centers, you'll only experience what is sometimes called "white noise."

Atmospheric noise is impulsive, though, and is not evenly distributed as is true white noise. White noise, when viewed on a scope is pretty well evenly distributed, as would arise from cosmic "background" noise. A Gaussian distribution of most parameters usually follows a "normal" (or Gaussian) probability curve, often called a bell-shaped curve. But impulsive noise is just that—impulsive. If you view it on a scope, it looks like short-lived pulses rising out of an even bed of background noise.

Atmospheric noise, then, is the combination of many, many lightning flashes. Radio scientists model each thunderstorm center as a radio transmitter, usually called an equivalent noise transmitter, or ENT. Such energies then propagate around the world just as do international broadcast radio transmissions. At a receiver we can then add up all of those energies propagated from worldwide storm centers. We find that the amount of that power-sum varies with seasons and with the nearness of the major storm centers.

Starting in the 1960s and continuing through the 1980s, a worldwide effort was made to measure all of this. The result was the CCIR 322 publication (see www.spawar.navy.mil/sti/publications/pubs/td/2813/index.html), which has been updated several times. The latest version is the CCIR 322-3, which summarizes the vast amounts of raw data on noise. A reader will quickly note that frequency plays a great part in HF communication from a noise standpoint. Lightning creates a

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 and especially at 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 (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 large distances.

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 waxes and wanes with an approximate 11-year cycle.

For more information, see http://prop.hfradio.org.

Optimum Working Frequencies (MHz) - For May 2006 - Flux = 74, 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	21	21	21	20	19	17	16	14	13	12	12	11	12	14	15	17	18	19	19	20	21	21	21	21
NORTHERN SOUTH AMERICA	28	27	27	25	23	21	19	18	16	15	14	14	14	16	19	21	23	24	25	26	27	27	28	28
CENTRAL SOUTH AMERICA	27	24	22	20	19	17	16	15	14	14	13	16	15	18	20	22	24	25	26	27	28	29	29	28
SOUTHERN SOUTH AMERICA	23	17	16	15	14	14	13	13	12	12	12	12	11	15	17	20	22	23	25	26	27	28	27	26
WESTERN EUROPE	11	11	10	10	9	11	12	12	11	10	10	13	16	17	18	19	19	20	19	19	18	17	16	15
EASTERN EUROPE	9	9	8	8	12	15	13	11	10	10	9	10	14	16	17	18	18	18	17	16	15	13	10	9
EASTERN NORTH AMERICA	25	25	24	24	23	21	19	18	16	15	14	14	15	18	19	21	22	23	24	24	25	25	25	25
CENTRAL NORTH AMERICA	14	14	14	13	13	12	12	11	10	9	8	8	8	9	10	11	12	12	13	13	14	14	14	14
WESTERN NORTH AMERICA	7	7	7	7	7	7	6	6	5	5	4	4	4	4	5	5	6	6	7	7	7	7	7	7
SOUTHERN NORTH AMERICA	23	22	22	22	21	21	19	17	16	14	13	12	12	13	15	17	18	19	20	21	21	22	22	22
NORTHERN AFRICA	15	14	13	12	11	11	13	12	11	11	12	14	16	17	18	19	19	20	20	20	20	19	18	17
CENTRAL AFRICA	17	15	14	13	13	14	13	12	11	10	10	14	16	17	18	19	19	20	20	20	20	20	20	18
SOUTH AFRICA	15	14	14	13	13	12	15	17	15	14	14	15	17	19	21	22	22	23	24	22	20	19	17	16
MIDDLE EAST	13	12	12	13	15	15	12	11	11	10	9	11	15	16	17	18	19	19	19	19	18	17	15	14
JAPAN	19	20	20	20	19	19	19	18	17	16	14	13	12	12	14	13	12	11	12	14	15	17	18	19
CENTRAL ASIA	20	20	20	19	19	19	18	18	17	16	15	13	13	13	14	16	17	16	14	14	13	14	17	18
INDIA	17	17	18	18	17	16	15	12	11	10	10	9	9	9	9	9	8	8	8	11	14	15	16	17
THAILAND	17	18	20	20	19	19	18	17	16	15	13	12	11	12	14	16	17	17	16	14	14	13	13	15
AUSTRALIA	28	29	29	29	29	29	28	27	25	23	21	19	18	17	16	15	14	14	13	13	16	21	24	26
CHINA	18	19	20	20	19	19	18	17	16	13	12	11	11	11	14	15	14	13	12	12	13	15	17	18
SOUTH PACIFIC	28	29	29	28	27	26	23	17	16	15	14	13	13	13	12	12	12	12	11	21	24	26	27	28

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	24	24	24	23	21	19	17	16	15	14	13	13	14	16	18	19	20	21	22	23	23	24	24	24
NORTHERN SOUTH AMERICA	25	25	25	22	20	19	17	16	15	14	13	13	13	16	18	20	21	22	23	24	24	25	25	25
CENTRAL SOUTH AMERICA	27	24	22	20	19	17	16	15	14	14	13	15	17	19	21	23	24	25	26	27	28	28	29	28
SOUTHERN SOUTH AMERICA	22	17	16	15	14	14	13	13	12	12	12	12	14	17	19	21	23	24	25	26	27	28	27	25
WESTERN EUROPE	14	12	11	11	10	11	13	12	12	14	15	16	17	18	18	19	19	19	19	19	19	18	17	16
EASTERN EUROPE	9	9	9	8	8	13	12	11	11	11	14	16	17	18	19	19	19	19	18	18	17	15	13	10
EASTERN NORTH AMERICA	18	18	17	17	16	15	13	12	11	10	10	10	11	13	14	15	16	17	17	17	18	18	18	18
CENTRAL NORTH AMERICA	8	8	8	8	8	7	6	6	5	5	5	4	5	6	6	7	7	7	8	8	8	8	8	8
WESTERN NORTH AMERICA	14	14	14	14	13	13	12	11	10	9	8	8	8	9	10	11	12	12	13	13	14	14	14	14
SOUTHERN NORTH AMERICA	16	16	16	15	15	14	12	11	10	10	9	8	8	10	11	12	13	14	14	15	15	15	16	16
NORTHERN AFRICA	19	18	16	15	14	14	14	13	12	12	14	16	17	18	19	19	20	20	20	20	20	20	20	20
CENTRAL AFRICA	17	16	14	14	13	13	14	12	12	13	15	16	17	18	19	19	20	20	20	20	20	20	20	18
SOUTH AFRICA	15	14	14	13	13	12	13	19	17	16	16	18	20	22	24	26	27	27	25	22	20	18	17	16
MIDDLE EAST	13	12	11	11	13	14	13	12	12	13	15	17	17	18	19	19	20	20	20	19	18	17	16	14
JAPAN	19	19	19	19	18	18	17	16	15	13	13	13	14	16	14	13	12	12	12	14	16	17	18	19
CENTRAL ASIA	20	20	19	19	18	18	17	16	14	13	12	12	14	16	17	18	17	16	15	14	13	14	17	18
INDIA	12	14	15	16	16	14	12	11	11	10	10	14	16	16	16	15	14	11	9	9	9	8	8	8
THAILAND	16	18	19	19	18	17	15	13	12	11	11	11	14	16	17	18	19	17	16	15	14	13	13	14
AUSTRALIA	28	29	29	29	29	28	27	24	22	20	19	17	16	16	15	14	14	13	13	12	17	22	25	27
CHINA	18	19	19	18	18	17	15	13	12	11	11	11	14	16	17	16	14	13	12	12	14	16	17	18
SOUTH PACIFIC	29	29	28	28	26	24	21	15	14	14	13	13	12	12	12	12	12	11	13	22	25	27	28	28

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	19	19	17	16	14	13	12	11	11	10	10	12	14	15	16	17	18	18	19	19	19	19	19
NORTHERN SOUTH AMERICA	22	22	21	19	17	16	15	14	13	12	11	11	13	15	17	18	19	20	21	21	22	22	22	22
CENTRAL SOUTH AMERICA	26	24	22	20	18	17	16	15	14	14	13	16	18	20	22	23	24	25	26	27	27	28	28	28
SOUTHERN SOUTH AMERICA	21	17	16	15	14	14	13	13	12	12	12	12	17	19	21	23	24	25	26	27	27	28	27	24
WESTERN EUROPE	16	15	13	12	12	12	12	11	11	13	15	16	17	18	18	18	18	18	18	18	18	17	17	16
EASTERN EUROPE	11	10	9	9	9	13	12	12	13	15	16	17	18	19	19	19	19	19	19	18	17	16	15	12
EASTERN NORTH AMERICA	8	8	8	8	7	6	6	5	5	5	4	5	6	6	7	7	8	8	8	8	8	9	9	9
CENTRAL NORTH AMERICA	19	19	18	18	17	15	14	13	12	11	10	10	12	14	15	16	17	17	18	18	19	19	19	19
WESTERN NORTH AMERICA	25	25	24	24	23	21	19	18	16	15	14	14	15	17	19	21	22	23	24	24	25	25	25	25
SOUTHERN NORTH AMERICA	19	19	19	19	17	16	14	13	12	11	11	10	11	13	14	16	17	17	18	19	19	19	19	20
NORTHERN AFRICA	19	18	16	15	14	13	13	14	14	15	17	19	20	22	23	23	24	25	25	25	24	24	23	21
CENTRAL AFRICA	17	16	15	14	13	12	14	14	14	15	17	19	20	22	23	23	24	24	24	24	24	22	20	18
SOUTH AFRICA	15	14	13	13	13	12	13	16	15	15	16	19	21	23	24	25	26	27	25	22	20	18	17	16
MIDDLE EAST	17	15	14	14	14	13	12	12	11	13	15	17	18	19	19	20	20	20	21	21	21	20	20	18
JAPAN	19	19	19	18	17	16	15	13	12	12	14	15	17	16	15	13	12	12	13	15	16	17	18	19
CENTRAL ASIA	19	18	18	17	17	16	14	13	13	14	15	16	17	18	18	19	18	16	15	14	13	14	16	18
INDIA	9	8	8	8	13	14	13	12	13	15	16	17	18	18	18	18	18	17	16	15	14	10	9	9
THAILAND	16	17	18	17	16	14	13	12	12	14	16	17	18	18	19	19	20	18	17	15	14	13	13	13
AUSTRALIA	29	29	29	28	27	25	23	21	19	18	16	15	15	16	15	14	13	13	12	12	18	23	26	27
CHINA	18	18	18	17	16	15	13	12	12	14	15	17	17	18	17	16	15	14	13	13	14	15	16	17
SOUTH PACIFIC	28	28	28	27	25	23	19	15	14	13	13	13	12	12	12	12	11	11	16	22	25	26	27	28

broad-spectrum emission, but in the high-frequency range, it is frequency-dependent, with noise power decreasing as frequency increases. In VLF (very-low frequency) work, atmospheric noise dominates nearly completely (assuming an electromagnetic interference-clean local environment and EMI-clean radio components). At HF, however, MM noise is a large part of the total energy in the high bands.

When the question is asked, "When will good propagation occur?" the reader should look at more factors than just the space-weather disturbed environment. The other factors that affect propagation are radio circuit path length and orientation, frequency, diurnal effects, as well as the transmitter power and antenna gain, and the parameters of the receiving station. Space weather and geophysical (weather, geomagnetic field, location) factors are not changeable by the average radio hobbyist (but, if you were God, perhaps you could tweak conditions). The rest of these factors are the parts you *can* control.

The principal effect is always propagation itself, which is the result of ionospheric profiles that vary over the world as the day-night terminator sweeps through—and that cannot be controlled by the radio operator. One might start by running propagation analysis tools (like the ACE-HF software at www.acehf.com/) to see how different the ionosphere is between steady-state daytime and nighttime, and how that affects reception on simple circuits. (ACE-HF defines the most reliable mode at every time of the prediction.)

You might not need the power of a computer propagation tool like ACE-HF to see what happens in cases where the radio circuit exists completely in either a day or night ambient environment. But, when the circuit crosses the terminator and part is in day and part in night the problem gets harder, and using computer modeling to sort out all the variables is about the only practical solution.

So When Will Good Propagation Occur?

Tools like ACE-HF will show you what to expect and will sort out the best frequencies to use, regardless of environmental conditions. The folks who created ACE-HF are about to release a new version of this powerful tool. Up until now, ACE-HF was targeted primarily at the amateur radio operator, but this new version includes very powerful shortwave listening tools and features.

Using ACE-HF, a selected radio circuit can be defined and then an analysis of the affect of noise can be made. You can also change out different antenna models, and see what that does to your reception. After you begin to understand the way these factors influence radio propagation, you can begin playing with the differences caused by the range of smoothed sunspot numbers (SSNs), the month, and so on. Using the powerful modeling tools of ACE-HF (like the animated maps that show the hour-by-hour coverage of a transmitted signal) one can quickly see that generalized "rules of thumb" about sunspots are often overly simplified. While low SSNs are usually worse, some frequencies favor lower SSNs while others favor higher SSNs. It all depends on time of day, season, circuit position, and so on.

So now, we have progressed a long way towards understanding "when good propagation will occur." And we haven't even touched on the disturbed environment. What then do we need to know about A and K indices, solar flux, solar flares, geomagnetic fields, and so on?

I suggest that to emphasize those factors alone is a mistake, because ACE-HF, WinCAP Wizard (www.taborsoft.com), and other propagation tools that use the Voice of America VOACAP engine (which is keyed to the CCIR data) at www.greg-hand.com/hfwin32.html have built-in compensations for such factors. This is where statistics comes into play.

VOACAP was calibrated through measurements made during a wide range of environmental conditions, so the resulting SNR distributions implicitly include the effects of a range of disturbed conditions. The range of environmental effects is built into the model and shows up in the statistical factors. Since VOACAP was validated through so many years of testing, and is generally acknowledged to be the "gold standard" of propagation models, it's a relief to know how easy it is to use with confidence. From a radio hobbyist standpoint, it is much easier to use tools based on VOACAP, like ACE-HF, than other models where such factors must be laboriously worked out and inputted.

In the upcoming issues, "The Propagation Corner" will dig into some of the propagation tools, like ACE-HF. We'll explore how to use them to begin unlocking the science of radio propagation at HF. More than ever before, with powerful computers available for reasonable prices, and with affordable tools like WinCAP Wizard and ACE-HF, any radio hobbyist can begin to make sense of all these factors that play a role in radio communications on HF.

HF Propagation

As we move away from the winter shortwave season into the longer days of summer, the overall trend in shortwave propa-

gation is the opening up of the higher frequencies into many areas of the world. However, these openings can be variable in strength, 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 radiation, 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.

On the higher HF frequencies (16 through 11 meters), fairly good daytime openings from strong international shortwave broadcasting stations 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—the strongest signals—will be found on the middle and lower HF bands. With the lower level of the 10.7-centimeter flux, many of the higher frequencies are not propagating via the resulting weaker ionosphere. Most reliable signals will be found on the 15-MHz band or below.

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 (remember what we just learned about the impact of noise on the usability of a radio circuit), and signals may sound weaker on DX openings during the daylight hours.

VHF Ionospheric Openings

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

A seasonal decline in 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 time. These TE openings will be north-south paths that cross the geomagnetic equator at an approximate right angle.

One meteor shower, the Eta Aquarids, will occur in May. This year the Eta Aquarids peak on the morning of May 6, but they start around April 20 and last until about May 25. This shower has a peak rate of up to 50 visuals per hour. The shower will be best viewed from the tropics or in the Southern Hemisphere. The current thinking is that the next big occurrence of this shower will be sometime between 2008 and 2010, with enough of an increase in activity to make for an exciting event in the Northern Hemisphere. Nevertheless, if you are in the Northern Hemisphere 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 are an amateur radio operator, look for 6- and 2-meter openings off the ionized meteor trails.

Current Cycle 23 Progress

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7-centimeter observed monthly mean solar flux of 83.8 for January 2006, down from December's 90.8. The 12-month smoothed 10.7-centimeter flux centered on July 2006 is 90.9. The predicted smoothed 10.7-centimeter solar flux for May 2006 is about 74, give or take about 16 points.

The Royal Observatory of Belgium reports that the monthly mean observed sunspot number for January 2006 is 15.4, a huge dive downward from December's 41.2, but just a bit lower than November's 18.0. This is still higher than October's 8.5. The lowest daily sunspot value during January, recorded on January 13, 30, and 31 was zero (0). The highest daily sunspot count was 37 on January 23. These high and low marks are significantly lower than the spread in December. The 12-month running smoothed sunspot number centered on July 2005 is 48.1, just slightly higher than June's reading. A smoothed sunspot count of 11 is expected for May 2006, give or take about 12 points.

The observed monthly mean planetary A-Index (Ap) for January 2006 is 6. The 12-month smoothed Ap index centered on July 2005 is 13.1, just lower than in June. Expect the overall geomagnetic activity to be quiet to active during most days in May, with some isolated periods of storm level activity, since we are just ending the equinoctial season.

I'd Like To Hear From You!

You can join in with others in discussing space weather, propagation, and shortwave or VHF listening at http://hfradio.org/forums/. Be sure to check out the latest conditions as well as the educational resources about propagation that I've put together for you at http://prop.hfradio.org/. I also provide a WAP/WML resource for wireless devices. If you want the latest propagation information like the solar flux, Ap reading, and so forth, check out http://wap.hfradio.org/, the wireless version of my propagation site.

Please don't hesitate to write and let me know about any interesting propagation that you've noticed. Do you have questions about propagation? I look forward to hearing from you. Until then, happy signal hunting! ■

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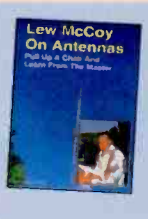

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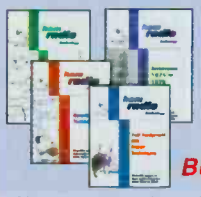

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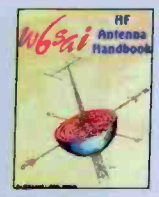

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by Harold Ort, N2RLL, Editor

The *etón* FR300 All-In-One Portable Radio

Any disaster survivor will be the first to tell you that information and news are two vital ingredients in overcoming a bad situation. In fact, they can make the difference between life and death. Being *forewarned* with a reliable radio broadcast greatly increases your chances of survival.

The *etón* FR300 AM/FM radio with NOAA, TV VHF, flashlight, and cell phone charger is poised to be your emergency warning system, or simply just a small portable take-anywhere radio for those times when you and your family just want to listen to the news or music. After all, today you just don't know when you'll need the extra benefits of an emergency radio like the FR300.

"The etón FR300 AM/FM radio with NOAA, TV VHF, flashlight, and cell phone charger is poised to be your emergency warning system."

As the sole licensee of the half-century-old Grundig brand for North America, *etón* has a sure winner with the FR300. This all-in-one self-powered radio comes complete with an internal rechargeable NiMH battery pack that's charged when you hand-crank the small dynamo. I tried this radio for several weeks before giving it our complete endorsement as a great sounding radio and emergency tool!

Cranking the FR300 is easy; it's small enough to hold with one hand and crank the dynamo with the other.

The two white LEDS are super bright.

The tuning dial is analog with a co-located coarse and fine-tuning knob.

Sometimes you need a crowbar to open a radio battery compartment, but accessing the FR300's battery compartment is a simple two-finger operation!

Operation of the FR300 is pretty straightforward: you crank, the radio plays from the now-charged internal battery. You can also power the radio by *continuously* cranking (with all batteries removed), from three "AA" batteries (not included), or by using the optional AC adapter/charger.

I cranked the radio for 60 seconds and got five minutes of play on FM at a moderate to high volume. You simply put the slide switch on the right side of the radio to "off" while cranking; when finished, slide it up to "dynamo."

