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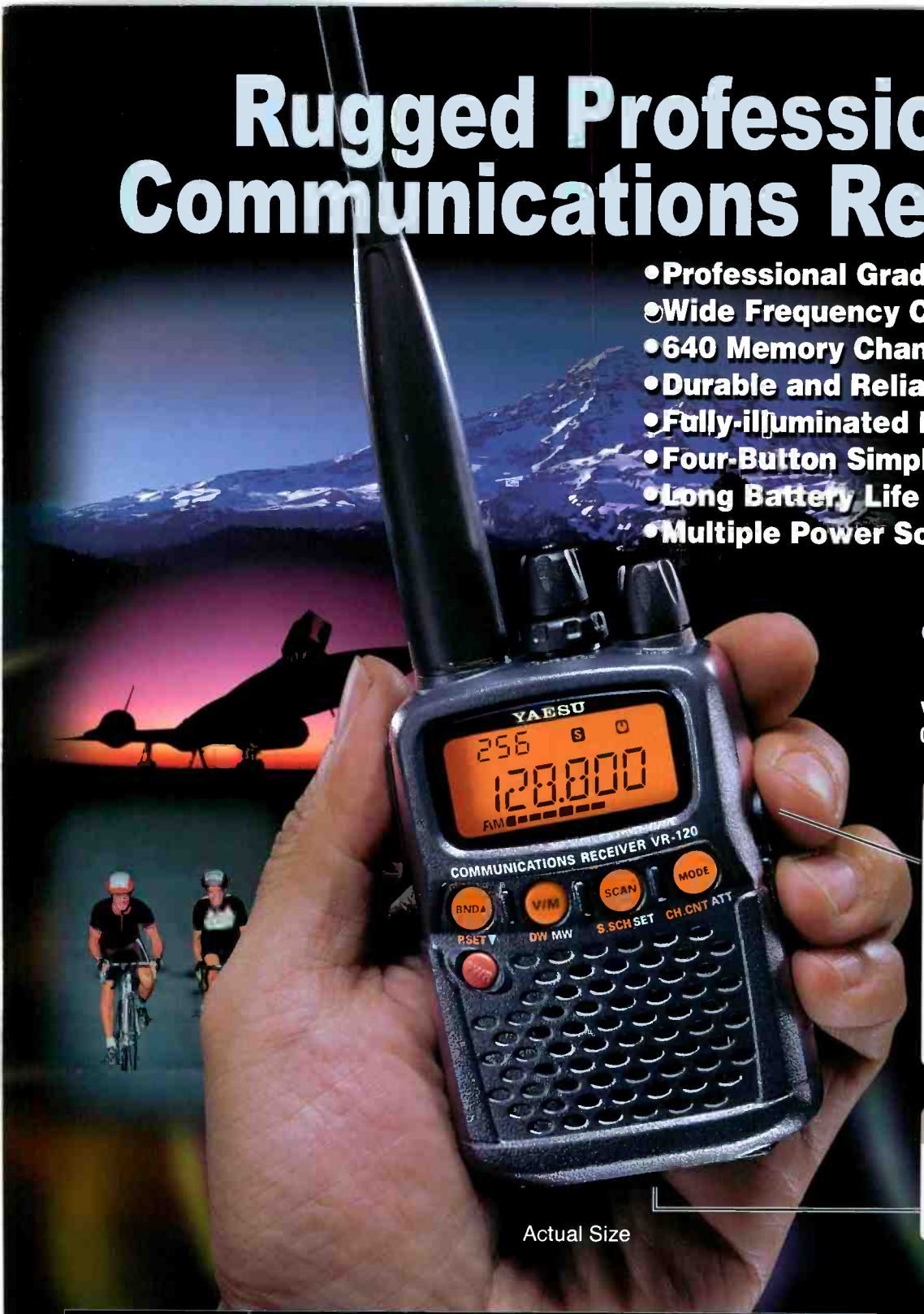