Select the band you wish to listen to by sliding the front switch to AM, FM, TV1, TV2, or WX (weather). If selecting weather, you simply turn the large front dial to one of the seven NOAA channels. In my area there are two stations that are easily heard, one better than the other, but the FR300 tunes both perfectly, right on frequency.

Now if you're thinking that 60 seconds of cranking only gets you five minutes of listening, consider this: cranking the dynamo about twice as fast will give you about 12 minutes listening time. Of course your mileage may vary, but you get the idea.

If you're in an emergency situation or without power because someone took out a power pole, that five or so minutes of radio news or music can really cheer you and your family right up, and possibly even turn a bad situation into one that's infinitely better!

Other Emergency Features

Got light when the power goes out? Chances are (hopefully!) you've got a flashlight or two, but because those flashlights are never where you want them when the power is out, the FR300 comes to your rescue. It's more than just a radio; the two bright LEDs on the front of the radio are worth a million bucks! Best of all, they (or the single blinking red emergency LED) can be used while playing the radio on any band, including weather.

How many times has your cell phone battery died when you need the phone the most? I think we've all been there, but never fear—when you're equipped with the FR300, which comes with a small package of common cell phone charger plug/adapters and cord that plugs into the back of the radio, you're back in business. I didn't try this feature, but one of the small FR300 plugs fits my Nokia phone perfectly!

Then there's the built-in siren. How loud is it? Well, loud enough that the first time she heard it, our cat scurried downstairs! It's certainly loud enough to get someone's attention if you need to do so, and you can use the siren in conjunction with either the flashing red LED or two white LEDs.

Check It Out

The FR300 is small (6 x 6.5 x 2.5 inches HWD) and light (1 pound, 4 ounces) enough to fit in any briefcase or large purse. Inspector Gadget would buy two; one for home and the other for wherever he travels. At only $50 each, you should, too!

For more information on the *etón* FR300 All-in-One portable radio, available direct from the company, contact *etón* online at www.etoncorp.com. Be sure to tell them you read about it in *Popular Communications*. ■

by Joe Cooper, carm_popcomm@hotmail.com

Digital Signal Processing— The Theory Behind Today's Digital Communication Technology

I had originally intended for this month's column to be a continued look at how to use Microsoft's Visual BASIC Express software development program to help you create a CAT (computer-assisted tuning) program for Ten-Tec's RX-320 "black box" communications receiver. However, I was getting feedback that I was moving ahead of the learning curve for some people, and they needed a break.

This is understandable as a number of readers had just downloaded their new Visual BASIC programs and were still working their way through the basics of how to use the application. So people were starting to fall behind as I began our look at more advanced topics, such as user interfaces (UIs) for the CAT program. Plus, there are many of you out there who aren't going to become computer programmers, but still want to learn more about the technology behind software-defined radios (SDRs).

For those who may have tuned in late, Microsoft is offering Visual BASIC Express, along with other software development language applications, on its website http://msdn.microsoft.com/vstudio/express/default.aspx. This particular version of Visual BASIC is unique in that it's completely free to download and is designed to help you to learn computer programming at a hobbyist level. That goal is facilitated through an extensive free training program.

So let's take a short break from the computer programming series; we'll come back to it in about four issues to give everyone a chance to get caught up. In the meantime, since I've already outlined the basics of what needs to be done in my last three columns, if anyone gets ahead of the game and puts together a working CAT program, please tell me about it. I'll be happy to share your story with the readers of this column. It doesn't have to be fancy, just work reasonably well.

Looking At DSP Technology

Over the next four columns I want to revisit digital signal processing, (DSP), which is a not only a very important component of SDR, it's also used extensively in any type of data communication today, whether voice, picture, or sound based.

SDR technology is totally dependent upon DSP technology in order to work. SDRs use DSP technology to produce the phased digital information needed for the software-based I/Q algorithms that demodulate the intelligence, such as voice or music information, contained in a digital signal. The front end of any SDR radio is based upon "ordinary" DSP technology, so it's important to know how it works. DSP technology is not that difficult to understand—it's simply where an analog signal is converted into a digital form and then manipulated using high-speed mathematical processing.

If you have a cell phone, a CD player, a handheld video game player, or even many modern superheterodyne radios, you're

already using DSP technology. Why is DSP so important in today's modern communication devices? Simply because DSP works to dramatically improve the sensitivity of a receiving unit in ways that could never be achieved with old analog circuits, whether they were vacuum tube or solid state devices. The truth is, all communications circuits contain some noise, whether the signals are analog or digital and regardless of the type of information conveyed. It's a problem with any communications technology and there's an ongoing struggle to improve the signal-to-noise (S/N) ratio of any communications systems.

Back in the old days of spark transmitters, the first method of optimizing S/N ratio included increasing the transmitted signal power up to a million watts. However, given the harmonic interference, such powerful signals made that approach impractical. So since the earliest days of radio the focus has been on improving the *receiving* side of the communications circuit.

DSP technology, while theoretically complex, is actually very simple from the hardware standpoint. For example, in processing an incoming analog signal, say a shortwave broadcast, the signal is first converted to digital form by an analog-to-digital converter (ADC). The resulting digital signal has two or more levels, which ideally are always predictable, exact voltages or currents. However, because the incoming signal contains noise, the levels are not always at the standard values. A DSP circuit works by adjusting these levels so they're at the correct values, which practically eliminates any noise. The digital signal is then converted back to analog form via a digital-to-analog converter (DAC), which allows it to be filtered or amplified in a conventional manner.

However, if a received signal is digital, say computer data, the ADC and DAC are not necessary. You can instead use the

DSP circuit to act directly on the incoming digital signal, eliminating irregularities caused by noise, and thereby minimizing the number of errors that may be contained in that signal.

A good DSP circuit will be superior to any conventional analog filter, but there are limits as to what it can do. Needless to say, if the noise is so strong that all traces of the signal's "intelligence" are obliterated, the DSP circuit will not be able to readjust (or process) that intelligence to a usable level. As a result all that can be passed through the DSP circuit is the original noise, so the bottom line is that you must have some signal in a digital signal in order to filter it properly using DSP.

The Beginnings Of Digital Technology In Telegraphy

What's really interesting about DSP is that while it's generally associated with today's modern computers, it's actually a much older technology. Strange as it may seem, the origins of DSP are traceable directly to theoretical work done in the 1920s on how to improve telegraphic signals.

Now you might think this a bit unusual, but the inspiration for taking a closer look DSP technology for this series of columns came when I read that Western Union had quietly ended telegraph service on January 27, 2006. Although this news item might not appear to have any direct connection to the topic of DSP, the truth is that if telegraphy had never been invented, then neither would DSP technology—the two technologies are that closely linked.

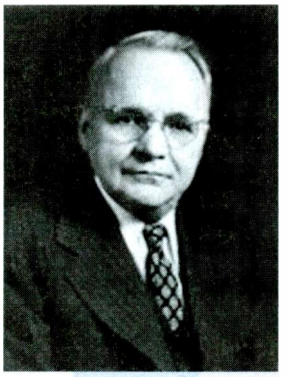
Telegraphy was originally developed in France in 1792 by Claude Chappe, and its introduction led to the establishment of countrywide telegraphy stations by the early 1800s. A true telegraphy system (based on the use of semaphores), it was a visual approach to communications, and as such was limited to daytime use, and even then could only be used in good weather. Alternative methods of telegraphic communication were, therefore, investigated in a number of countries.

Some early methods of electrical transmission of information were attempted in various forms in Europe. Baron Pavel Lvovitch Schilling, a Russian diplomat in Germany, developed the world's first practical electromagnetic system of telegraphy in 1832. But since the wires used to transmit telegraph signals could be cut, European military leaders saw his system as strategically vulnerable, so little progress was made in its development.

A year before Schilling developed his system, however, U.S. scientist Joseph Henry successfully demonstrated his own unique electrical telegraph system. In Henry's approach, electric current traveled down a wire, over even great distances, and then magnetically activated a striker, or plunger, creating a noise. Five years later, Samuel Morse would successfully exploit Henry's invention by creating a commercially viable telegraph network in the United States.

The differences between the Morse system and both Schilling's and Henry's were significant. For instance, Schilling used a compass needle that, as it turned through a circle of 360 degrees, would point at a letter of the alphabet, stopping on one and then moving on to the next letter of a word. Henry's system was no different from a simple doorbell: all it could do was ring a bell at a distance.

Perhaps Morse's greatest contribution was the code that bears his name. It cleverly exploited the human brain's amazing ability to distinguish patterns through the analysis of differences in groups of things it encounters. Normally such groups can be comprised of the sounds of a musical score, visual information such as letters in an alphabet, or even abstract ideas such as words in a crossword puzzle or figures in a mathematical formula. Morse's code was made up of groups of dots, dashes and spaces, which are simply created by the different lengths of time in which a current passes through a magnetic circuit.



Harry Nyquist (1889–1976) was born in Nilsby, Sweden, prior to his family's immigration to the United States. After obtaining a Ph.D. from Yale in 1917, he went to work for AT&T where he developed his now famous theory of digital sampling in 1928, which laid the foundation for today's DSP technology. In 1934, he went to work for Bell Laboratories, where he stayed until his retirement in 1954. (Photo courtesy IEEE)

The human brain, when properly trained, is smart enough to measure the minute differences in time lengths between the three elements in the original Morse code (later two elements, dots and dashes, would be used in the International Code). That same training allowed the brain to associate those different groups of elements into numbers or letters of the alphabet.

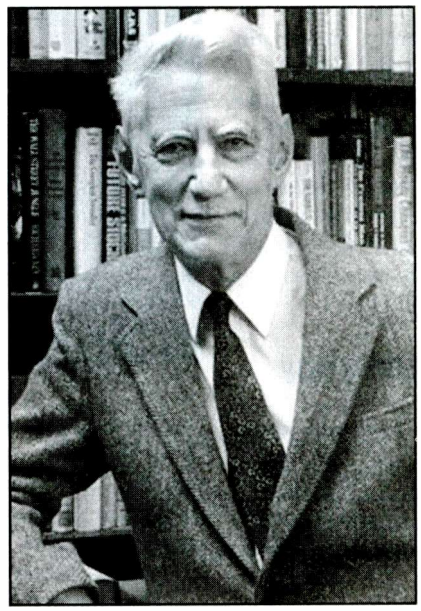
But Morse also exploited Henry's contribution to telegraphy by using a plunger to place pencil marks on a moving piece of paper, which would be "read" by someone familiar with the code it "spelled" out. Interestingly enough, Henry's legitimate invention of the magnetic plunger would be used in a lawsuit against Morse's patents, which ended with Morse losing his patents to the telegraph in the 1840s. This decision was overturned in 1853, however, when the U.S. Supreme Court ruled in Morse's favor out of respect for the way society had benefited from his development and application of the technology, which Henry simply had not done.

Regardless of its early controversies, telegraphy was "the original digital" in that "intelligence" was sent as individual bits of information; today those bits take the form of being in a state of either "on" or "off."

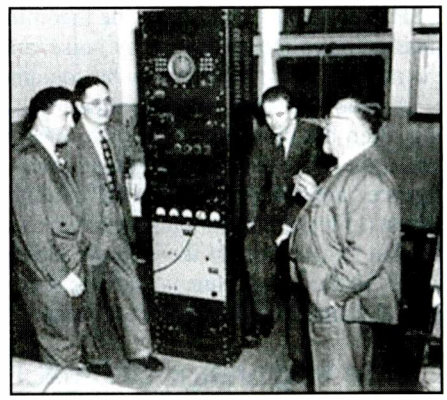
Telegraphy Gives Place To DSP

By the early 1920s data communication was becoming increasingly complicated, particularly with the advancements being made in radio technology. As a result, landlines were no longer carrying only the dots and dashes of Morse code, but also telephone and teletype signals. Indeed telegraph companies were even transmitting code using radio waves over their wires to increase their transmission bandwidth. However, this approach introduced the old adversary of any communication method: noise.

About this time, Harry Nyquist, a scientist employed by AT&T, undertook a series of studies on how to use digital sampling techniques to reduce or eliminate noise in telegraph signals. His work culminated in 1927 with the discovery that an analog signal should be sampled at regular intervals over time and at twice the frequency of the signal's bandwidth in order to be converted into an adequate representation of the signal in digital form. The results of this research appeared in a paper entitled "Certain topics in telegraph transmission theorym," which



Claude Shannon (1916–2001) graduated from the University of Michigan in 1936 with bachelor's degrees in mathematics and electrical engineering. In 1948 he published his landmark piece, "A Mathematical Theory of Communication," and single-handedly started today's modern communication industry. (Photo courtesy Bell Laboratories/Lucent Technology)



Thanks to the ideas, influence, and theories of Harry Nyquist and Claude Shannon, post-World War II experiments at the Research in Electronics facility at MIT focused on DSP technology. This photo shows an early DSP experiment being conducted under the supervision of Professor Norbert Wiener, who developed the discipline of Cybernetics, the study of communication and control through feedback. (Photo courtesy RIE/MIT)

was published in 1928 and is available for download at www.comelec.enst.fr/~rodrigez/CNTI/images/nyquist.pdf.

Also around the same time a young man named Claude Shannon was working as a messenger for Western Union in his home town of Gaylord, Michigan, saving up to enter university for a degree in electrical engineering. After entering the University of Michigan, Shannon incorporated Nyquist's ideas on digital sampling to develop the basic concepts that have lead to today digital computers, CD recordings, and data compression. The early work of both Nyquist and Shannon was used by a number of communications companies, including Western Union, to improve their relaying of information. But Shannon's impact did not end simply with his contribution to digital circuitry; he also furthered early DSP research and design through his association with MIT and Bell Laboratories.

It was at MIT during the 1940s and '50s that Nyquist's and Shannon's work was applied to the creation of DSP in the first generation electronic digital computers. These advances lead to the development of the first of practical software-based DSP using the (then) high speed TX-2 computer. The success of this project laid the foundation for digital recording, signal processing, and data compression, culminating in today's digital revolution.

Applied Technology

It's interesting to note how that new digital revolution impacted one of the pioneers of the digital age, Western Union. Western Union used the ideas of Nyquist and Shannon to improve their rate of digital transmission and circuit switching.

By the 1940s telegraph keys had pretty much been retired for teleprinters, and faster code systems, such as Baudot and ASCII, came into use. These advancements in telegram technology evolved into a computerized system of digital transmission and switching that was to become the foundation for the military's Automatic Digital Network (AUTODIN) used during the 1960s.

That digital communications system was very slow by today's standards, running at 2400 baud, but it was reliable and reigned supreme until 1982, when it was replaced by ARPANET. ARPANET, as you may know, would become the foundation for the early Internet of the 1990s.

Another technology Western Union developed in conjunction with AUTODIN was one of the first true digital commercial communication systems. Called EasyLink, this integrated service used a modem to connect with a computer terminal over a telephone line that enabled the user to communicate by e-mail, fax, or telegram.

During the early 1970s the DSP program at Research in Electronics at MIT had use of the (then) powerful TX-2 mainframe computer. It was here in 1972 that the first software-based DSP application was created. This became the foundation for our current DSP technology and software-defined radios. (Photo courtesy RIE/MIT)

Ironically, it was the success of AUTODIN (which led to the creation of the Internet) and EasyLink (which led to today's e-mail systems) that eventually caused the demise of the Western Union telegraph. By 2005 only 20,000 telegrams a year were being sent. So on January 27, 2006, after 155 years of continuous service, Western Union ended its telegraph service. That final telegram sent by Western Union was not just an important milestone in the history of telegraphy, but in computer history as well. Truly, "what hath man wrought?"

Next Month

I'll continue this exploration of DSP technology, looking at how analog signals are sampled using digital sampling devices, then processed using DSP software before being turned back into post-processed analog signals. I'll introduce you to some interesting DSP software and hardware that can be used to enhance your current radio monitoring practices.

Do not forget to e-mail me with any questions at carm_popcomm@hotmail.com. As mentioned before, I cannot answer general questions on computers, but will be more than happy to help you with any issues raised in the columns.

I've heard that this summer some people in the weather business are predicting up to nine significant hurricanes, which is disquieting given that there are still many people still feeling the effects of past natural disasters like Hurricane Katrina. I would like to suggest that rather than waiting for a disaster to occur before contributing, you might send a donation now to the American Red Cross (www.redcross.org/donate/donate.html) to help your fellow Americans in this time of trouble. There are many good (and ethical) organizations that you can contribute to so please use them if you wish, but do not give into "charity fatigue."

If you have a job, a family around you, and are living in a stable neighborhood, then show your thanks for that wonderful luck by sharing of it someone less fortunate, and do so regularly.

Let us also not forget our troops overseas who continue to need our support, particularly as tensions in the Middle East continue to rise. Please refer to the U.S. Department of Defense's official webpage, "Defend America." There is a section found at www.defendamerica.mil/support_troops.html with an amazingly wide range of practical and useful ways that you can directly help.

Again, if you are fortunate enough to live in the United States of America, have a safe and secure home, a paying job and your loved ones around you when so many don't, please remember to give thanks for your personal blessings by passing on that blessing to others through regular acts of selfless sharing. See you again next month! ■

by Gerry L. Dexter, gdex@genevaonline.com

The VOA Takes One In The Chops!

The Voice of America has taken a major hit. The government's International Broadcast Bureau (IBB) has ordered the VOA to make drastic cuts in its schedule, supposedly to free up more facilities, which can then be given over to broadcasting's part in the war on terror. Some 247 transmitter hours per day have been deleted—a total of 90,000 transmitter hours per year! By now we should have seen a significant increase in the schedules of Radio Farda, Radio Free Asia, and perhaps even Radio Sawa (of late off shortwave). The bottom line: The VOA has definitely been relegated to back of the bus status in the global radio wars.

Sad news again this month as we report the passing of Keith Glover, probably one of the most widely known and loved voices on shortwave and long-time host of Radio Australia's "Mailbag" program. He was with ABC/Radio Australia from 1947 until his retirement in 1985.

Hurricane Katrina resulted in a cooperative effort by a number of New Orleans broadcasters to bring the public news and information on the crisis. These non-stop broadcasts, aired under the banner "United Radio Broadcasters of New Orleans," were also relayed for a while on shortwave by WHRI, World Harvest Radio International. It's now possible to receive a QSL for these broadcasts. This applies to any or all of the local stations in the network. You need to send a standard reception report, complete with at least 15 minutes of program details. Also be sure to include enough return postage to cover replies for each station you report. Members of the mediumwave-focused International Radio Club of America are providing the QSL service. Send your reports to URBONO QSL, P.O. Box 3777, Memphis, TN 38173-0777.

A new entry in the anti-Castro radio wars is Radio Republica—La Voz del Directorio Democratico Cubano. It's using 5965, 6010, and 6135 at various times and is easily audible in the United States during the late afternoons and evening. It's also on 9955 over WRMI, Radio Miami International, which also acted as a middleman in arranging a relay over T-systems' (DTK Systems) Julich transmitter. This is on 7160 from 2300 to 0400 Monday through Friday. They earlier were using 7110, which likely was via Julich as well, since use of that range is not permitted for broadcasting within North America. In addition, it claims AM channels 570 and 1550; though it's likely these are just time purchases. (We suspect the 1550 outlet may be WAMA-Tampa, which runs a Spanish language format) Usually there is Cuban bubble jamming in evidence. The address is P.O. Box 110235, Hialeah, FL 33011, and it can be contacted via e-mail at info@radiorepublica.org. (There was no reply to an e-mail query sent to that address). The schedule seems to be 6135 from 2200 to 0030, 6010 from 0000 to 0200, and 7110 at 0200 to 0400.

Studio Raided

Another opposition broadcaster has had its studio raided. This time it was the Sri Lankan-based Minivan Radio, which broadcasts programming against the government of the Maldives Islands. At the urging of the Maldives government, the Sri Lanka Criminal Investigation Department conducted the raid, having been led to believe weapons were being kept in the studio. Several members of the staff have left Sri Lanka, and the station's journalists still in the Maldives are subject to regular harassment. Radio Minivan broadcasts via Julich, Germany, on 11810 daily at 1600 to 1700 in the local Dhivahi language. The main offices are in the United Kingdom. Its website is at radiominivannews.com. The group is seeking funding to continue its work.

Other News

Adventist World Radio is now carried via Wertachtal, Germany, from 2000 to 2300 on 7110 beamed to Iran in Farsi.

Slovak Radio's foreign service, in a shaky state for a while now, has a strong backer in the president of Slovakia who says he wants to make certain the foreign service continues.

RTV Algeria has resumed shortwave operations, although the broadcasts are relayed via VT Merlin sites in the United Kingdom. At this writing it is on 9735 via Rampisham from 0600 to 0700 and 0700 to 0800 on 9735 and 12020, both via Skelton, then from 0800 to 0900 on 13750 via Skelton, 1200 to 1400 on 17690 via Wooferton, also at that hour on 17775 via Rampisham, 1900 to 2000 on 5985 via Skelton, 2000 to 2100 via Wooferton also on 5985 and 7105 to Rampisham and 2100

Joe Wood received this attractive QSL card and sticker from Radio Verdad in Guatemala.

Help Wanted

The "Global Information Guide" consistently presents more shortwave broadcast loggings than any other monthly SW publication! (This month we processed **747 loggings!**)* 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 "Global Information Guide," *Popular Communications*, 25 Newbridge Rd., Hicksville NY 11801-2953. Or e-mail them to Editor Harold Ort at popular-com@aol.com, or to your "GIG" columnist at 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.*

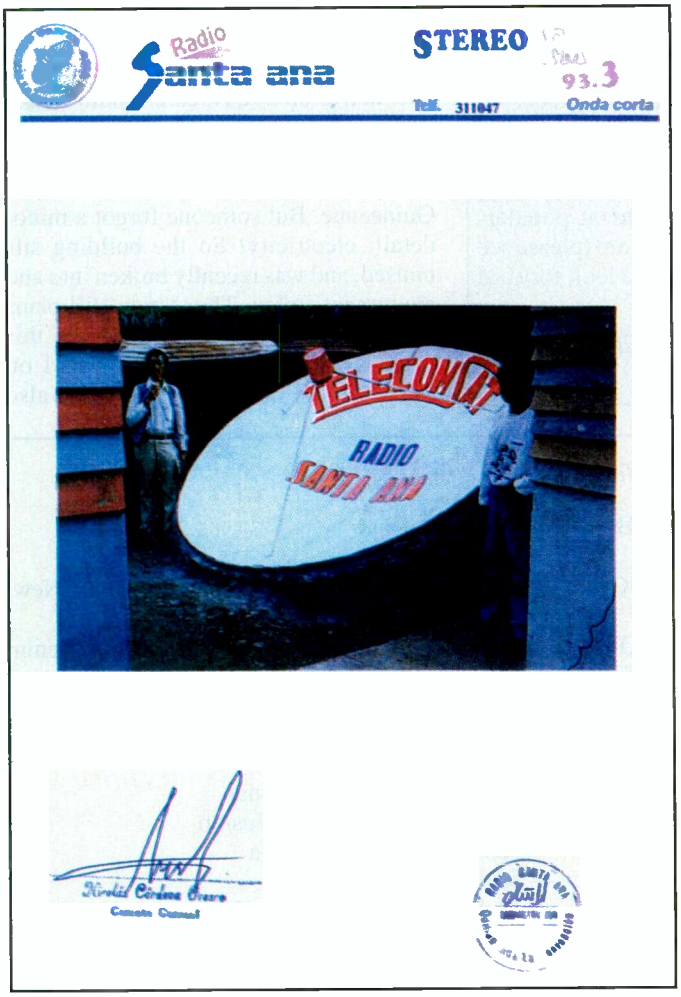
to 2200 via Rampisham on 7105, all beamed to various parts of Africa.

A new Bolivian, Radio Cooperativa, is now active on 5984v, as is Radio Logos in Santa Cruz, using 6165

A couple of years ago China built a new broadcast center for RTV Guineenne. But someone forgot a minor detail: electricity! So the building sits unused, and was recently broken into and equipment stolen. The station still plans to move into the facility sometime this year. RTVG continues to be heard on 7125 with an 0600 sign on. And it also

Abbreviations Used In This Month's Column

*	— 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
//	— in parallel
AA	— Arabic
ABC	— Australian Broadcasting Corporation
AFN	— Armed Forces Network
AFRTS	— Armed Forces Radio TV Service
AIR	— All India Radio
Anmt(s)	— announcement(s)
Anncr	— announcer
AWR	— Adventist World Radio
BSKSA	— Broadcasting Service of Kingdom of Saudi Arabia
CC	— Chinese
Co-chan	— co-channel (same frequency)
Comml(s)	— commercial(s)
CP	— Bolivia, Bolivian
CRI	— China Radio International
DD	— Dutch
DJ	— disc jockey
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
GBC	— Ghana Broadcasting Corp
GG	— German
GMT	— Greenwich Mean Time
HH	— Hebrew, Hungarian, Hindi
HOA	— Horn of Africa
ID	— station identification
II	— Italian, Indonesian
Int	— international
IRRS	— Italian Radio Relay Service
IS	— interval signal
JJ	— Japanese
KK	— Korean
LSB	— lower sideband
LV	— La Voz, La Voix
NBC	— National Broadcasting Corporation (Papua New Guinea)
ORTB	— Office de Radiodiffusion et Television du Benin
PBS	— People's Broadcasting Station
PP	— Portuguese
PSA	— public service announcement
QQ	— Quechua
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 not owned by the broadcaster
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
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"
VOAS	— Voice of America
VOIRI	— Voice of Islamic Republic of Iran
WCNA	— West Coast of North America
ZBC	— Zimbabwe Broadcasting Corporation



Looks like Radio Santa Ana in Quillabamba, Peru, takes some satellite feeds. (Thanks Rich D'Angelo)

manages to maintain its abominable reputation in the QSL department.

Trans World Radio Africa is making progress in getting on the air from Benin. The broadcast tower is up and the building is about half finished. The hard part of the project, not surprisingly, is getting the government bureaucrats to issue a license.

Is there trouble at University Network? The widow of the late Dr. Gene Scott was heard to complain about declining financial support for the broadcasts and threatening cutbacks beginning with the local broadcasts if things do not improve. This loop tape announcement aired non-stop for several days back in early December. We've heard this kind of thing before, as in last year's false death kneel for Trinity Broadcasting's KTBN.

RTV Gabonaise has been reactivated on its former 4777 spot, with sign on at 0500 and all-French language programming.

More folks are reporting signals from the rare AFN, Diego Garcia on 4319 (running to 0200) and 12579 (0200 to 1400). Both frequencies are in upper sideband.

The Federal Emergency Management Agency (FEMA) is complaining to the FCC about interference its transmissions are receiving from out-of-band U.S. shortwave broadcasters and has asked the Commission to "remove from the schedule" any channel within 13 kHz either side of any of FEMA frequency. Broadcasters who engage in out-of-band operation are supposedly aware they must move when asked to do so by the FCC. As of the middle of the B05 Winter schedule, four U.S. broadcasters had had to make changes. While FEMA is busy protecting its territories they might also do some protesting to the FCC about this broadband over power line stuff!

NASWA News, And A Peruvian On 5700 Changes Its Name

The North American Shortwave Association has a new URL for its website: www.naswa.net. The site offers a large listing of programs broadcast on shortwave as well as a loggings database, which contains almost all the shortwave loggings submitted to club editors since November 1988! You can also download and print both the NASWA Countries List and the Awards Program Guide. NASWA says it is looking at adding several additional features for the future.

That infrequently heard Peruvian on 5700, Radio Frecuencia San Ignacio, has changed is name to Radio Triple SH and is active until around 0230. The "Triple" comes from the fact that it uses three frequencies: AM, FM, and SW. A genuine new one to chase down is Radio Corazon, believed to be in Ancash and now active on variable 4060.

Reader Logs

Remember, your shortwave broadcast station logs are always welcome. But please be sure to double or triple space items, list them by country, and include your last name and state abbreviation after each log. Also much wanted are spare QSLs you don't need returned, station schedules, brochures, pennants, station photos, and anything else you think would be of interest. And how about sending a photo of yourself at your listening post? C'mon! Jack up your nerve and do it!

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 specified, the broadcast is assumed to be in English (EE).

ALASKA—KNLS, 9645 with religious programming in CC at 1153. (DeGennaro, NY)

ALBANIA—Radio Tirana, 6205 in Albanian at 2158, 7455 in Albanian at 0019, 7465 in EE at 1952 and 7530 in EE to Europe at 1944. (DeGennaro, NY)

ANGOLA—Radio Nacional, 4950 in PP at 0315. (Brossell, WI) 2201. (DeGennaro, NY)

ANGUILLA—Caribbean Beacon, 11775 with music and Gene Scott preaching at 2029. (DeGennaro, NY)

ARGENTINA—RAE, 11710 in PP at 0146 and 15344.5 in FF to Europe at 2023. (DeGennaro, NY) 11710 in SS at 0150, into EE at 0201. (Alexander, PA) 0215. (Maxant, WV) 0250 with a DX program. (Brossell, WI) Radio Nacional, 15345 in SS at 1941. (Jeffery, NY)

ARMENIA—Voice of Armenia (aka Public Radio of Armenia) 9775 at 1825, ID "This is Armenia" at 1830 and news. Anncd parallels 4810 and 11640 and web address www.armradio.am. (Brossell, WI) 9965 in Armenian at 0318. (DeGennaro, NY) 1915 in GG. (Burrow, WA) 1934 to 1946 close in EE. Closed with classical music segment. (D'Angelo, PA)

ASCENSION IS—BBC Relay, 12095 to South Africa at 2000, 15400 to West Africa at 2010, 17885 in Hausa to West Africa at 1938 and 21470 to South Africa at 1556. (DeGennaro, NY) UN Radio, 17810 at 1742 ending "UN Today" and off at 1746. (D'Angelo, PA)

AUSTRALIA—Radio Australia, 5995//6080//9475//9580//9710//11880 with interview at 1743. (Burrow, WA) 6020 at 1138, 9475 at 1116, 9560 at 1123, 9580 at 1200, 9590 at 1203, 9710 at 0958, 11650 at 2022, 11660 at 2013, 11880 at 2013 and 15515 at 2107, all in EE.

(DeGennaro, NY) 6020 at 1100, 7240 at 1510 and 15515 at 2230. (Maxant, WV) 15240 at 2315 and 15415 at 2334. (MacKenzie, CA) 6020 at 1308 with "Saturday Night Country." (Paszkiewicz, WI) 9710 at 1600 sign on. (Yohnicki, CN) 17785 with news at 2300. (Gay, KY) Voice International, 15335 heard at 0625 with youth-oriented "moral" music. (Burrow, WA)

AUSTRIA—Radio Austria Int., 5945 in GG at 2107, 6155 in GG at 2045, 7325 in EE at 0017 and 13730 in GG at 1212. (DeGennaro, NY) 7325 at 0030 and 13675 at 1645. (Maxant, WV) 13675 via Canada at 1617. (Charlton, ON)

BELGIUM—RTBF, 9970 with FF to Western Europe monitored at 1136. (DeGennaro, NY)

BELARUS—Radio Belarus, 7325 on repairs to schools at 2335. (Maxant, WV)

BENIN—Radio Parakou, 7190 at 1203 in FF and unid local language with pops. "Ici Parakou" at 1220. Co-channel with Tashkent. (Taylor, WI)

BOTSWANA—VOA Relay, 4930 on Zimbabwe at 0312 and 12080 at 2030 with ID and into Hausa. (Brossell, WI) 6035 with "Daybreak Africa" at 0315. (Jeffery, NY) 1908 in FF. Also 17895 with rap at 1945. (Charlton, ON) 13710 at 2000 and 17895 at 1840 talking about African newspapers. (Wood, TN)

BRAZIL (*All in PP—gld*) Radio Cultura, Araraquara, 3365.1 with continuous religious vocals, ID at 0300 and more music. (D'Angelo, PA) Radio Alvorada, Londrina, 4865 at 0309. (D'Angelo, PA) Radio Difusora, Macapa, 4915 at 0228. (DeGennaro, NY) 0328. (Brossell, WI) 0422 with ID. (D'Angelo, PA) Radio Nacional Amazonia, Brasilia, 6180 with religious message at 2250 and 11780 at 1008. (DeGennaro, NY) 2109. (Wood, TN) Radio Cultura Ondas Tropicais, Manaus, 4845 with talk at 1047. (DeGennaro, NY) Radio Anhanguera, Goiania, 4915 at 0922 and 11830 at 2035. (DeGennaro, NY) Radio Senado, Brasilia, 5990 with local music, IDs at 0900. (Alexander, PA) 0953. (DeGennaro, NY) 0958. (D'Angelo, PA) Radio Verdes Florestes, Cruzeiro do Sul, 4865 with ID at 1055. (DeGennaro, NY) Radio Difusora Roraima, Boa Vista, 4875 at 1058. (DeGennaro, NY) Radio Brazil Central, Goiania, 4985 at 0317 and 11815 at 0534. (Brossell, WI) 4985 at 0926 and 11815 at 0340. (DeGennaro, NY) Radio Trans Mundial, Santa Maria, 11735 at 1054. (DeGennaro, NY) Heard with pops in both PP and EE at 1848. (Wood, TN) 1054. (DeGennaro, NY) Radio Educacao Rural, Campo Grande, 4754 at 0854. (DeGennaro, NY) Radio Tupi, Curitiba, 6060 with religious message at 2210. (DeGennaro, NY) Radio Cancao Nova, Cachoiera Paulista, 4825 with religious message at 0902 and 9675 at 2305. (DeGennaro, NY) 4825 at 0038 with futbol and occasional jingle IDs. (D'Angelo, PA) Radio Rural, Santarem, 4765 at 0857. (DeGennaro, NY) Radio Misssoes da Amazonia, Obidas, 4865 with ID at 1107. (DeGennaro, NY) Radio Educadora, Braganca, 4825 with ID at 0910. (DeGennaro, NY) Radio Aparecida, Aparecida, 5035 with religious programming at 0337, 6135 at 2235 and 9630 at 2322. (DeGennaro, NY) Radio Clube do Para, Belem, 4885 with music and talk to 0145. (Barton, NM) 0449 with PP songs. (Brossell, WI) 0914 with talk on family values. (DeGennaro, NY) Radio Gaucha, Porto Alegre, 11915 with discussion at 2250. (DeGennaro, NY) Radio Cultura Sao Paulo, 9615 at 2214 with music from the 1930s and '40s. (DeGennaro, NY) Radio Marumby, Florinapolis, 9665 with religious talk at 2310 and 11749.8 at 2322. (DeGennaro, NY) Radio Educacao Rural, Tefe, 4925 with time checks, local anmts at 1048. (DeGennaro, NY) Radio Difusora, Londrina, 4815 with music, ads and anmts at 0036. (DeGennaro, NY) Radio Guaruja Paulista, Presidente Prudente, 5045 with music, anmts, ID and frequency/schedule at 0100. (DeGennaro, NY) Radio Bandeirantes, Sao Paulo, 9645 with local news and ads at 0415. (DeGennaro, NY)]

In Times Past...

And now for some nostalgia. We'll give you a blast from the past here each month, perhaps a logging or a station tidbit from the *Pop'Comm* shortwave history book. Here's one to remember:

COOK ISLANDS—Radio Cook Islands, 11760 at 0602 July 17, 1989 with a special DX test broadcast in EE, running just 1 kW. The Voice of America, normally here at this hour, stood down so DXers could have a shot at logging this rare one. (Dexter-WI)

Here's the QSL being issued for the hurricane coverage provided by the United Radio Broadcasters of New Orleans and relayed on shortwave over WHRI. (Thanks D'Angelo)

BURKINA FASO—Radio Burkina, 5030 with 0600 sign on with anthem. Afro-pops at 0605. Sign on time seems to from vary day to day. (Alexander, PA) 2138 with woman annor, music. (DeGennaro, NY)

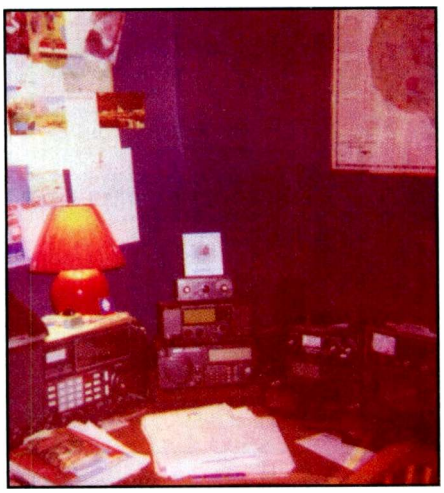
BULGARIA—Radio Bulgaria, 5800 in GG to Europe at 2045, 5900 in BB to Europe at 2055, 7400 to ECNA at 0051, 7500 in SS to S. America at 0058, 9400 in SS to Central America at 0232, 9500 in SS to S. America at 0240, 9755 to ECNA at 0338, 11600 closing RR to Europe at 1158, 11700 in GG to W. Europe at 1141 and 15700 in EE to W. Europe at 1229. (DeGennaro, NY) 5800 at 2214. (Gay, KY) 5800//7500 with ID at 2257. (Burrow, WA) 7400 with "Arts and Artists" at 0025. (Wood, TN) 9400 in RR at 1843. (Brossell, WI) 15700 in SS at 1200. (Weronka, NC) Radio Varna, 7600 with pops and BB talks at 0325 to 0354 close. UTC Mondays only. (Alexander, PA)

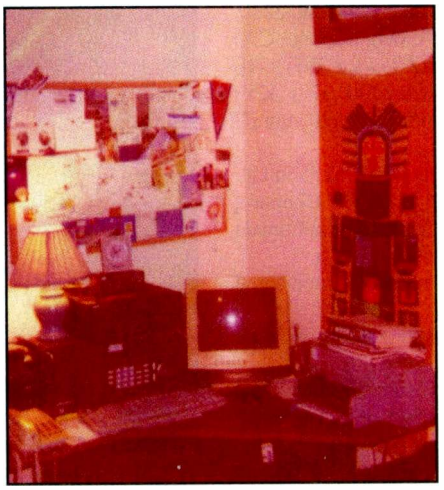
CANADA—RCI, 5850 via Sweden with "Canada Today" at 2129. Also 11865 in AA to North Africa at 2018 and 11990 in PP to S. America at 2248. (DeGennaro, NY) 9405-spur with programming from 9515-RCI and CBC-9625 mixing at 1500. CBC announced their frequency as "96 point 25 kilohertz." (Alexander, PA) 9515 with an interview at 1520. (Maxant, WV) 11990 at 2225. (Gay, KY) CFRX relay CFRB, Toronto, 6070 at 1104. (DeGennaro, NY) Weather and traffic at 1245. (Barton, AZ) 1500 with Bill Jaro Show. (Maxant, WV) CKZN, St. John's, 6160 with Canadian news and weather heard at 1003. (DeGennaro, NY)

CHAD—Radiodiffusion Nationale Tchadienne, 6165 in FF with news and ID at 2112. (Paszkiewicz, WI) 2156 with highlife, ID and FF news at 2200. Closing at 2230. (D'Angelo, PA)