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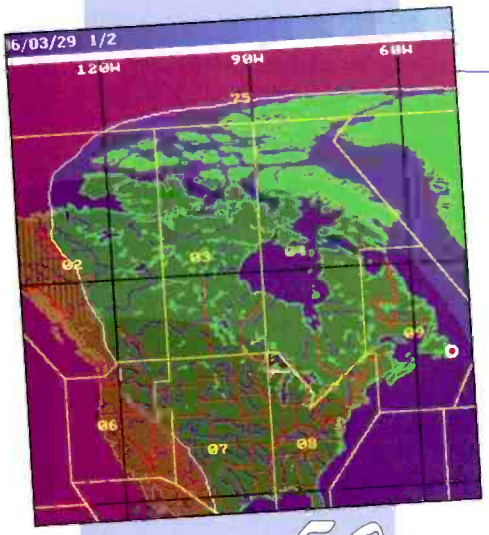

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On The Cover

Here's George Goble, KB9TBN of West Lafayette, IN in his Hummer with his scanner–and other radios–ready to hit the road. You probably don't have this much room in your vehicle, so we've put together 12 great mobile radio installation tips to help you maximize your mobile installation. Be sure to check out the article, "Miles Of Smiles," beginning on page 8. (Photo by Larry Mulvehill, WB2ZPI.)

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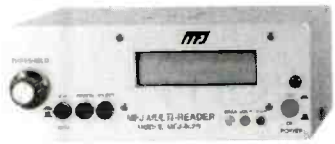

MFJ-462B **$189.95**

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

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

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

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

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MFJ-1024 **$149.95**

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MFJ-1020C **$89.95**

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MFJ-1022 **$59.95**

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MFJ Antenna Matcher

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

MFJ-959C **$109.95**

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

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MFJ-752C **$109.95**

MFJ Shortwave Headphones

MFJ-392B **$24.95**

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

High-Q Passive Preselector

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

MFJ-956 **$59.95**

Super Passive Preselector

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

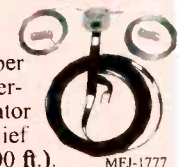
MFJ-1046 **$109.95**

MFJ Shortwave Speaker

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

MFJ-281 **$12.95**

MFJ All Band Doublet



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

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MFJ-461 **$89.95**

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by Harold Ort, N2RLL

Amateur—Just What Does It Mean?

Pop'Comm writer Bob Sturtevant and I regularly talk about relevant radio topics (and some things not so relevant!), things I'm sure you're also thinking and talking about from time to time. Over the years, I've found that relying on other folks' professional opinions to be invaluable.

The topic of how the general public perceives radio enthusiasts recently came up, along with what we might do to improve that image...if indeed it needs improvement. In some cases, I think it does.

Bob brought up some good points about "amateur radio," for example, saying, "Does the name 'amateur' reduce our value in the eyes of those we interact with in a public service way? Does this cause a reduction in our effectiveness because of this reduced value in their estimation? What can we do about it? Is there such a thing as a professional amateur?"

Good points, don't you think? In a world gone mad, where frequently what we see in real-world America on TV and read in the paper is more "reality" than those so-called reality TV programs, there should—must—come a point when we collectively sit back and examine where we're headed. That goes for within our homes, our schools, inside the Beltway, and even within the many facets of our radio hobby.

It's no secret that the general public frequently thinks of scanner users as snoops, voyeurs, cop wanna-bees, and criminals. CBers are simply all truckers, or simply out-of-touch with reality. And hams, well, hams are those older folks with the radios who help out during disasters. But whatever hams are in the public mind, for better or worse, we're still stuck with the term "amateur."

The term "amateur" actually comes from the word, "amatore" or "to love." And that we do; we love our radios, experimenting, talking around the world, and using new technology to further our understanding of the many aspects of radio. In general, we love being an integral part of our community in times of need while enjoying the fun aspects of our hobby. We can't be called "professionals" because that term would indicate that folks get paid for their services, and by law, amateurs cannot.

But then there's the all-important public perception part of the equation, which is perhaps as important today as it's ever been. After all, numerous political and military actions are begun only after the public opinion is gauged. An idea is floated—leaked, if you will—and the game is to sit back and wait for outrage, agreement, or simply complacency from the general public. It happens every day at the national, state, and local levels. And if too few folks express concern or comment, the "idea" becomes reality in short order.