CHILE—Voz Cristiana, 6070 in SS at 0955, 11745 in PP at 0036 and 17680 in SS at 2032. (DeGennaro, NY) 17680 in SS at 1840. (Charlton, ON)

CHINA—China Radio Int., 6176 via Albania, at 2212, 7180-Jinhua in Italian at 2059, 7190-Beijing in JJ to Japan at 1300, 7200-Urumqi in FF at 2224, 7210 via Albania in SS at 2314, 7250-Urumqai in SS to Europe at 2320, 9410-Kashi in PP at 2235, 9440-Kunming in local dialect at 1135, 9470-Xi'an in RR at 0035, 9570 via Albania to NA at 0052, 9590-Kashi in SS to S. America at 1325, 9600-Kashi to Europe at 2120, 9640-Kashi in SS at 2019, 9695-Kashi in AA at 2102, 9710-Kashi in SS at 0250, 9745 via Bonaire in SS at 0043, 9800-Kashi in SS at 0037, 9860-Kashi in Esperanto at 2245, 11725 via Albania in AA at 1712, 11875-Kunming in Chaozhou at 1140, 11975 via Mali in CC at 2256, 13630 via Mali to East Africa at 2125, 13665 via Albania at 1202 and 13700 via Sackville in SS at 2223. (DeGennaro, NY) 6040





Sometimes one shack is not enough. Charles Maxant operates this installation in Barboursville...and this one in Hinton, West Virginia!

via Canada with news at 2303. (Gay, KY) 9580 via Cuba at 0115. (Charlton, ON) 9440-Beijing at 1225 in CC with translation into another Asian language, 11640 via Mali at 2034 and 11965-Kashi with CC language lesson at 1655 to abrupt close at 1657. (Brossell, WI) 13630 via Mali at 2010. (Wood, TN) CPBS/CNR-Shijiazhuang, 6125 in CC at 2232, 7305-Shijiazhuang in CC at 1030 and 7 313-Xi'an in CC at 2201. (DeGennaro, NY) Xizang PBS, Lhasa (Tibet) 5240 in CC at 2138. (DeGennaro, NY) Voice of Jinling, Nanjang, 5860 in CC to Taiwan at 1146. (DeGennaro, NY) China Music Jammer, 9905 against RFA-Palau heard at 1630, //11765 against RFA, No. Marianas. (Brossell, WI)

COLOMBIA—Radio Lider, Santa Fe de Bogota, 6139.8 in SS at 2242. (DeGennaro, NY) La Voz de su Concencia, Puerto Llera, 6010 in SS at 1121. (DeGennaro, NY)

CROATIA—Voice of Croatia, 6165 in Croatian to Europe at 2020. And 7285 in EE to S. America heard at 2319. (DeGennaro, NY)

COSTA RICA—Faro del Caribe, 5054v in SS at 0250 with man mentions of El Salvador. (Taylor, WI) 0934. (DeGennaro, NY) 1130. (Barton, AZ) University Network, 9725 at 0357 with Dr. Scott on Joshua and attributes of a good minister. (Wood, TN)

CUBA—Radio Havana Cuba, 6000 at 0519 with woman in harangue about capitalism. Also 9820 with feature on Martinique at 0340. (Wood, TN) 9550 with news at 0530. (Maxant, WV) 2322. (Gay, KY) 0045 in FF. Also 11760 in FF to Europe at 2159, 11800 in PP to Brazil at 2024 and 15230 in SS at 2205. (DeGennaro, NY) Radio Rebelde, 5025 in SS at 0929, 9605 in SS at 1119 and 11655 in SS at 1143. (DeGennaro, NY)

CZECH REPUBLIC—Radio Prague, 7345 at 2240 on Catholic charities there. (Maxant, WV) 2341 with news. (Gay, KY) 2104 to Western Europe. Also 6200 in FF at 0105, 7345 at 2320, 7385 in SS via Miami at 1310, 11640 at 1151 to language change at 1156, 11665 via Ascension in SS at 0022, 15710 in Czech at 1638 and 21745 to NA at 1418. (DeGennaro, NY) 7345 with news items at 2330. (Maxant, WV) 0104 with news. (Charlton, ON) 0103 with news, ID at 0104. (Wood, TN) 11665 via Ascension from 0000 sign on. (D'Angelo, PA)

CYPRUS—BBC Relay, 9915 in AA at 1837. (Brossell, WI) 21660 in EE to East Africa at 1426. (DeGennaro, NY) Cyprus Broadcasting Corp., 7210 with discussion in Greek at 2230. (Paszkiewicz, WI) 7210 in Greek to Europe at 2222 and 9760 same at 2243. (DeGennaro, NY)

DIEGO GARCIA—AFN/AFRTS, 4319u monitored at 0027 with football game coverage. (DeGennaro, NY) 2344 with "Marketplace" and AFN ID heard at 0000. Poor in noise. (Brossell, WI)

DJIBOUTI—Radio Djibouti, 4780 with Koran recitations at 0303. Complete deterioration after about 15 minutes. (Brossell, WI) 0403 with Koran. (DeGennaro, NY)

ECUADOR—HCJB, 6050 in SS at 2205, 6125 in QQ at 0959, 9745 in QQ at 2248, 11690 in QQ at 1141, 11920 in PP at 2300, 12000 in SS at 2139, 12025 via Canada in AA at 2130 and 12040 in GG at 2243. (DeGennaro, NY) 6050 at 1118. (Jeffery, NY) 9745 at 0355 in SS. (Wood, TN) 12005 at 1115. (Maxant, WV) Radio Quito, 4919 in SS with ID at 1111. (DeGennaro, NY) Radio Chaskis, Otavalo, 4909.3 in QQ at 0918. (DeGennaro, NY) La Voz del Napo Tena, 3279 in SS at 0842. (DeGennaro, NY)

EGYPT—Radio Cairo/Egyptian Radio, 7270 in SS to NA at 0155, into EE at 0200. Also 9990 in FF to Europe at 2019 and 12050 in AA at 1916. (DeGennaro, NY) 9990 in FF at 2035 and 12050 in AA at 1701. (Brossell, WI) 9990 at 2230. (Maxant, WV) 11655 in AA at 2208 and 12050 in AA at 2021. (Charlton, ON) 15155 with closedown procedure at 1430 and off at 1435. (Linonis, PA)

ENGLAND—BBC, 5875-Rampisham in AA at 2106, 6195 via French Guiana at 1028, 7135 via Singapore in Indonesian at 1100, 9510 via Thailand in Indonesian at 1127, 0740 via Singapore at 1113, 11855 via French Guiana at 1133, 15420 via South Africa at 1653, 15425-Rampisham in FF at 1217 and 17585-Skelton in AA and EE at 1449. (DeGennaro, NY) 5975 at 2350, 11885 at 1105 and 12095 at 1705. (Maxant, WV) 5975 at 2228. (Gay, KY) 6110 via French Guiana in SS at 0352. (MacKenzie, CA) 12095 via Ascension at 1909, 15400 at 2135 and 17830 at 1848. (Charlton, ON)

EQUATORIAL GUINEA—Radio Nacional, Bata, 5005 heard in SS at 2153. (DeGennaro, NY) 2200–2255 close. Also at 0505 abrupt sign on. (Alexander, PA) 2250. (Paszkiewicz, WI) 2255–2300 close. (D'Angelo, PA) 0541 with highlife vocals. (D'Angelo, PA)

ETHIOPIA—Radio Ethiopia, 7110 in unid language (*Amharic?—gld*) at 0404. (DeGennaro, NY) 9560.9 at 1627 with pops, clear ID, 7:30 p.m. time check and into news. Slight TX drift. (Burrow, WA) Radio Fana, 6210 in Amharic at 0310 and 9640 at 0412. (DeGennaro, NY)

FRANCE—Radio France Int., 6045 with EE ID at 0500 and into FF. (Brossell, WI) 7160 via South Africa in FF at 2051, 11615 to Mideast at 1703, 11705 in FF at 2149, 11965 in PP at 2009. Also 15300 in FF at 1158, 17620 in FF at 1616, 21580 in FF at 1434 and 21685 in FF at 1423. (DeGennaro, NY) 9865 via Canada with simulcast of Paris news station. (Weronka, NC) 15160 in EE closing at 1700 and 11995 in FF heard at 1907. (Charlton, ON)

FRENCH GUIANA—RFI Relay, 11670 heard in FF at 1147 and 13640 in FF at 1157. (DeGennaro, NY)

GABON—Africa Number One, 9580 in FF with an interview at 2107, 15475 in FF at 1649 and 17630 in FF at 1444. (DeGennaro, NY) 9580 in FF at 2155. (Taylor, WI) 15475 in FF at 1725. (Charlton, ON) 1820. (Linonis, WI) 1825. (Wood, TN) Radiodiffusion TV Gabonaise, 4777 at 0458 sign on with FF anmts, news at 0500 and "Radio Gabon" IDs. (Alexander, PA) 0528. (D'Angelo, PA) Radio France Int. Relay, 4890 with FF talks, music at 0412. (D'Angelo, PA) 0450. (Brossell, WI)

GERMANY—Deutsche Welle, 5895 via Novosibirsk, Russia in FF to Asia at 2052, 5905 via Bonaire in GG to Central America at 1116, 7400 via Irkutsk, Russia, in GG to Asia at 1026. Also 7430 via Armivir, Russia, in GG to Asia at 0025, 9495 via Sines, Portugal, in AA to North Africa at 2128, 9735-Wertachtal in EE at 2057, 9795 via Sri Lanka at 1629, 11890 via Sri Lanka in AA to North Africa at 2003. And 13780 via Rwanda in AA to North Africa at 2120, 15320-Weretachtal in GG to ECNA at 1201, 15410 via Rwanda in FF to Africa at 1213 and 17620-Wertachtal in FF to Africa at 1619. (DeGennaro, NY) 6100 via Bonaire in GG at 0354, //9875. (MacKenzie, CA) 6135 in GG at 0109, 11690 at 2130, and 12015 in unid language at 1856. (Charlton, ON) 12035 in GG at 1330. (Weronka, NC) Deutschland Rundfunk, Berlin, 6190 in GG at 2255. (DeGennaro, NY) Deutschland Radio, Berlin, 6005 in GG at 2117. (DeGennaro, NY) Deutsche Telekom, 7160 with test transmis-

sion at 0233 (one day only) with repeated anmts in several languages and giving a Munich address. Went off at 0300 in mid-EE anmt. (Taylor, WI)

GHANA—Ghana Broadcasting Corp. 4915 with news by man and woman at 2203. (DeGennaro, NY) 2217 with discussion, riding over one of the Brazilians. (Paszkiewicz, WI)

GREECE—Voice of Greece, 5865 to West Europe at 0342, 7430 with US rock/rap at 1955, 7475 to Europe and ECNA at 0055, 9420 to Europe at 2141. Also 9375 to Middle East at 2150, 15485 via Delano at 2017, 15630 to Europe and Atlantic at 1225 and 17565 via Greenville to South America at 2012. (DeGennaro, NY) 12105 at 1503. (Yohnicki, ON) 1509. (Charlton, ON) (*Note: All transmissions were in Greek.—gld*) RS Makedonias, 7450 with Greek to Europe at 2225, also 9935 heard at 1118. (DeGennaro, NY)

GUAM—Adventist World Radio, on 17515 with talk on U..S. relations with Indonesia at 1420. (Linonis, PA)

GUATEMALA—Radio Cultural Coatan, San Sebastian, 4780 heard in SS at 1136. (DeGennaro, NY) Radio Verdad, Chiquimula, 5052.5 at 0340 with choral vocals, fire and brimstone EE preacher. Closing anmts in SS and off at 0401. (D'Angelo, PA) 0533 with EE anncr between inspirational songs, IDs as Radio Truth, prayers, address, request for reports. Off at 0600. (Wood, TN) Radio Buenas Nuevas, San Sebastian, 4779.8 in SS at 1039. (DeGennaro, NY)

GUINEA—RTV Guineenne, 7125 in FF at 2308. (DeGennaro, NY)

GUYANA—Voice of Guyana, 3291 relaying BBC news at 0500. (Maxant, WV) 0504 relaying BBC. (Taylor, WI) 0700 with news, several "GBC" IDs. (Burrow, WA) 0845 in EE with music, ID at 0845. (DeGennaro, NY)

HAWAII—WWVH, 10000 with EE time anmts by a woman at 1929. (Wood, TN) KWHR, 11555 with talks in an Asian language at1247. (Brossell, WI) AFN/AFRTS, Pearl Harbor, 6350u with program computers heard at 1113. (DeGennaro, NY)

HONDURAS—La Voz Evangelica, Tegucigalpa, 4819 in SS at 1042. (DeGennaro, NY) Radio Luz y Vida, San Luis, 3249.6 at 0235 in SS with preacher, ID, another preacher. (Taylor, WI) 0340 in SS. (DeGennaro, NY) Radio Misiones Int., Tegucigalpa, 3340 with religious programming in SS at 0348. (DeGennaro, NY)

HUNGARY—Radio Budapest, 6025 with EE to Europe at 2200, 7285 with SS to W. Europe at 2245, 9580 in HH to S. America at 2343, 9820 in HH to NA at 0110, 9825 in HH to NA at 2235 and 9855 in HH to Europe at 0325. (DeGennaro, NY) 9775 at 0340 with "Hungary Today." (Maxant, WV) 9825 in HH to 2258 sign off. (MacKenzie, CA)

ICELAND—AFN/AFRTS, Grindavik, 7590 with excerpts from "Travel Radio International" at 1939. (DeGennaro, NY)

INDIA—All India Radio-Delhi, 4860 in HH at 1228. (D'Angelo, PA) 1230. Also 5010-Thiruvananthapuram in presumed HH at 1322, 10330-Bangaluru (Bangalore) in HH at 1635 and 11620 in HH at 1250. (Brossell, WI) 5010-Thiruvananthapuram, at 1308 with talks and short Indian musical bits, ID at top of hour, unsure of language. Also 7250-Panazji (Goa) in Nepalese at 0142. (Taylor, WI) 6165-Delhi at 1228 sign on, covering Vietnam. Listed in Sindhi. (D'Angelo, PA) 1400 mixing with co-channel CPBS. (Barton, AZ) 9445 in EE at 2200 and 10330 in Farsi at 1510. (Maxant, WV) 11620 in EE at 2121. (Charlton, ON) 4760-Leh (t) at 1145 in HH, 5010-Thiruvananthapuram in Tamil at 0138, 7410-Delhi in EE to Europe at 2214, 9425-Bangaluru in Hindi at 2155, 9445-Bangaluru in EE to Europe at 2137, 9705-Panji (Goa) in EE to Asia at 2251, 9835-Delhi in HH to Asia at 0250, 10330-Bangaluru in Hindi to Asia at 1140. Also 11620-Delhi in Hindi to Asia at 0347 and 11715-Panaji (Goa) in EE to Australasia at 2155. (DeGennaro, NY)

INDONESIA—RRI-Pontianak (Kalimantan), 3976.1 in II at 1250. (Barton, AZ) RRI-Serui (Papua) 4605 with II pops and man anncr in II at 1154 to SCI at 1159 and Jakarta news. (D'Angelo, PA)

IRAN—VOIRI, 6010 with EE to Europe at 1958, 6120 with EE to ECNA at 0144, 7130 with SS to Europe at 2043, 7235 in Bosnian to SE Europe at 2217, 7320 in EE to Europe at 2014, 7350 in SS to W. Europe at 2120, 9740 in Albanian at 2052, 9905 in SS to S. America at 0202 and 15545 in AA to Mideast at 1222. (DeGennaro, NY) 6120 with "Voice of Justice" program at 0145. (Maxant, WV) 7330//9940 in EE at 1558. (Burrow, WA) 9935 inn AA at 1840. (Brossell, WI) 21520 in Farsi on European Union at 1415. (Linonis, PA)

ISRAEL—Kol Israel, 7545 at 0103 with music, long discourse in HH, ID at TOH. (Wood, TN) 2215 excellent in HH. Also 6280 in EE at 0435. (Maxant, WV) 7545 in HH to W. Europe and ECNA at 0103, 11590 in EE at 2025, 17535 in HH to Europe and N. America at 1455. (DeGennaro, NY) 9345//11590 with news and interviews, time pips at 1845 and into another service. (Burrow, WA) 6280 with local pops, EE ID, news at 0430 and into FF at 0445. (Alexander, PA) 11590 at 2000. (Brossell, WI) 11590 in EE at 2010. (Charlton, ON) 17535 in HH & EE at 1430. (Linonis, PA) Galei Zahal, 6973 at 0048 with electronic dance sounds and two man in HH. (Wood, TN) 0148 in HH with music, women conversing. Also 15785 in HH at 1500. (DeGennaro, NY)

ITALY—RAI Int., 6010 in AA to N. Africa at 2147, 7175 in PP at 2055, 9840 in II to S. America at 0244, 11800 in II to N. America at 2311, 11875 in II to E. Africa at 1725 and 15520 at 1710 in II to N. America. (DeGennaro, NY) 6120 in II at 0434. (Jeffery, NY) 9760 at 1933 with IS, ID and into news. (Burrow, WA) 11830 in II at 1850. (Wood, TN) 11830 in II at 1858 and off at 1905. (Charlton, ON) IRRS-Milan, 5775 at 2059 in EE to N. Africa and Middle East with author. Interview. (DeGennaro, NY)

JAPAN—Radio Japan/NHK, 6115 via UK in JJ to W. Europe at 2216, 7115 via UAE in JJ at 2300, 9530 via French Guiana in SS to S. America at 1004, 9660 via UK in GG to Europe at 1126, 11710 via UK in RR to Europe at 1147, 11935 via Bonaire in JJ to S. America at 0230 and 15355 via Gabon in EE to S. Africa at 1701. (DeGennaro, NY) 6120 in EE at 1000. (Weronka, NC) 6135 via Ascension in Swahili at 0350. (MacKenzie, CA) 6145 via Canada at 0009. (Gay, KY) 9535 at 1705 with news and "Japan Today." Also 11935 at 0115 with "Asia Watch." (Maxant, WV) 15355 in EE at 1703. (Charlton, ON)

JORDAN—Radio Jordan, 11690 heard at 1510 with rap and inviting listener letters. (Charlton, ON) 1530 with classical music. (Maxant, WV) 1558 with pops, Mideast news at 1600. (Burrow, WA) 1620 with ID and music. (DeGennaro, NY) 1641 with pops and EE anmts but annoying RTTY QRM. (Brossell, WI) 1645 with pops. Using upper sideband helps to avoid the QRM here. (Barton, AZ)

KAZAKHISTAN (p) Overcomer Ministry (Bro. Stair), 11510 at 1340 to abrupt sign off at 1400 with signs of the end times and ultimate destruction of the U.S. Fluttery, noisy signal. No ID given. (Brossell, WI)

KUWAIT—Radio Kuwait, 9850 in AA at 2045 and 11990 in AA at 1636. (DeGennaro, NY) 9855 in AA at 2259. (MacKenzie, CA) 9880 in AA at 1834 and 11990 in AA at 1658. (Brossell, WI) 11990 with Koran heard at 1529. (Charlton, ON)

LATVIA—Radio Six via Latvia, 9290 at 1336 with male anncr and rock. (Taylor, WI)

LIBERIA—ELWA, 4760 with religious programming heard at 2218. (DeGennaro, NY) Star Radio, 11965 via Ascension talking about infections at 2136. (Charlton, ON)

LIBYA—Radio Jamahiriya, 7320 via France in AA at 2327. (DeGennaro, NY) 15615 via France in AA at 1740. (Charlton, ON)

LITHUANIA—Radio Vilnius, 7325 with LL to ECNA heard at 2324. (DeGennaro, NY)

MADAGASCAR—Family Radio, on 11805 via Talata in local dialect monitored at 1242. (Brossell, WI)

MALAYSIA—Radio Malaysia, Kuching (Sarawak), 7270 in unid language heard at 1215. (DeGennaro, NY)

MAURITANIA—Radio Mauritanie, 4845 in AA heard at 0210. (Brossell, WI) 2210 with two men in discussion. (DeGennaro, NY)

MEXICO—Radio Educacion, Mexico City, 6180 in SS heard at 0042 with ballads and Mexican folk music. (Wood, TN) 1131 with classical music. (DeGennaro, NY)

MOLDOVA—Voice of Russia relay, 7125 in RR to ECNA heard at 0144. Also 7180 in SS to Americas at 0111. (DeGennaro, NY)

MOROCCO—RTV Marocaine, 5980 in AA to North Africa and Mideast at 0248, 7135 in AA to Europe at 2310 and 15345 in AA to N. Africa and Middle East at 1923. (DeGennaro, NY) 15345 in AA at 1739. (Yohnicki, ON) 1815. (Charlton, ON) Voice of America Relay, 6045 with "Daybreak

Africa" at 0321. (Jeffery, NY) 15240 at 1729. (Yohnicki, ON) Radio Medi Un, Nador, 9575 in AA to Europe and N. Africa at 2346. (DeGennaro, NY)

NETHERLANDS—Radio Nederland, 5975, in DD with anmts and music to 0500 close. (Maxant, WV) 6015 in DD to Europe at 2151, 7285 via Madagascar in Indonesian at 2206, 9795 via Singapore in Indonesian at 1211, 9895 via Madagascar in SS to C. America at 0351 and 13700 in DD to Europe at 1206. (DeGennaro, NY) 11655 at 1958 with "Newsline." (Charlton, ON)

NETHERLANDS ANTILLES—Radio Nederland Bonaire Relay, 6165 at 0513 on sleeping disorders, //15315. (Wood, TN) 0115 on Venezuelan expropriation. (Maxant, WV) EE talk at 0022. (Gay, KY) 0345 with SS radio drama. (MacKenzie, CA) 15525 at 1925 with "Dutch Horizons." Also 17810 at 1922 on AIDS in Kenya. (Charlton, WV) 17810 on West Africa heard at 2037. (DeGennaro, NY)

NEW ZEALAND—Radio New Zealand Int. 9520 monitored at 1238 leaving frequency and advising listeners to retune to 6095. Then bird IS and off. Also 11810 with sports roundup from Radio National at 0535. (Brossell, WI) 9870 at 1608 with coastal weather report, ID and into Maori recordings. (Burrow, WA) 9885 to the Pacific at 0952. (DeGennaro, NY) 15720 with IS at 1800, opening and into news. (Barton, AZ)

NIGERIA—Voice of Nigeria, 7255 with news heard at 0513. (Brossell, WI) 2059 sign on and into FF programming. (Alexander, PA) 2203 in unid language with presumed news. (DeGennaro, NY) 2212 with long talk in local language, time pips at 2300. (D'Angelo, PA) 1045 with frequencies and time checks. (Maxant, WV) 15120 at 1630 in AA, Koran at 1633. (Alexander, PA) 1812 with interview in EE. (Charlton, ON) 1832 with features on Nigerian constitution. (Wood, TN) 1956 with music to 2000 ID, drums and news. (D'Angelo, PA) Radio Nigeria, Kaduna, 4770 with highlife music at 0446. (Brossell, WI) 0557 with Afro-pops, ID and news at 0600. (Alexander, PA)

NORTH KOREA—Voice of Korea, 6285 at 1230 with woman singing praises of the great leader. (Barton, NM) 9335 at 1300 with ID, anthem and news. (Brossell, WI) 9990 at 1640 with Kim Jung Il and news. (Burrow, WA)

OPPOSITION—Radio Republica, 5965 co-channel with RHC at 0200 with pgms in SS and Cuban bubble jammer underneath. Also 7110 in SS at 0200, also with bubble jammer. (Taylor, WI) 6010 at 0000 opening suddenly after shifting from 6135 with SS phone interview, full ID at 0029. Also 9955 over WRMI at 0428 with SS talk, ID, Cuban vocals, more phone talk. (D'Angelo, PA) 6135 in SS to Cuba at 2357, off at 2359. (*9955 via Miami is the only known site at present.—gld*) Voices From the Diaspora, (p) 9405 via Julich, at 2000 sign on with instl music, EE talk concerning Gambia. Poor, muddy audio and adjacent channel splatter. Active only on Saturdays. (Alexander, PA) Echo of Hope (p) 6348 at 1230 in KK. (Barton, AZ) Denge (Voice of) Mesopotamia, 11530 via Moldova at 1147 in Kurdish with ID at 1151. (DeGennaro, NY) 1330. (Linonis, PA) 1430 in Kurdish to 1500 close. (Taylor, WI) RFE/RL, 15120 via Thailand at 1354 with open carrier to multi-lingual ID including "You are tuned to Radio Free Europe/Radio Liberty." And into news in listed Kazakh. (D'Angelo, PA) Radio Free Asia, via No. Marianas 15430 in CC. China Music jammer in the background, //15550. Also 15565-Vladivostok in CC at 2347. (MacKenzie, CA) Radio Nile, 12060 via Madagascar at 0400 sign on with local music, ID, frequencies, music, Radio Nile jingles, EE/vern talk and radio drama. //15320. (Alexander, PA) Radio Rhino Int., 17870 via Germany in FF at 1516. (Charlton, ON) Radio Free Southern Cameroon, 12130 via Russia at 1800 sign on with EE ID, anthem and talk about Southern Cameroon. Off at 1900, Sundays only. (Alexander, PA) Sudan Radio Service, 7120 via Wooferton at 0300 opening, PSA on avoiding AIDS and into news. (D'Angelo, PA) Radio Marti, 15330 at 1800 in SS about Bolivian elections. (Linonis, PA) Radio Farda, 9585 via Morocco in Farsi to Iran at 0315 and 15410-Wooferton heard at 1657. (DeGennaro, NY)

OMAN—Radio Sultanate of Oman, 15140 with U.S. oldies at 1410, feature on an archeological dig and more US oldies. (Alexander, PA)

PAKISTAN—Radio Pakistan, 11570 at 1605 with woman and possible news. Off at 1614. (Burrow, WA)

PAPUA NEW GUINEA—NBC, Port Moresby, 4890 at 0959 with regional news, "NBC" ID at 1010 and into Pacific island music. (Burrow, WA) 1327 with pops, ID heard at 1327 "National Radio, the voice of Papua New Guinea." (Barton, NM)

PERU—Radio La Hora, Cusco, 4855.8 with talk at 1051. (DeGennaro, NY) Radio Altura, Cerro de Pasco, 5014 in SS with ID at 1101. (DeGennaro, NY) Radio Tarma, Tarma, 4775 at 1034 with non-stop commercials and local anmts. (DeGennaro, NY) Radio Huanta 2000, Huanta, 4746 in SS and QQ at 1052. (DeGennaro, NY) Radio Difusora, Huancabamba, 6536 at 0026 with lively SS talk, ID and TC and program of OA music. (D'Angelo, PA)

PHILIPPINES—Radio Veritas Asia, 11820 in II to SE Asia heard at 2307. (DeGennaro, NY) FEBC, 9405 in CC to SEA at 1145, 9430 in CC to SEA at 11478 and 9435 in Indonesian to SEA at 2242. (DeGennaro, NY) 9405 in CC at 1245 and 9920 with EE ID at 1258. (Brossell, WI) 9435 with EE to Indonesian at 2303. (Taylor, WI) 9920 in possible Tagalog at 1340. (Linonis, PA) 15465 in CC at 2340. (MacKenzie, CA) VOA Relay, 15150 in EE at 2305. 15205 in II at 2310, //11805. Also 15290 at 2318, //15185 and 17740. (MacKenzie, CA)

PIRATES—Voice of the Islands, (t) 13887.8v with oldies pops at 1550. (Alexander, PA) Ground Zero Radio, 6925.4 at 2220 sign on with air raid sirens and the "Duck and Cover" film audio, various Johnny Cash tunes. Said to be a test and gave gzrsw@yahoo.com and Elkhorn address. (Zeller, OH) Alfa Lima Int. (Euro) 15073.8 at 1425 with pops and IDs, listener phone calls. Also acknowledged several U.S. listeners. (Alexander, PA) Mystery Radio (Euro) 6220 at 0257 with instls, Euro-pops, usual canned IDs. (Alexander, PA) KIPM—Has been very active lately. Summarizing frequencies and reception times: 6925u at 0017, 1644, 1916, and 2226 with usual host Alan Maxwell and far out dramas. Elkhorn contact address. (Zeller, OH) 1225. (Hassig, IL) 6955 at 0023. (Balint, OH) Radio Free Speech, 6925u at 1624 with "Bill O. Rights" including a parody of the National Anthem. (Zeller, OH) Radio Free Whatever, 6925u at 0314 with lengthy pgm of rock and ID as "Radio Free Whatever from the right coast." IDs. Off at 0436. No address given. (Zeller, OH) Undercover Radio, 3480u at 0200 with e-mail and Merlin, Ontario, addresses, recap of stories from the past year. (Alexander, PA) 6925u at 2016. (Gay, KY) 2330 with a discussion of previous broadcasts. Address given as undercoveradio@mail for reports. (Zeller, OH) WBNY—Radio Bunny, 6925u at 1635 with Commander Bunny and Pink Floyd selections. Hard to copy in his chipmunk-style voice. (Zeller, OH) 6955 at 0037. (Balint, OH) WMPR—6925u at 0110 and 2220 with 70s

This Month's Book Winner

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

Our book winner this month is **Ciro DeGennaro** of Feura Bush, NY. Ciro receives a copy of *The Shortwave Listening Guidebook* by Harry Helms, from our good friends at Universal Radio, 6830 Americana Parkway, Reynoldsburg OH 43068. You can write the company at that address to request a copy of its super catalog, or e-mail dx@universal-radio.com, or even give them a jingle at 614-866-4267.

pop, punk rock. Distorted audio. Also 6955 with over modulated dance music. (Hassig, IL) 6955.2 at 1740, and off at 1743. (Zeller, OH) SP (Sierra Papa), 6925u at 1701 with the host wanting ham-style pirate QSOs on a couple of frequencies he announced. No address given. Also noted other dates at 2135, 2216, 2236, 2244 and 2319. (Zeller, OH) 2235 announcing 3475 l and 6670 lsb for 2-way pirate QSOs. (Hassig, IL) The Crystal Ship, 3319.8 at 0400 with story, IDs, Belfast address and e-mail address. f/by pop-rock. (Alexander, PA) 3479v at 0157 with several IDs "You are tuned to The Crystal Ship Shortwave, the official voice of the blue states republic. And hits from the 50s–70s. (Wood, TN) WHYP, 6925u at 2208 with sign on with CW ID, anncd as the WHYP propagation beacon, long program of pirate song parodies, "Grandma Got Run Over by George Zeller" (*what a thought!—gld*). (Zeller, OH) KOF, 6925u at 2004 with anncr. hosting pgm of foreign music, most of it Arabic in nature, anncr was critical of U.S. policy in the Middle East. Gave unaeosos@yahoo.com for reports, which I doubt is valid. Off at 2040. (Zeller, OH) Take It Easy Radio, 6925u at 2348 to 0115 close. Played various Christmas tunes and their "Take It easy" signature tune by the Eagles (Zeller, OH) 0010 with tunes by Stan Freeberg and Chipmunks. (Hassig, IL) Captain Morgan, 6924.8v at 0107 with modern jazz, dance music, "Mission Impossible" theme. Muffled audio. (Hassig, IL) 6924.8v with various parodies and ID as "You're in the pirate zone with Captain Morgan." Off at 2334. (Zeller, OH) Melvin Malfunction, 6925u at 1557 sign on with instl music, rock "Welcome to the Machine" but mainly talk about Melvin Malfunction. Address: melvinmalfunction@yahoo.com. (Zeller, OH) WICA—Voodoo Radio, 6925u at 0309 with music and comedy sketches. Clear ID at 033. (Taylor, WI) KRMI—6925u at 0400 with novelty tunes. (Hassig, IL) 2157 with nice rendition of Lincolnshire Poacher number station IS, then into novelty songs. (Zeller, OH) Old Turkey Radio, 6925u at 0320 with normal fare of parodies, and an old geezer anncr. (Zeller, OH) Pirate Mac Shortwave, 6950 at 2341 with fancy guitar, calls for reports to machshortwave@yahoo.com. (Wood, TN)

POLAND—Radio Polonia, 6000 in RR at 2005 with "Goverit Radio Polonia" at 2005. (Brossell, WI) 9525 at 1258 sign on with ID, EE at 1300 with sign on anmts and news. Poor and no sign of //11850. (D'Angelo, PA)

PORTUGAL—RDP Int., 0715 at 0211 to ECNA, 9815 to Europe at 1107, 1875 to Europe at 1129, 11960 to Europe at 1633, 15540 to ECNA at 2105, 15555 to Brazil at 2102, 17680 in PP to Africa at 1945, 21685 in PP to Africa and S. America at 1550 and 21830 to Africa at 1543, all in PP. (DeGennaro, NY) 17680 in PP at 2311. (Charlton, ON)

ROMANIA—Radio Romania Int., 6115 at 0424 with requirements for foreign nationals to live in Romania, art museum in Bucharest and several IDs. (Wood, TN) 7145 in EE to W. Europe at 2145, 7260 in FF to W. Europe at 2108, 9525 in SS to Central & S. America at 0039, 9610 in EE to ECNA at 2327, 9640 in EE to W. Europe at 2318, 9715 in FF to W. Europe at 2107 and 11940 in EE to ECNA at 2144. (DeGennaro, NY)

RUSSIA—Voice of Russia, 5945-Armavir in SS to S. America at 0234, 5975 via Julich, in RR to Mideast at 2121, 6195-St. Petersburg in SS to S. America at 0132, 7150-Armavir in RR to ECNA at 0312, 7240 via Ukraine in RR to NA at 0306, 7250 via Armenia in EE to ECNA at 0219, 7260-Moscow in RR to Central and S. America at 0215, 7350 via Vatican in RR to ECNA at 0211 and 7390-Samara in SS to S. America at 0134. (DeGennaro, NY) 7350 with program of opera at 0423. //7150 and 7180. (Wood, TN) 9875-Samara in RR at 1243, 9900-Irkutsk in GG at 1234 and 11510 via Armenia with EE ID, news at 1815. (Brossell, WI) Radio Tikhy Okean, 5960 with long talk in RR to close at 0959. (Barton, AZ)

RWANDA—Deutsche Welle Relay, at 0555 in EE to SEA at 2350 and 9720 in Indonesian at 2227. (DeGennaro, NY) 15205 in AA at 1928 and 15275 in GG at 1935. (Jeffery, NY)

SAO TOME—VOA Relay, 7290 with "News Now" format at 0515. (Brossell, WI) 11975 at 2130. (Linonis, PA) 13735 in FF at 1950. (Wood TN)

SAUDI ARABIA—BSKSA, on 9555 in AA at 1845. (Brossell, WI) 9870 in AA at 2256. (MacKenzie, CA) AA to Europe at 2042. Also 11935 in AA at 1151 and 15380 in AA at 1209. (DeGennaro, NY)

SEYCHELLES IS—BBC Relay, 9605 in EE to W. Africa at 2249. (DeGennaro, NY)

SINGAPORE—Mediacorp Radio, 6150 at 1550 with interview. I believe this is a simulcast of local Class 95 FM. (Burrow, WA) 7170 in Tamil at 1159. (DeGennaro, NY) Radio Singapore Int., 6080 in EE to SEA at 1201. (DeGennaro, NY) BBC Relay, 9740 with World Service at 1200. (Linonis, PA)

SLOVAKIA—Radio Slovakia Int., 7230 with EE pgm for young people heard at 0109. (Charlton, ON) 0151. Also 7345 with ID at 2006 and 9440 in SS to S. America at 0236. (DeGennaro, NY)

SOUTH AFRICA—Channel Africa, 3345 with domestic EE service at 0352 and 7390 in EE to E. Africa at 0335. (DeGennaro, NY) 11875 at 0504 on U.S. Navy in Liberian waters. (Wood, TN) 15235 with news of Kenya and Uganda at 1703. (Brossell, WI) 15285 at 1746 with domestic news, ID. (Burrow, WA) 1708 in EE. (Charlton, ON) Trans World Radio via Meyerton, 7215 from 0327 with alternating IS and EE ID. Into Amharic at 0330. (D'Angelo, PA) Adventist World Radio via Meyerton, 11925 at 1800 with ID, then blocked, ID again at 1802 and into programming. (Burrow, WA) 15140 at 1922 in unid language, ID as "Radio Advantist" and off at 1926. (Jeffery, NY) 1920–1927 off without anmts. (Wood, TN) Radio Sondergrense, 3320 in Afrikaans at 0321. (DeGennaro, NY)

SOUTH KOREA—KBS World Service, 5975 monitored at 1625 with news magazine program and South Korean rap, "Let's Learn Korean." (Wood, TN) 11795 via Sackville at 1109 in SS at 1109, 9805 in Indonesian at 2233. (DeGennaro, NY)

SPAIN—Radio Exterior de Espana, 6055 with EE to NA at 0004, 7275 in SS at 2248, 9620 in SS to S. America at 2324, 9630 in SS at 2112, 9675 in SS to Europe at 0303, 12025 in FF to Mideast at 1913. Also 13720 in SS to W. Europe at 1150, 17755 in SS to Africa at 1608, 17850 via Costa Rica with futbol play by play at 2040 and 21610 in SS at 1431. (DeGennaro, NY) 9595 with IS and EE ID at 2229. (Gay, KY) 9630 in SS at 2230, // 9765 and 17850. (MacKenzie, CA) 9675 in SS at 0248. (Barton, NM) 12035 in SS at 1907. (Wood, TN) 12035 in AA at 2030 and 17850 in SS with soccer at 1943. (Charlton, ON)

SRI LANKA—SLBC, 7300 in Sinhala to South Asia at 1121. (DeGennaro, NY)

SURINAME—Radio Apinte, 4990 in DD with rap at 0222. (DeGennaro, NY)

SWAZILAND—Trans World Radio, 4775 with IS and ID at 0355. (Brossell, WI) 9500 at 1730 with IS, ID, religious music and message. (Burrow, WA)

SWEDEN—Radio Sweden, 6065 in EE at 2310. (Maxant, WV) 2213 with Swedish to Europe, 7420 in EE to E. Asia at 1107, 9485 via Bonaire in Swedish at 1152, 11550 via Madagascar to S. Asia at 1154 and 1610 in Swedish at 1154. (DeGennaro, NY) 15240 at 1330 with IS, ID, news. (Linonis, PA) IBRA Radio, 7340 via Julich in AA to N. Africa at 2009. (DeGennaro, NY)

SYRIA—Radio Damascus, 9330 heard at 2143 in EE to Australasia. (DeGennaro, NY)

TAIWAN—Radio Taiwan Int., 5950 via Florida at 0240 and 11665-Florida in GG to Europe at 2143. (DeGennaro, NY) 17760-Florida in CC heard at 1940. (Charlton, ON)

TAJIKISTAN—Voice of Russia, 11500 in Hindi at 1245. (Brossell, WI)

TANZANIA—Radio Tanzania, 5050 in Swahili at 2051. (DeGennaro, NY)