So, we're *amateurs*. Ask any junior high school student or his *parents* (those *are* the folks we're trying to get interested in the hobby, right?) what "amateur operator" means and in most cases they'll be aware of all we do in the name of public assistance, but still in their mind there's the term "amateur."

One young fellow who passed his exam at the recent Dayton Hamvention brought up a good point, telling me, "CBers always get a bad rap from amateurs, yet many people still think of amateurs as Citizens Band operators." We talked for a while and finally agreed that it's important—again, for public perception which goes a long way toward beefing up our ranks—to put forward a name, and image, that encompasses everyone. "Amateur operator" *might* not be the name we want in today's world, but honestly I don't know what would make everyone happy or even how (at this point in the evolution of our great hobby) we'd change the name. But clearly, based on attendance at this year's Hamvention, something must be done...and quickly.

Through the years our Amateur Radio Service has been well served by the ideas and innovations of hundreds of thousands of outstanding people from all walks of life. Those ideas have brought about license changes that brought in much-needed newcomers, and we're now possessed of new and exciting digital modes that have completely changed the face of disaster communications on a worldwide basis. Gone are the days of CW being the mode of choice for disaster comms.

This month, Rich Arland in his "Homeland Security" column reports on a new endeavor called the National Registry of Certified EmComm Volunteers, NRCEV for short. Amateur operator, Chris Snyder, NG3F, and other EmComm volunteers have formed a private organization that will, as Arland reports, "test, certify, and maintain a standardized registry of emergency communicators on a nationwide basis. Their mission: to structure a private certification organization that will certify EmComm volunteers, Amateur Radio Communications Teams (ARCTs), and EmComm organizations in the basic and advanced areas of providing communications during emergencies and disasters."

The NRCEV simply wants to begin a certification process for us that's recognized nationally by FEMA and other government agencies (state and local as well). It's really no different than certification for EMS personnel or CPR training and certification; after you've been tested and demonstrated your proficiency in emergency comms you're "certified" and become a valuable asset during times of need. And we know from the disastrous hurricanes and severe weather events that happen every year that you never know when your skills will be needed. As sure as we're amateur operators, our skills *will* be needed.

Specialized *on-going* training is a necessity, and as Arland observed, simply having an amateur license and "....the ability to build a transceiver out of a baggie of spare parts or even completing any of the ARRL ECC courses does not mean that you can function effectively as an emergency communicator during a disaster."

The League's three-tiered Amateur Radio Emergency Communications Course (ARECC) is an excellent start, but did you know that *certification* is federally mandated by Presidential Directive? That's where the NRCEV comes in. And it's where you come in: it's something we *all* need to support and become involved in, post-haste! As Arland says, "Like it or not, you're going to have to get on the certification bandwagon or be left in the dust."

Now is the time to stand up and be counted. After all, if we can't change our name, we can at least change the way we do business with those we serve. And the public perception of us amateurs might get a boost in the process. ■

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

News, Trends, And Short Takes

HCJB Ends English Broadcasts From Ecuador

Radio Station HCJB, the Voice of the Andes, aired its final English-language broadcasts on international shortwave radio from Ecuador on Saturday, May 6, even as the station's English Language Service shifts its emphasis toward teaching English as a second language. English was one of the first two languages, along with Spanish, to air when the station began broadcasting in Quito on Christmas Day, 1931.

To accommodate new international airport construction near the capital city of Quito, missionary engineers and national staff have lowered a two-antenna curtain array. And in 2003 the mission switched to local and regional AM and FM broadcasts in these regions while refocusing its Ecuador-based international shortwave outreach on Latin America.

Mission leadership has determined that the station will not risk potential radio interference to future air traffic communications once commercial flights begin. Barring unforeseen circumstances, all transmissions from the Pifo site (including Spanish, Portuguese, German, Low German, English, and various indigenous languages, including Quichua) are expected to end sometime in 2009.

HCJB is considering various options, including the idea of building a new, smaller site in Ecuador as the mission reviews how shortwave radio in Ecuador fits into its objectives of reaching the world for Christ. Other options include buying airtime from other broadcasters or placing transmitters at other sites owned by likeminded missions.