THAILAND—Radio Thailand, 6040 in Lao to SEA at 1155 and 7285 in Thai to SEA at 1038. (DeGennaro, NY) VOA Relay, 9700 in unid Asian language at 1235. (Brossell, WI)

TURKEY—Voice of Turkey, 5980 in TT to Europe at 2114, 6055 in EE to Europe at 2008, 6120 in TT to N. Africa at 2223, 7155 in FF to W. Europe at 2047, 7300 in TT to W. Europe at 0038 and 9840 in TT to N. Africa at 2232. (DeGennaro, NY) 5960 in EE at 2336. (Gay, KY) 6020 anncing times and frequencies at 0445 and 7270 going into news at 0310. (Maxant, WV) 6095 in unid Asian language at 1600. (Barton, AZ) 9785 to Europe at 1829 with piano IS, EE ID. (Brossell, WI)

TURKMEN—Turkmen Radio, 5015-Ashgabat with woman anncrs alternating in TT at 0332. (DeGennaro, NY)

TUNISIA—RT Tunisienne, 7190 in AA at 2213, 7225 in AA at 2104, 9720 in AA at 0403 and 12005 in AA at 1638. (DeGennaro, NY) 7275 in AA at 0514. (Brossell, WI) 9720

in AA at 0359. (Wood, TN) 12005 in AA at 1650. (Yohnicki, ON)

UKRAINE—Radio Ukraine Int., 5910 in EE at 0105. (Maxant, WV) UU to ECNA at 0347. (DeGennaro, NY)

UGANDA—Radio Uganda, on 4976 with woman reading news in EE at 0420. (DeGennaro, NY)

UNITED ARAB EMIRATES—Gospel for Asia, 6145 via Dhabayya, UAE. in AA or similar at 0130 to close at 0128, f/by a VT Merlin test loop until 0130. (Taylor, WI)

UNITED STATES—AFN/AFRTS, Key West, 5446.5u at 1156, 7811u at 2220 with football and 12133.5u at 2239 with talk on satellite communications. (DeGennaro, NY) 0320 with basketball and IDs as "AFN Radio." Also noted at 1412. (Wood, TN)

VATICAN CITY—Vatican Radio, 5885 to Europe in FF monitored at 2049, 7305 in PP to Brazil at 0044, 9605 in PP to Brazil at 0053, 9865 in EE to S. Asia at 0155, 11625 in FF to E. Africa at 1707 and 11910 in SS to S. America at 0224. (DeGennaro, NY) 7250 at 0511 with "World Tuesday." (Brossell, WI) 7360 on African poverty at 0315. (Maxant, WV) 11625 reading St. John at 2015 and 15570 in FF at 1737. (Charlton, ON)

VENEZUELA—Radio Nacional, 6060 in SS at 0152, 11760 in SS at 2317 and 13680 in SS at 22035. (DeGennaro, NY) (*all via Havana—gld*)

Radio Amazonas, Puerto Ayacucho, 4937.7 at 0125 with lively LA music, SS anmts, ID, phone talk. (Alexander, PA) 1102. (DeGennaro, NY)

VIETNAM—Voice of Vietnam, Xuan Mai, on 6165 with H'mong service at 1225. (D'Angelo, PA) Voice of Vietnam, 6175 via Canada to ECNA in EE to ECNA at 0108. (Charlton, ON) 0156 in unid language. (DeGennaro, NY)

YEMEN—Republic of Yemen Radio, 9779.5 in AA at 0357. (DeGennaro, NY)1947 to ID at 2000 and news in AA. News again at 2200. (D'Angelo, PA)

ZAMBIA—ZNBC/Radio Zambia, 4910.5 at 0246 with fish eagle IS, anthem, ID, Afro-pops, man annor with group singing. (Taylor, WI) 0349 with group chorals to anmts in unid language at 0352. (Brossell, WI) 0413 with phone-ins in unid language. (DeGennaro, NY) Radio Christian Voice, (t) 4965 at 1603 with news, mentions of Zambia and Christian rap. (Burrow, WA) 2157 in unid language. (DeGennaro, NY) 0147 with Christian vocals, promo anmt, jingle ID and off at 0200. (D'Angelo, PA)

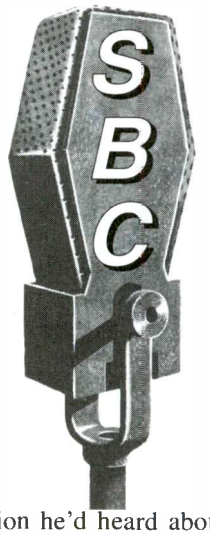
ZANZIBAR—Radio Tanzania Zanzibar, 6015 at 0324 in presumed Swahili with drum rolls, group singing, ID at 0330. (Brossell, WI) 1758 with Spice FM pick up and EE news. (D'Angelo, PA) 1803 with "Spice FM from—" to 1810. (Burrow, WA) 2009 in Swahili. (DeGennaro, NY) 2030 with various African music forms. (Paszkiewicz, WI) 2049 in Swahili. (Charlton, ON)

And once again, order is restored! A mighty roar of approval for the following who did the good thing this time: Joe Wood, Greenback, TN; William Hassig, Mt. Prospect, IL; Charles Maxant, Barboursville, NC; George Zeller, Cleveland, OH; David Weronka, Benson, NC; Rick Barton, Phoenix, AZ (and in NM); Robert Brossell, Pewaukee, WI; Michael Yohnicki, London, ON; Arnold Zeck. Bayberry, NY; Chris Gay, Louisville, KY; Stewart MacKenzie, Huntington Beach, CA; Bruce Burrow, Snoqualmie, WA; Rich D'Angelo, Wyomissing, PA; Robert Charlton, Windsor ON; Brian Alexander, Mechanicsburg, PA; Dave Balint, Mentor, OH; Sheryl Paszkiewicz, Manitowoc, WI (welcome back!); Ciro DeGennaro, Feura Bush, NY, Jack Linonis, Hermitage, PA; and Dave Jeffery, Niagara Falls, NY.

Thanks to each one of you—and, until next month, good listening! ■

by Shannon Huniwell, melodyfm@dreamscape.com

Vintage Cable Radio—Signals Along The Fence Posts



My Dad reuses Manila envelopes the way 1960s Top 40 stations recycled their number one song into "future gold" and then made it a "groovy golden oldie." So, when handed a big dog-eared mailer, plastered with cross-outs and doubled-up address stickers, I knew the postal clerk was conveying to me some interesting document from father's obscure radio history files.

Admittedly, I'd pretty much expected the mailing, as Dad had recently phoned with his two cents worth about what he predicted would make "another fascinating exposé on eclectic electronic social studies." In other words, and in this case, he wanted me to write-up some information he'd heard about a strange series of down-home cable companies that, during the Great Depression, provided pennies-a-month radio sound to thousands of country folk in South Carolina.

But Didn't The Earliest Cable Radio Debut In The 1970s?

That's what I always thought—*if* I ever thought about what seemed to me to be the very outer fringes of radio trivia. I figured cable radio to be an obscure byproduct of cable TV's scrambled pay channels that hid at least a hundred digits past HBO. And even then, one needed some extra black box connection to hear the seemingly encrypted audio!

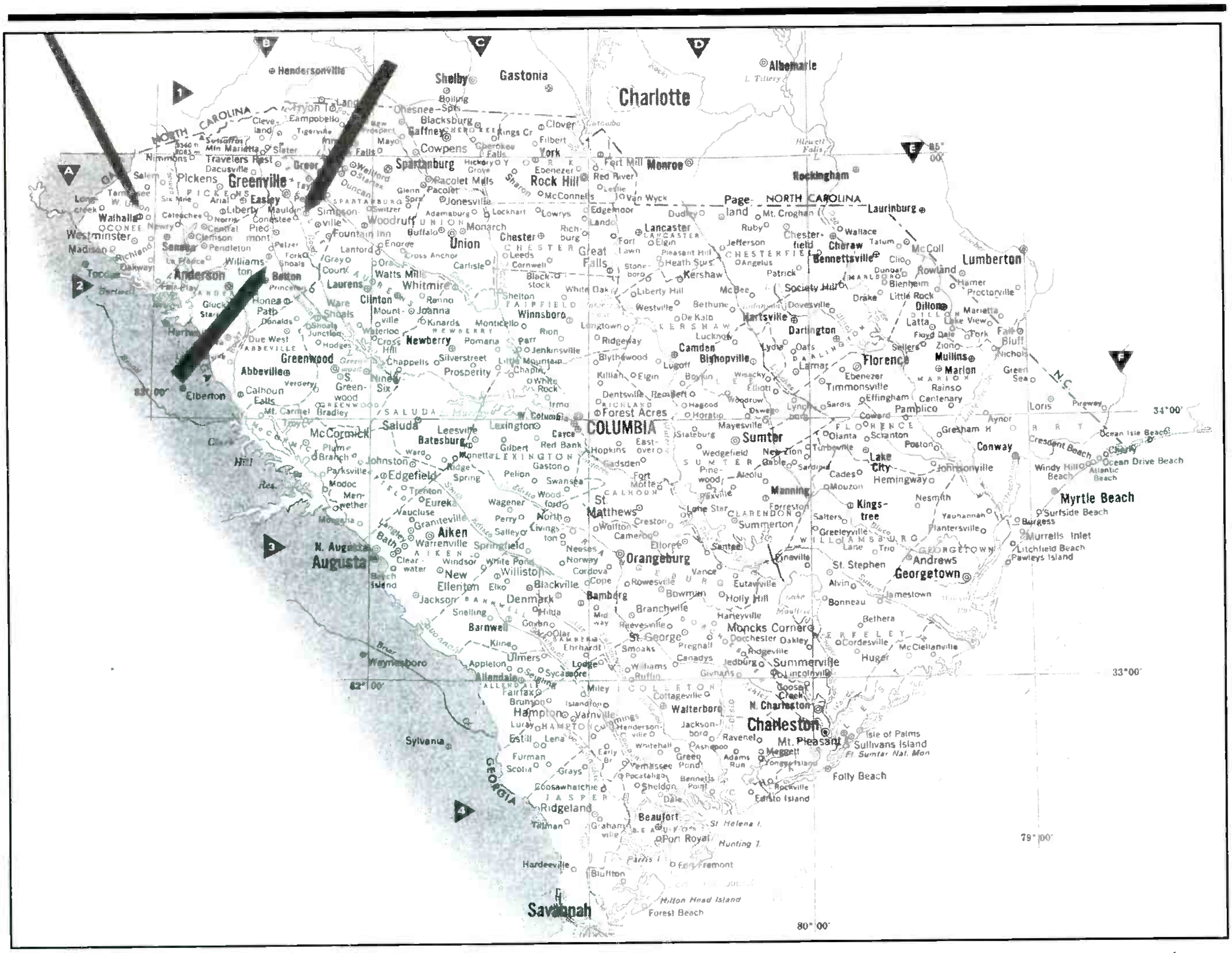
Case in point: Back in the 1970s, some gray-haired, retired electronics engineer in our town visited my forth-grade in order to record us reading Christmas poems we'd been assigned to compose. Mine was as simple and sappy as the rest of the kids' rhymes, but when my folks learned the guy was going to "air" the stuff on cable FM, they made great effort to catch the "broadcast." Despite my father's penchant for persuasion, though, he couldn't connect us with anyone who subscribed to local cable *and* paid the extra buck-fifty a month for the related radio service.

A few weeks later, a fellow at church was talking radio with dad and mentioned cable FM. Seems that he'd immediately cancelled near the expiration of his three-month-free trial for cable radio because the Realistic brand FM receiver he had perched atop his TV (so that the hook-up wires could reach from it to the cable box) kept crashing to the floor. "Besides," he noted, "I couldn't figure out how to tune to the classical or jazz stations the cable company claimed were included. All I heard was hum, buzzing, traces of a couple of real stations that came in much better before I hooked up the darn thing, and some hard rock music interrupted by a distorted anti-drug announcement that played over and over again."

Heaven for installers of "wired radio" line, this rugged old phone and power pole would be just the thing to bring 110 volts worth of house current to the radio receiver in the station's studio, and then host the first length of sending wire headed to several hundred bucolic audio subscribers. In fact, this photo was snapped during summer 2005 in New York's Adirondack Mountain region, a locale still boasting a few primitive utility installations.

No doubt, there were savvier cable radio subscribers able to clearly listen to what they'd paid for, but compared to the "plug 'n' play" user-friendliness of their good old five-tube AM set or go-anywhere transistorized AM/FM portable, wired radio was often perceived as a lot of rigmarole yielding little benefit.

First eyed by some would-be media moguls in the 1970s, cable FM's big promise was simply the opportunity to own a "radio station" reaching potentially thousands of ears without having to go through the arduously expensive battle of securing an FCC broadcast license. By then, the AM dial was already packed and most of the areas with a viable amount of retail density no longer had any "up for grabs" FM broadcast



Three arrows target upstate South Carolina "wired radio's" most active triangle. Mauldin, Williamston, and Walhalla are big enough communities to appear on the map, while tiny towns such as Hickory Tavern and Ware Place now require a more local directory to pinpoint. Each, though, is home to some unique electronic communication history!

frequencies. Entrepreneurs saw a chance to reach a big audience by renting a little chunk of audio space from their local cable TV company and sending locally produced radio programming down the line. Sometimes, cable providers were willing to give cable FM stations a free ride in exchange for the extra service and promotion such an audio feature added to the overall cable package.

On paper, the idea looked great: establish an instant radio station for just the price of throwing together a studio, and with no FCC application to file! Even so, except for rare situations, like in northeastern Pennsylvania where cable culture had been around since the late 1940s and cable penetration was high, cable FM gained minimal traction. Position was key with such audio offerings. The cable FM outlets that had a shot at success were typically those positioned as the audio portion of a cable company's local information channel—a spot just above the ABC, CBS, and NBC TV network affiliates. There, cable subscribers could browse for time, temperature, relative humidity, wind speed (sometimes via a black & white camera fixed upon a clock, thermometer, barometer, and anemometer), as well as public service announcements printed on 5 x 7 cards.

A small town cable FM pioneer recalls his high hopes while setting up a full service "station," complete with DJs, local news, and contests:

> We were the only live media game in our community of about 5,000, which was very heavily cabled," he noted. "But, after only seven or eight months of putting out some darn good hometown programming, I had to cut back to a few taped newscasts/weather and automated background music. And, a year into the venture, I pulled the plug. We knew people listened, but with regular TV shows just a click away—and most of the television sets permanently positioned in the living room—folks didn't stay with us nearly as long as they would if we'd been even a 250-watt AM station they could hear on a cheap kitchen radio or in their pickup truck.
>
> The portability factor was one thing we hadn't figured into our business model. We never managed to capture many local ad dollars from the weekly newspaper because our cable FM operation was perceived by potential sponsors as being a shot in the dark, where people tuned in and out quickly. This was especially true for the storeowners who didn't yet have a TV remote control at home. They'd argue, "Who the %$#@ is gonna tune to the local access channel just to check the temperature and then sit down long enough to maybe catch my commercial on your cable FM sound?"

One of the relatively few independent cable radio outlets surviving from the 1970s is dubbed WALN-FM 92, an unlicensed programming service featuring a wide range of oldies (from the 1940s through the 1980s) on weekdays and polkas during Saturday and Sunday. Since 1974, WALN-FM 92 has been

piped to radios of interested Service Electric Cable subscribers in parts of Eastern Pennsylvania and Western New Jersey. The specialized polka fare (which is best enjoyed at home in the company of family) and its tenacious sheer longevity have played major roles in this cable FM's success.

Nowadays, it's the Internet that plays host to most of the unlicensed wired "radio stations"—program sources poised to be virtually on a par with conventional radio when pocket-sized computer, cell phone, and online Wi-Fi technologies eventually morph into a single, affordable, easy-to-use unit.

Any Cable Radio Prior To The 1970s?

Actually, the cable radio concept was being considered a hundred years earlier, in the 1870s, when first generation telephone executives mused about piping music, news, and other entertainment to subscribers through their phone lines. Media historians note that some telephone companies experimented with an hour or two of such fare daily. Subscribers could listen by putting the phone receiver to their ear.

It wasn't until the 1920s, though, that cable or "wired" radio caught the general public's attention via the popular press. The August 1922 edition of *Popular Science*, for example, devoted several pages to the question, "Can Wired Wireless Change Radio Broadcasting?"

The publication's radio columnist, Jack Binns, announced that "Major-General George O. Squier, chief signal officer of the United States Army, apparently threw a monkey-wrench into the general machinery of radio broadcasting when he gave a demonstration in Washington of his 'wired wireless' [or 'wired radio'] system, as applied to music transmission. [Binns speculated that Squier's] success immediately threw the electric light people into paroxysms of joy, and correspondingly caused the new radio fans a lot of perplexity and wonderment."

In other words, the Major-General's system for simultaneously "broadcasting" several programs over one power line or phone wire set the stage for utility companies to challenge the then-fledgling radio broadcasting business, with a chance to quickly marginalize over-the-air radio even before it got off the ground.

For a listener, technically all that was required for such a coup were existing utility wires, a speaker, and several other inexpensive electronic components, including a switch and potentiometer. This gear was far less costly than the average "wireless" or radio receiver (not to mention a related antenna rig) that regular broadcasting necessitated.

Curiously, however, and although most 1920s and 1930s radio listening was done in front of a hefty living room-based set—not on a portable or in the car—"wired radio" didn't enjoy much momentum. Also a mystery is why utility companies didn't emphasize "wired radio's" ability to offer much better fidelity than that rendered by AM transmission.

Ten years after predicting big things for "wired radio," *Popular Science* reported that a full-service cable radio system had been founded by the Lorain, Ohio, phone company. This firm went all out and installed miles of dedicated wire alongside its telephone lines to carry high-fidelity programming it would offer from early morning to the wee hours. Variations on this theme included New York City's Waldorf-Astoria Hotel, where a choice of six channels was piped into each room. Guests could select from a menu of a half dozen Gotham AM outlets that Waldorf engineers relayed over the lines after receiving the stations on six radios hooked to a master antenna on the hotel roof.

Perhaps one of the swanky venue's patrons got the idea there to make a business of sending, by telephone wire, stylish dinner music to other Big Apple hotels and classy eateries. According to a February 1936 edition of the *New York Times*, about 40 sites subscribed to such background music after inventive individuals, founding outfits with names like Wired Radio Corporation and Muzak, purposed to provide a constant, reliable, high-fidelity mix of tunes appropriate for making working, shopping, lodging, or dining a more pleasant experience.

Muzak was the brainchild of Major-General Squier who wanted a company with which he could pipe phonograph music by wire to subscribers. But even Muzak, the best known of the original "wired radio" systems, was thrilled to ditch the leased phone lines (which it rented for a pretty penny to relay programming to subscribers) and become a wireless service when, in the late 1940s/early 1950s, over-the-air FM stations offered to save such services a

lot of money by more economically carrying its product over the main channel, and later via subcarrier.

The Circle Complete

In a roundabout way, this is how my Dad got us into our column's subject matter. Every winter, he and my Mom volunteer for a few weeks at the Wickliffe Bible Translator's main base in North Carolina. While helping there in a maintenance capacity, my father somehow found someone with whom he could talk radio and brag about having a daughter who writes for *Popular Communications*. Of course, he just happened to have a random copy of the magazine handy, so he could show the guy my article, "FM's Secret Service" (*Pop'Comm* November 2004) about Muzak carriage, etc.

Apparently, this led to a conversation, probably mostly from Dad, on how Muzak and some phone companies used to send programming to subscribers by wire. That topic triggered my father's coincidental co-worker to reminisce about a relative who, "back in the '30s, started his own local radio station in a tiny South Carolina town, and used fence wire to transmit it from house to house." When the fellow mentioned fence wire and the fact that a college professor had traveled down south to interview the guy's great uncle about his rural station, my father must have looked skeptical enough to motivate the Carolinian to prove the claim's veracity.

Back home again and a few months later, Dad was mailed a photocopy of a *Journal of Radio Studies* (Vol. 1, 1992) treatise, titled "The Development Of Rural Wired Radio Systems In Upstate South Carolina." A Post-it note stuck to the front page simply stated, "Hi Sid, Told you it's *true*!—Regards, Jim." It is that piece, by Susan Opt, that my father enthusiastically studied and then relayed to me in the old crinkled Manila envelope that started this story.

Why Cable Radio Down South?

Broadcast historian Opt credits rural upstate South Carolina's pre-World War II disconnect with just about everything urban and suburban, as the logical reason why that region appears to have spawned the lion's share of 1930s "wired radio." She notes that persons living there then "were still fairly isolated from other parts of the world despite the development of technologies such as telegraph, telephone, and radio."

In fact, through the mid-1940s, some bucolic burgs had no phone service at all. And, as strange as it might seem to modern folk, Depression-era rural South Carolina (as well as other deep country U.S. locales) was not yet fully electrified. Opt indicates "utility expansion into the rural areas had halted during the Depression because of the high cost of erecting electric power lines to serve isolated customers." Even if the wires had been installed, the region's tiny economy would have prevented most residents there from being able to afford the monthly power bill.

With no "street juice," radio listening in un-electrified spots like northern South Carolina was confined to households owning either a crystal set or battery-fired radio. The former offered only primitive reception, while the latter mandated a regular supply of fresh batteries, bucolic budget busters, to be sure. Opt argues that such conditions, including "...created a niche for the development of wired radio systems in South Carolina."

The area's originator of wired or cable radio appears to be an inventive fellow named Gordon Rogers, who happened to live near the very last pole of his local utility's power line. During the early days of 1931, he concocted a 110-volt street current-powered AM radio from "junk parts and a speaker from an old battery set." When a neighbor, without any electrical service, admired the radio playing in Rogers' Mauldin, South Carolina, home, Rogers decided to give the guy a thrill. He ran a wire from his radio's audio output over to the man's house, and hooked it to a modest speaker. Ground return was used to balance the speaker's other terminal. Both were pleased that the set-up allowed the sound from Rogers' radio to come in nicely next door. Rogers told Opt that word of the audio arrangement spread quickly, and "within several months [Rogers] extended service to seven families."

By 1935, 600 Mauldin houses were paying Rogers about a dime monthly for his wired radio sound. Opt's research also shows,

> ....the first wire Rogers ran as part of his wired radio system came from a Model T ignition coil. He strung it across trees and a fence to reach his neighbors. Broken ends off of 5-cent size Coke bottles served as insulators. When the family beyond the first connection wanted on the system, Rogers used iron wire and stapled it to telephone poles. However, when it rained, the radio transmitted over the telephone lines. The president of the telephone party line came out and cut Rogers' line to shreds. When the line extended to about 10 miles, the volume at the far end became so low as to be quite unsatisfactory, because of excessive losses in the iron wire. He called a meeting of all subscribers who lived five miles and beyond [from his master radio receiver]. Each subscriber paid $1 to replace the iron wire with copper wire. In one day, the community installed five miles of posts and copper wires along with telephone type insulators. Eventually his system consisted of 400 miles of single wire transmission lines that extended over three counties.

What Could Subscribers Hear?

Much of the fare originated from the receiver at the "wired radio station's" base of operations. In several cases, this master control studio was a spare corner of a general store. The proprietor established the system to generate a little extra revenue. Typically, he or she would dial the radio to the clearest local station during the day and then to some venerable 50-kW clear channel flamethrower after sunset. The folks who owned the store and wired radio system at Saylors Crossroads rigged up an alarm clock to turn off the master radio at 11 p.m.

The Ware Place, South Carolina, system was representative of what often happened following official sign-off. After they "shut down at night," a former listener told Opt, "subscribers could shout into the loudspeakers and hear each other. People would take turns talking. That was the way to find out the neighborhood news." Community news of a more official nature became a daily feature on several systems.

Additionally, the good news of the Gospel was a staple of Carolina "wired radio." The owners of Williamston, South Carolina's operation, for example, invited ministers from various "big city" Greenville churches to come into their living room, which doubled as a broadcast studio, where the pastors could do some preaching on the microphone. Remote lines from a local church also made transmitting live services possible. "Main studio" gear typically consisted of an inexpensive crystal mic and a phonograph wired into the amplifier section of the radio receiver that served as the facility's "transmitter."

Though programming from a "real" or FCC-licensed broadcast station

From 1-1/2 to 45 volts direct current, Eveready's assortment of radio batteries. It was a rather costly proposition for country folk without electricity who just wanted a bit of broadcast enjoyment while trying to scrape through the Great Depression. Subscribing to a "wired radio station" was much cheaper than the cost of even one of these power packs. And then you wouldn't need to buy a battery-powered radio either!

(caught by a regular radio set) gave "wired radio" operators the bulk of what they in turn sent down the line, this content could easily be preempted by visiting clergy, or when local folks dropped by with a heartfelt plea. A fellow wandered into the Saylors Crossroads studio to relay the misfortune of his donkey having run away. And, when a well-known hometown person passed on, the station operator might fade down the radio receiver volume control to break in on the microphone with details.

Did This Stuff Make Money?

Research by Opt indicates cash flow was initially a motivating factor for the founding of the South Carolina "wired radio" entrepreneurs. "Two of the systems," she noted, "Hickory Tavern and Williamston, carried paid advertising. Sometimes the [advertisers] would do their own [ads]. Sometimes they'd bring in singers and sponsor a program." And then there was a little chunk of change generated by the monthly subscribers' payments, just a dime here and a dime there. One old timer recalled for Opt, "People would scrap and sell eggs to pay that fee."

But not everyone was able to come up with the dough, or had sincere intentions of doing so.

"Like today's modern cable television services, [some wired radio station operators] had problems with bootleggers" who simply tapped into the wires. Lots of times, this unauthorized jerry rigging messed up the signal. Opt said, though, that neither such pirating nor subscribers with a delinquent account dampened the spirits of South Carolina's wired radio station owners. As time went by, "the orientation of [their] systems was to serve the community, not to make a profit." Above all, they helped "rural communities to participate in the communication revolution occurring in the nation as a whole."

But then, as quickly as the systems appeared, the upstate South Carolina wired radio culture faded from the fence posts when power companies got around to electrifying every humble home along the dirt road.

The Broadcasting Yearbook Of South Carolinian Cable Radio

Had there been such a directory, a page of it might've looked like what follows. Noted, where available, are each system's ownership, number of subscribing households at the system's most successful period, approximate mileage/radius of connections, estimated hours of operation, program offerings other than rebroadcasts of FCC-licensed stations, monthly subscription rate, and approximate years of operation.

Hickory Tavern, SC: "*Grapevine Radio*"; Wasson Brothers Store; 500 subs; 12-miles; 23 miles; 6a-7p; local news; 25 cents; 1936-1941.

Mauldin, SC: Gordon Rogers; 600 subs; w/Ware Place; 10 cents; local fare; 1931-1939.

Saylors Crossroads, SC: "*Speakerline Radio*"; Charles Murdock's General Store; 500 subs; 6a-11p; church services; 45 cents; 1937-1941.

Walhalla, SC: Reportedly related to the Mauldin system.

Ware Place, SC: J.R. Chandler's Store; 525 subs; 6a-10p; 35 cents; 1934-1946.

Williamston, SC: Carl Ellison's General Store; 700 subs; 50 cents; 6a-12 midnight; full local programming; 1933-1940.

And so ends another broadcast day at *Pop'Comm*! See you again next time. ■

by Peter J. Bertini, radioconnection@juno.com

The Majestic Restoration Continues!

Our last column wrapped up the steps needed to restore the Majestic 9P6 power supply section that powered the Majestic 90 radio. Since the column was written, I was able to reunite the restored chassis with its refinished cabinet at the furniture restoration shop that contracted our services.

A TRF Radio

These sets were TRF (tuned radio frequency) receivers. A few of the simpler and least expensive four-tube table broadcast band radio designs still used TRF circuits for many more years, but by the early 1930s most consumer receivers were using RCA's patented superheterodyne circuit.

The superheterodyne solved many of the shortcomings that limited the TRF radios. First, it was much easier to apply AGC (automatic gain control) to a superhet. The superhet was inherently more stable, since it required less amplified gain at any frequency. The low frequency IF (intermediate frequency) assured a constant bandwidth across the tuning range, and the superhet reduced the number of tuned stages that had to track each other across the tuning range—a major improvement in its own right! The superhet also simplified bandswitching, thus paving the way for the practical and inexpensive multiband shortwave receivers that appeared within a few short years.

While putting things back together, I discovered the model tag on the cabinet showing that it was a Model 92. It wasn't all that unusual for a manufacturer to use a popular chassis style in more than one cabinet. During any model year, manufacturers often used the same chassis in tabletop and console versions (sometimes a larger speaker was used for the console cabinet) of the same model series, thus the difference between the radio model and chassis.

The restored set is shown in **Photo A**, while the rear of the radio is shown in **Photo B**. Notice that the legs are less than one-half the total height of the cabinet; this style cabinet is called a "lowboy." Ornate, boxy, and large, these designs were popular in the 1920s, but they now look dated and are out of style in contemporary homes, which is why these sets are often available at fire sale prices at radio meets or on Internet auction sites. Alas, most are destined for the scrap heap; and the pot metal problem that plagued the early 90 tuning capacitor did much to exacerbate their demise in later years as those parts degraded to the point of failure. Repairing the pot metal damage will take up a good portion of our next column and will be an interesting read!

One thing to watch for: The 9P6 power supply isn't bolted to the wood support board it rests on, despite having tapped 1/4-20NC mounting holes on its metal base. Gravity holds it in position. I'd suggest making a cardboard template of the power supply's bottom pan, pushing a sharp pencil into those holes to make a drill pattern. The pattern can then be aligned with the baseboard to provide a guide for drilling holes for mounting screws. If you do this, check that the bolt shafts aren't going to be long enough to interfere with wiring or parts in the power supply. These sets originally had back covers to keep the user away from exposed hot surfaces and high voltages; if the cover is missing, a replacement should be made from a sheet of Masonite and fitted with ventilation holes.

Photo A. I took this photo of the restored Majestic when the chassis, speaker, and power supply sections were reunited with the refinished cabinet at the furniture restoration shop.

The Model 90 chassis schematic is shown in **Figure 1**. The first five tubes are all No. 27s. The factory-supplied tubes were originally globe shaped and marked with three digits, the first digit indicating the tube's manufacturer. For example, a 227 might have been made by RCA, while a Cunningham tube may have been marked as a 327. When the more modern ST glass tube shape (coke bottle) was introduced, the manufacturer's prefix digit was no longer used. All the tubes in the set were made in globe and ST shapes. The audio output tubes are type 45 triodes, and unfortunately new old stocks for those tubes are becoming very scarce and pricey due to their desirability among audiophiles who covet the "sound" of triode tubes. Regardless,

Photo B. Here's how it all goes together! The speaker, chassis, power supply, and ballast tube assembly can be seen in the rear view of the cabinet. The set should have a ventilated rear cover to prevent contact with the exposed high voltages and hot surfaces on the ballast and tube surfaces.

Photo C. Despite the simple circuit, these sets are mammoth and require a lot of bench-top real estate during restoration!

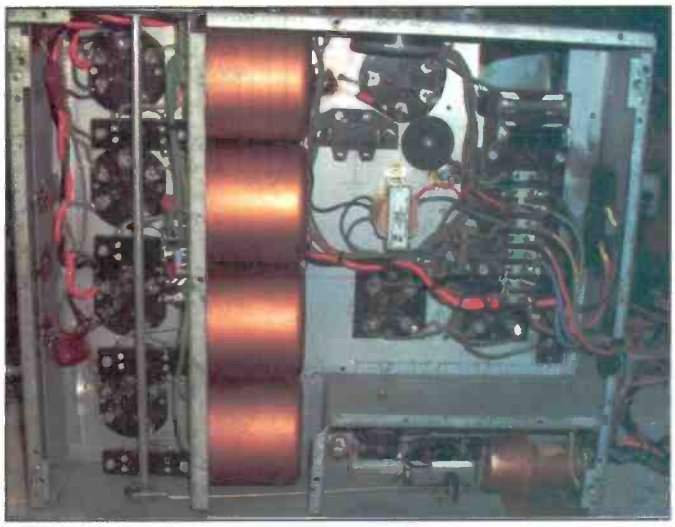


Photo D. Here's a bird's-eye view of the chassis bottom. To the left, four of the shielded round cans housing the RF coils can be seen. The first input RF coil is adjustable, and is nestled into the lower right corner of the chassis. The upper right portion of the chassis contains the detector, audio transformers, and push-pull type No. 45 triode audio power amplifier.

good used 45 tubes are readily available, and even 45 tubes with relatively low emission will perform quite well in these radios! Expect to pay over $100 each for NOS 45 globes; while serviceable, used ST 45 tubes can be had for $13 and upwards, depending on how well they test.

TRF Stages

The first four No. 27 tubes are used as RF amplifiers, and are tuned to the designed station frequency using a massive five-gang tuning capacitor. Using five cascaded RF tuned stages assures adequate selectivity at the higher frequencies. Remember that *arithmetic selectivity* (arithmetic selectivity states the *percentage bandwidth* of a tuned circuit remains the same across its tuning range) will limit a TRF's ability to separate nearby stations at the high end of the dial. Each additional tuned RF stage greatly improved the shape factor for the set's bandwidth, improving the set's selectivity and ability to reject strong off-frequency stations.

Let me add a few more comments: In Europe, where LF (low frequency) broadcasting is popular, many sets have limited bandwidth and fidelity due to the selectivity of the antenna coil, which is operating at a few hundred kHz! Some folks add a resistance in series with the antenna coil to spoil the Q and widen the bandwidth. That's arithmetic selectivity at work.

Electrical Restoration

The top of the chassis is shown in **Photo C**, and a bottom view is shown in **Photo D**. Most of the electrical restoration involves replacing rotting rubber coated wiring and five wax paper bypass capacitors under the chassis. **Photo E** gives a good view of the TRF amplifier section. The filament wiring for the No. 27 tubes was done with rubber insulated wiring, and you'll most likely find the insulation has become very friable and will flake from the wiring if disturbed.

Some folks advocate leaving the wiring alone, the assumption being that if left undisturbed the insulation will be fine. If I'm going to do a job, however, I believe in taking care of everything that needs to be done. The No. 27 is a 2.5-volt tube (filament), and *each* No. 27 tube filament requires a whopping 1.75 amps @ 2.5 volts! This means the filament wiring has to be a large gauge to prevent resistive losses. I used some scrap lengths of red and black vinyl insulated wiring that was originally used as 12-volt power cables for Motorola mobile two-way FM radios. It was the same gauge (or maybe a tad larger) as the older

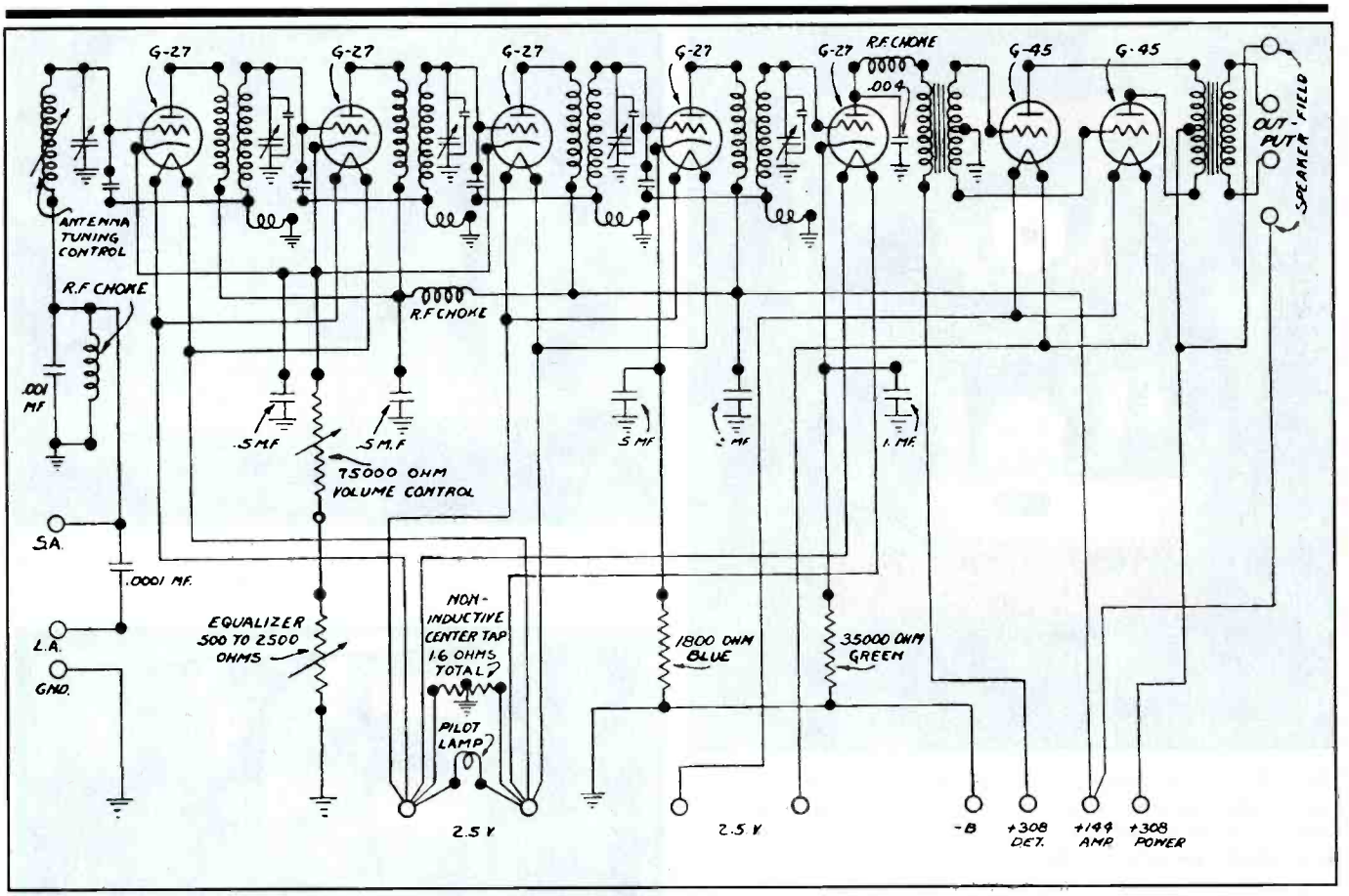


Figure 1. The schematic for the Majestic 90 chassis.

red and black rubber insulated wire, and it looked correct under the chassis.

Wax Capacitors And Resistors

There are five paper capacitors under the chassis that should be changed. Again, some fellow restorers advised that they've never bothered to change the wax paper capacitors and the sets worked fine. That might be okay for the two 0.5-mFd cathode bypasses capacitors that are shared by two No. 27 tube pairs and subjected to relatively low operating voltages, but it is risky not to change the two 0.5-mFd capacitors used for the plate voltage bypasses. If you're going to bother changing out two capacitors, you might as well spend a few more dollars and time to complete the job properly.

The Majestic wax paper capacitors were housed in small metal shells, and those were mounted to the chassis with solder. Each capacitor had solder terminals that served as wiring terminals. If you wish to do so, these caps are easily gutted and rebuilt, hiding a modern 630-volt Mylar capacitor inside, to keep the original chassis appearance.