A 100-kW transmitter has already been shipped from Pifo to HCJB World Radio-Australia's shortwave site at Kununurra. That facility began transmissions in mostly Asian languages (in addition to English) in January 2003. Ten shortwave transmitters remain in Ecuador. The international transmitter site was later moved to Pifo in the early 1950s. Four of those transmitters were designed and built at the HCJB World Radio Engineering Center in Elkhart, Indiana, including a powerful 500,000-watt unit.

iBiquity Certifies New Reference Design For HD Radio Receivers

iBiquity Digital Corporation, the sole developer of digital HD Radio technology for AM and FM broadcasting, has recently released a new, upgraded HD Radio Reference Design for tabletop and home receiver manufacturers. Optimized for heightened AM/FM sensitivity and reduced bill-of-material costs, Version 2.0 provides a fast-track solution for OEM/ODM consumer electronics manufacturers looking to integrate HD Radio technology into current and future AM and FM radio product lines. The enhancements made to Version 2.0 will play an important role in lowering overall engineering expenses for consumer audio manufacturers and speeding time-to-market for new HD Radio products.

Sri Lanka Turns Back The Clocks

Sri Lanka permanently put its clocks back 30 minutes at midnight on May 5. For those who regularly travel between government and rebel Tamil Tiger-held areas, putting the two on the same time zone for the first time in a decade ended a sometimes irritating and confusing difference. The Tigers, de facto rulers of one fifth of Sri Lanka since a 2002 truce halted two decades of civil war, never accepted the original 1996 time change and simply kept their clocks set five and a half hours ahead of Greenwich Mean Time (GMT), in line with neighbor India.

Sri Lanka's decade-long flirtation with setting time six hours ahead of GMT began when President Chandrika Kumaratunga put the clocks forward by an hour with the aim of giving an extra hour of light in the evenings and reducing electricity demand. But the dark mornings produced by setting clocks at GMT plus six and a half hours provoked outcry, and the same year the clocks were pushed back again, where they have remained ever since—except in Buddhist temples, astrologers' offices and, of course, in rebel territory.

DAB Digital Radio Trials Launch In New Zealand

New Zealand joins the growing list of countries to adopt DAB as the new way of broadcasting in the digital age. The 12-month trial, driven by Broadcast Communications Limited (BCL), a broadcast network provider, will cover a large part of the Auckland area. The trial launches in September and during the trial, BCL will work closely with New Zealand's regulatory body to develop a spectrum plan and a policy for roll-out of both commercial and public broadcasting services.

The WorldDAB Forum, an international non-governmental organization whose role is to promote the awareness, adoption, and implementation of DAB worldwide, will support BCL by allowing it to benefit from other countries' successful regulatory systems for DAB. Public broadcaster Radio New Zealand and commercial broadcasters RadioWorks and Local Media Group have agreed to take part in the trial. Manufacturers will also support the trial by providing DAB products to be placed with consumers and industry figures during the trial. Commercial services are expected to launch in the country within 18 to 24 months of the trial start date.

Astra 1 KR Satellite Successfully Launched

SES Astra has announced that its new Astra 1KR satellite has been successfully launched into orbit. Astra 1KR roared into space onboard an Atlas V rocket from Cape Canaveral, Florida, and will be located at 19.2° East, Astra's prime orbital position for delivering broadcast services to Continental Europe, and will also transmit HDTV channels. With its satellite fleet ASTRA reaches 107 million homes in Europe.

(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.*

It's Coming—Are We Ready?

Dear Editor:

Like you, I'm still in shock and awe at our collective response to last year's hurricane disaster relief. I'm also amazed that there are those who will criticize me (us) for still complaining (and loudly) about it a year later. As you've observed in your "Tuning In" repeatedly, the government at both federal and state level is responsible for its citizens' welfare, and to *not* continue beating the drum is wrong, not to continue letting them have it in the chops!

Thank you for always coming out on the side of Americans who really care. (I also love to read Ken Reiss' "ScanTech," Joe Cooper's "Computer-Assisted Radio Monitoring," and Bill Price's "The Loose Connection"). Keep firing those rounds!

Harry B. Whitbeck
Omaha, NE

Worth The Price

Dear Editor:

I buy *Pop'Comm* because there's always something in each issue that catches my attention. Many times I first go to the "Readers Speak Out" section, then "Tuning In," and then Bill Price's "The Loose Connection." Either he has a big imagination or is really a very funny guy with more stories to tell than most people. What's your take?