I opted to replace the metal capacitors without rebuilding the old ones. Instead, I installed Phenolic terminal strips to provide connection points for the new replacement capacitors as needed. While the schematic (**Figure 1**) shows an RFC (radio frequency choke) between two of the plate bypass 0.5-mFd capacitors, you'll find that a 60-ohm carbon resistor was used instead in some sets. If present, replace the original carbon resistor with a modern 1-watt film or metal oxide 56- or 68-ohm resistor (the value isn't overly critical). The remaining wax paper capacitor is a 1.0-mFd value and is used for a cathode bypass on the No. 27 tube used for the detector stage. Again, I replaced it with a Mylar capacitor. The remaining caps are 0.004-mFd, 0.001-mFd, and 0.0001-mFd (100-pF) molded micas. These are probably still good, but I thought it best to replace them because many fellow restorers have begun noting failures in similar parts.

A dipped mica capacitor can be used for the 100-pF capacitor, while either a dipped mica or Mylar will do for the 0.001-mFd component. Use a .0039- to 0047-mFd 630-volt Mylar to replace the 0.004-mFd plate bypass on the No. 27 detector stage. The 1800-ohm and 35,000-ohm resistors were in good physical condition and measured very close to their published values.

Volume Control

Adding a few drops of watch oil (or another light oil) to the control shaft where it enters the potentiometer bushing should help free up a stiff control. These controls use a moving pressure point on a thin metal disk to make contact with the resistive strip to produce a variable resistance with rotation. Removing the back cover on the pot shows how this works. I suggest adding a dab of lubricant (GC Lubriplate works well) between the pressure point and disk to reduce friction. I'm sorry that I didn't snap a few photos when I did this task!

Checking The Audio Transformers

The audio interstage transformer and audio output transformer were encapsulated in a high sulfur content tar. The sulfur can eventually corrode the fine wires

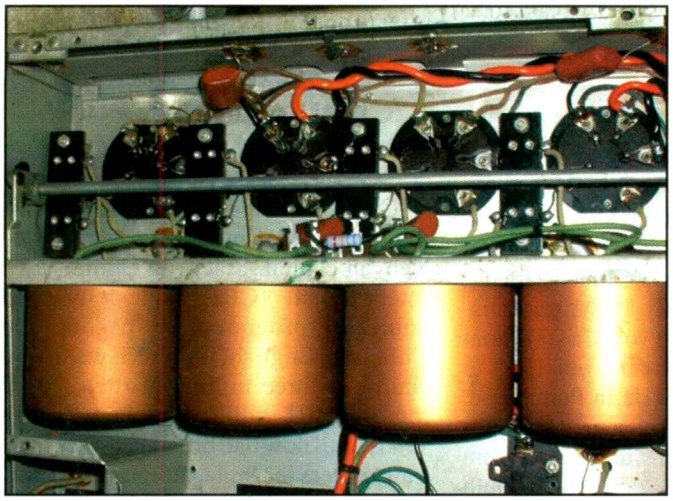


Photo E. A close-up view shows the TRF RF stages and coil assemblies.

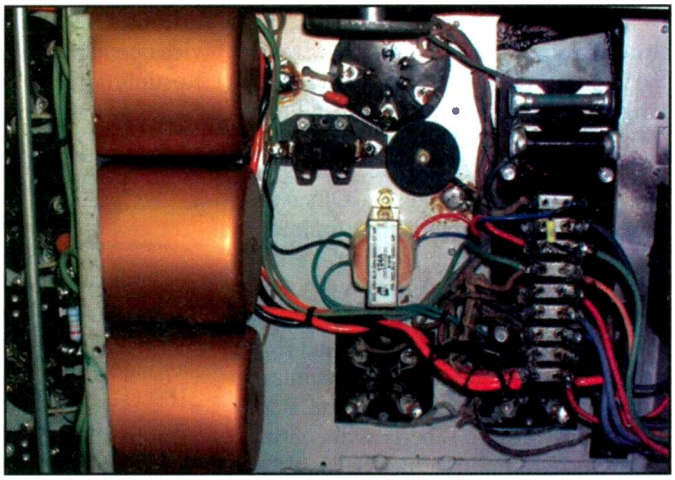


Photo F. The replacement audio transformer is visible in the center of the photo.

used in the transformer windings, causing failures. An ohmmeter test will quickly find any open primary or secondary windings. Suitable replacements are available from RadioDaze[1]. For example, their Hammond HX124A transformer was an excellent replacement for the defective audio interstage transformer found in this Majestic.

The old potted transformer core can be freed from the metal shell by applying hot air from a heat gun to the metal shell while gently prying the innards away from the shell. While I did take the time to remove the old core from the transformer shell, I decided it was best to mount the replacement under the chassis closer to the tube sockets so I could take advantage of the available transformer lead lengths. **Photo F** shows where I mounted the replacement. If you mount the replacement under chassis as I did, you can leave the old potted assembly in the can and simply cut the old leads flush.

Coming Next Month, And A Few Brickbats

Next month things will get more interesting when we cover how to deal with the pot metal portions of the tuning capacitor and I show how to align and neutralize the radio.

In closing, here are a few the comments I've received on our recent series dealing with signal tracing. The first comes from Mike Adams, N3JW:

> Thank you for the terrific and timely article on updating the old Heath T-4 Signal Tracer appearing in the current issue of *Pop'Comm*! I happen to be restoring one now and needed a schematic, which you thoughtfully provided. As a recently retired electronics tech (45-plus years) and public school teacher (32-plus years), I just can't get the odor of rosin core solder out of the system! At least, that's offered as part of the rationale. So, it's back to the bench doing antique electronics restoration...for fun this time around. Article photos, layout, sequencing, etc. were superb. Thanks again and I'm looking forward to the next part!

And another:

> Just responding to your request for comment in the February '06 issue of *Pop'Comm*. I thoroughly enjoyed your article about signal tracing and signal tracers. I recently began to restore some of those old radios I have lying around, and my skills were pretty old from the distant past. This was a very helpful piece. I would be interested in additional articles of this sort, including a piece on use of a signal generator, how to buy a used tube tester, and other restoration techniques.
>
> —Jeff Heller, Naperville, IL.

We also received a few well-deserved brickbats from our astute, technically inclined readers:

> The tubes in the schematic should be a 12BE6, 12BA6, and 12AV6. I bet this is not the first e-mail on this topic! Enjoyed the article. 73,
>
> —Tom WB9YTG.

Well, Tom was right on two counts, we received at least three letters pointing out our gaffe, and the tubes should be have been marked as Tom and others noted. One other letter noted:

> The schematic of the old five-tube basic radio in the February 2006 issue of *Pop'Comm* shows a 12AT7 tube instead of a 12AT6. All of the radios I've worked on over 40 years ago used a tube lineup consisting of 50C5 35W4, 12AT6, 12BA6, and 12BE6. The two 6-volt tubes will total only 109 volts. A 115-volt or higher line voltage would burn out the heaters in no time. This is not a question of your knowledge, as you know the heaters or tube filaments are series connected to provide as close to 120 volts as possible.
>
> —Leo Chapman, KC5RM

I can blame the 12AT7 on the auto incrementing feature of my CAD program; I must have placed the tube type twice and deleted the wrong one. But *no one* caught the fact that the 6-volt and 12-volt tubes have different filament currents. The 6-volt tubes are designed for 300-mA filament strings, while the 12-volt tubes are designed for 150-mA series string operation. Regardless of how the voltages added up, the different filament current ratings nixes mixing the two different tube groups in a simple series strung filament arrangement.

Thanks for writing with your comments. I've learned that many of my readers are interested in more test equipment coverage, and I'll try to accommodate your wishes in future columns. Until then, keep those old tubes glowing and your soldering irons warm. See you in June! ■

References

1. Radio Daze, LLC, 620 Omnitech Place, Victor, NY 114564-9783; Phone: 585-742-2020, ext. 100; Fax: (800) 456-6494 or 585-742-2099; E-mail: info@radiodaze.com; Web: www.radiodaze.com.

The bad news is that the Board has had to make some painful choices. As a result, the budget proposes reductions in English language programming, by eliminating VOA News Now radio while maintaining VOA English to Africa, Special English, and VOA's English website. Other proposed reductions include the elimination of VOA broadcasts in Croatian, Turkish, Thai, Greek, and Georgian. VOA radio broadcasts in Albanian, Bosnian, Macedonian, Serbian, Russian, and Hindi would end while television programming in these languages would continue. Radio Free Europe/Radio Liberty will continue radio programming in Russian and Georgian while eliminating radio programming in Macedonian.

Radio Netherlands Now In DRM At 1400 UTC On 15735 kHz

Radio Netherlands' English shortwave transmission is now available in Europe via DRM on 15735 kHz from 1400 to 1500 UTC. This is the new DRM service operated by WRN via a transmitter at Kostinbrod, Bulgaria.

CVC Commences DRM Transmissions From Santiago

Christian Vision (CVC) has started a period of regular daily DRM transmissions in Portuguese (Voz Cristã) from Santiago targeting Brazil from 1900 to 2100 UTC on 17645 kHz in Portuguese. CVC has also announced a period of regular daily transmissions in Spanish from Santiago targeting northern South America, Central America, and Mexico. Coverage may also extend into the western United States. Look for them in Spanish from 1800 to 1900 UTC on 17640 kHz using 15 kW.

ADDX Asks For Analog Schedule, And DRM Transmissions In Different Parts Of HF Bands

The Association of German Radio Listeners (ADDX) recently asked the HFCC (High Frequency Coordination Conference) to schedule analogue and DRM transmissions in different portions of the HF bands, since their members have encountered interference from DRM transmissions while trying to hear analogue shortwave broadcasts.

The HFCC said that there are a number of reasons why this arrangement would be difficult to achieve in practice. For example, setting aside parts of the HF bands for DRM-only transmissions would "sterilize" those parts of those bands in areas of the world where DRM is not currently used. Thus, such an arrangement would be less spectrum-efficient. However, the HFCC said it would encourage its members to try to schedule their DRM transmissions in clusters.

For instance, it was suggested that some of the long daytime DRM transmissions on 7 MHz could be clustered together in a part of that band with Radio Netherlands, Deutsche Welle, and Merlin taking the initiative. However, it is understood that this will need good cooperation from other HFCC/ASBU (Arab States Broadcasting Union) members in those instances where the transmissions of other members are involved. It was also recognized that some of the DXer complaints about interference refer to analog transmissions that are not beamed to their target area.

China Launches Radio Station In Kenya

China has launched its first FM transmitter outside Chinese territory in the Kenyan capital. State-run China Radio International (CRI) will deliver 19 hours of programming per day in Chinese, English, and Kiswahili to Nairobi's three million residents, CRI reports. CRI, which was launched in 1941, until now had broadcast only from transmitters in China, although its offerings were available on the Internet. But as Beijing increasingly looks to Africa as a market for trade and a source for natural resources, particularly oil, officials said CRI intends to expand its presence beyond Kenya on the continent, where foreign media giants like the BBC, Radio France Internationale, and Voice of America have long dominated. CRI plans to set up another FM station in Tanzania next year, officials said.

DX Program "Radio World" From All India Radio

The External Service of All India Radio, Chennai, has broadcast the First DX program called, "Vaanoli Ulagam" (Radio World) in the Tamil language. This 10-minute program is broadcast every Sunday sometime between 1115 and 1215 UT. Southeast Asia listeners will hear the program on 13710, 15770, and 17810 kHz; Sri Lankan listeners will tune to 15050, 17860 shortwave and 1053 kHz mediumwave.

The program is divided into four segments: In the first segment, there's a brief description of international radio history; the second segment is for current DX news; the third segment covers DX publications and magazine details; and in the last segment offers useful DX website details.

For a QSL letter with AIR logo stamp sticker, send a reception report and the program details with two IRCs to the following address:

Vaanoli Ulagam (Radio World)
Thirai Kadal Aadivarum Thamizh Naatham
All India Radio
Kamarajar Salai, Maylapore,
Chennai-600 004
Tamil Nadu, India ■

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by Bill Price, N3AVY

You Can Make Me *Tune* It, But You Can't Make Me *Talk* Into It!

It is thanks to my dear friends Norm and John and some loyal readers that I have a license at all, what with forgetting to renew it and then not being aware of the new online process. And now it is thanks to Norm (I think) for almost getting me on the air.

You see, Norm was en route from just about one end of U.S. Route 1 to just about the other end when he took a detour and met me just outside the Nation's capital where I am employed in my HPJIE.* Ever since Norm realized he didn't like being a stock broker or whatever it was he did a long time ago, he too has had an HPJIE. I believe we both saw the same magazine ad featuring the cruel Mr. Bemis docking some poor sap's pay for being a minute late. The "sap" then took a correspondence course in electronics, and by the final frame he had told an astonished Mr. Bemis that he could stuff his job because he had found a (are your ready for this?) HPJIE! Somehow, Norm and I have always worked for Mr. Bemis, even in our HPJIEs, but I digress.

Norm and I didn't have enough time for even the briefest of lunches; instead we met in a supermarket parking lot where he unloaded part of his overstuffed car into my waiting arms. I now have a commercially built, store-bought, single-sideband amateur radio transceiver, complete with a 100-watt final (that, according to Norm, I *won't* have to tap on with a pencil to make it work) and a matching VFO! Oh, yes, and a microphone. Did I mention that it came with a matching microphone?

As we moved these goodies from one vehicle to another in a parking lot, it crossed my mind that any law enforcement officer would look upon this activity as "unusual," if not outright suspicious. That's what kept me from asking Norm to show me the new shotgun he had told me about and that he was carrying in the trunk. Of course it was all legal, but after transferring reasonably valuable electronics equipment from one car to another (with different state license plates on each), I think that fondling (I think the police use the term "brandishing") a shotgun in a supermarket parking lot would have been pushing the limits of common sense—something neither Norm nor I have been blessed with an abundance of.

In exchange for this, I have had to swear on some old *Callbooks* that I will erect a G5RV antenna and actually get *on the air*. I didn't exactly have to promise that I'd speak into the microphone, but since I have given away both my beautiful Vibroplex bugs, it's either that or touch two wires together to send some CW.

In my four years in the U.S. Coast Guard, most of which was spent as a Radioman, I never once used voice communications. It was *always* CW. In all my years as a licensed amateur (which I think began in 1973 as WN3SKM and later KA3BRH), I never once spoke into a microphone—well, there were a few moments on someone else's 2-meter rigs. While others studied and worked hard to get the right to use a microphone, I avoided it like a bad case of mad cow disease. Now, I'm stuck. There is apparently no way out. I will have to speak into a microphone.

"As we moved these goodies from one vehicle to another in a parking lot, it crossed my mind that any law enforcement officer would look upon this activity as 'unusual,' if not outright suspicious."

How could a person qualify for Quarter Century Wireless Association membership and have mic fright? Okay, so it's not exactly mic fright, after all, I do a fair amount of public speaking—I just *like* the anonymity of my key.

So how many of you have been given a very nice, very complete Kenwood TS-520 with all the accoutrements and left it on the front seat of your truck for two weeks, avoiding bringing it into the house and turning it on? Does that tell you something about this lunatic whose words you've been reading all these years? Maybe I could say I'm getting it "acclimated" to its new home south of the Mason-Dixon line. After all, it's always been a Yankee rig up till now. Of course, now that it's been cooling off out in the truck, I wouldn't want to expose it to the warm house too rapidly. Maybe I should wait till spring to bring it inside.

And wasn't it me just a few months ago who wrote about wanting to use CW to communicate on the Internet? Well, didn't loyal reader Jeff Makus of Grand Prairie, Alberta (where they grow those clippers...), drop me an e-mail (using standard ASCII characters, not CW) to tell me that such a system and place exists! So now it looks as if I'll have to polish up my CW skills for Internet use, *and* figure out how to use that press-to-talk switch, all in the same month.

During our brief meeting in the parking lot, I asked Norm why he wasn't driving his brand-new "babe-magnet" SUV, and without skipping a beat he told me that he'd read the column where I talked about putting antenna mounting holes in it with my .45 and he didn't want to take the chance until he was sure I was only kidding. (Of *course* I was kidding; I'd use my rifle with the scope sight on it for antenna mounting holes. You get much more accurate placement that way.)

So as I sit examining my trees for antenna mounting options and plan to search the Net for all I ever need to know about how to construct a G5RV antenna, I am becoming more resolute in my promise to actually get on the air with a microphone and at least have a few QSOs with Norm. And, if by chance, any of you readers hear us, by all means just break in and say "Hi." After all, though my cards might be a dime a dozen, who wouldn't jump at the chance to have a QSL card from the one and only Norm? Talk about rare DX! ■

**High-Paying Job In Electronics*

AOR SR2000 Frequency Monitor

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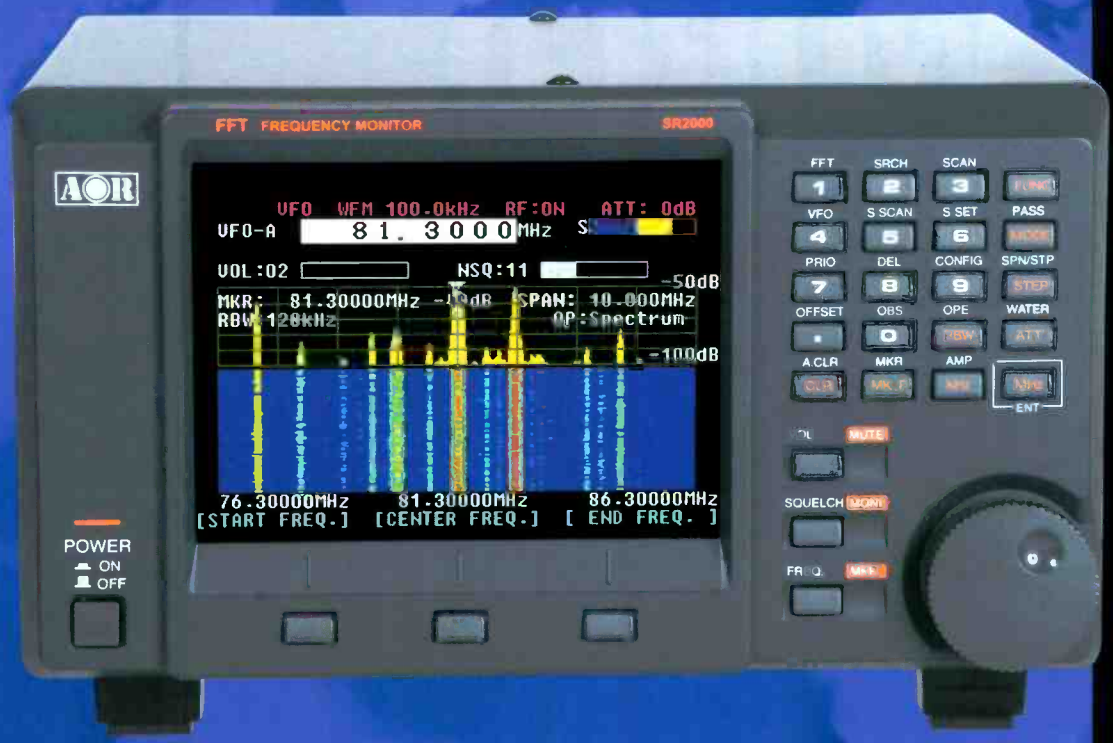

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The SR2000 is an ultra-fast spectrum display monitor with a high quality triple-conversion receiver

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Please note that the remote head is not an option for the PCR1500. There are key internal and external differences between the R1500 and PCR1500.