Stephen Pembroke
Harrisburg, PA

Dear Stephen:

You hit the nail on the head; Bill is all those things. Just say "Good morning, how's it going?" and you'll usually get a funny story to start the day. What you read when you read "The Loose Connection" is far from imagination—unbelievably it's real stuff.

Got The DR-635T

Dear Editor:

After reading your "Tech Showcase" in the June *Pop'Comm* (page 46), I was pushed over the edge and bought the Alinco DR-635T. It's the best rig I've ever owned.

P.S. The picture of your cat going for the power cable made my day. Our cats are the same: If you put out something new and different and begin playing with it they immediately sit at a comfortable distance watching, until they determine it's safe, then come over to examine what's going on!

Robert Walters
Dallas, TX

Dear Robert:

That's exactly what our Daisy did. She sat on a chair at a considerable distance, then five minutes into the unpacking of the radio came over and became part of the action. Good luck with the 635T and thanks for writing!

Shortwave With A View

Dear Editor:

I'm new to the radio monitoring hobby (shortwave listening, in particular) and find it not only intriguing, but also very informative. You and your staff are doing a great job of giving out those frequencies and information on countries that are, as you've said, "part of the global community." I agree that it's more important now than ever to get all sides to the story.

Robert Jameson
Philadelphia, PA

Where's Shannon?

Dear Editor:

You probably don't remember me, but we talked at last year's Virginia Beach Hamfest and agreed to disagree on a few things you've talked about in your "Tuning In" column. At the time I was pretty satisfied that "things" were going along quite well here, but as time went on, I now have a different view on the world. Your points are well taken and I've decided to keep reading your magazine!

Now, what about Shannon? I love her column. You said she wasn't with you on that trip, but will she be there this year?

Gary Schneider
Norfolk, VA

Dear Gary:

Yes, I remember our conversation, and thank you for taking the time to write. No, Shannon won't be there, but she sends her appreciation to you for reading her monthly column!

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The Bearcat BCT8 scanner, licensed by NASCAR, is a superb preprogrammed 800 MHz trunked highway patrol system scanner. Featuring TrunkTracker III, PC Programming, 250 Channels with unique BearTracker warning system to alert you to activity on highway patrol link frequencies. Preprogrammed service searches makes finding interesting active frequencies even easier and include preprogrammed police, fire and emergency medical, news agency, weather, CB band, air band, railroad, marine band and department of transportation service searches. The BCT8 also has preprogrammed highway patrol alert frequencies by state to help you quickly find frequencies likely to be active when you are driving. The BCT8 includes AC adapter, DC power cable, cigarette lighter adapter plug, telescopic antenna, window mount antenna, owner's manual, one year limited Uniden warranty, frequency guide and free mobile mounting bracket. For maximum scanning enjoyment, also order the following optional accessories: External speaker **ESP20** with mounting bracket & 10 feet of cable with plug attached $19.95. Magnetic Mount mobile antenna **ANTMMBNC** for $29.95.

Bearcat® BCD396T Trunk Tracker IV

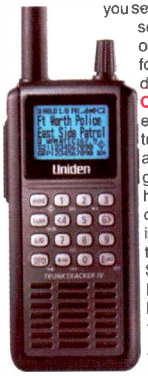
Suggested list price $799.95/**CEI price $519.95**

APCO 25 9,600 baud compact digital ready handheld TrunkTracker IV scanner featuring Fire Tone Out Paging, Close Call and Dynamically Allocated Channel Memory (up to 6,000 channels), SAME Weather Alert, CTCSS/DCS, Alpha Tagging. Size: 2.40" Wide x 1.22" Deep x 5.35" High

Frequency Coverage:

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

The handheld BCD396T scanner was designed for National Security/Emergency Preparedness (NS/EP) and homeland security use with new features such as **Fire Tone Out Decoder**. This feature lets you set the BCD396T to alert if your selected two-tone sequential paging tones are received. Ideal for on-call firefighters, emergency response staff and for activating individual scanners used for incident management and population attack warning.



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

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Bearcat® BC246T Trunk Tracker III

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

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

Frequency Coverage:

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

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

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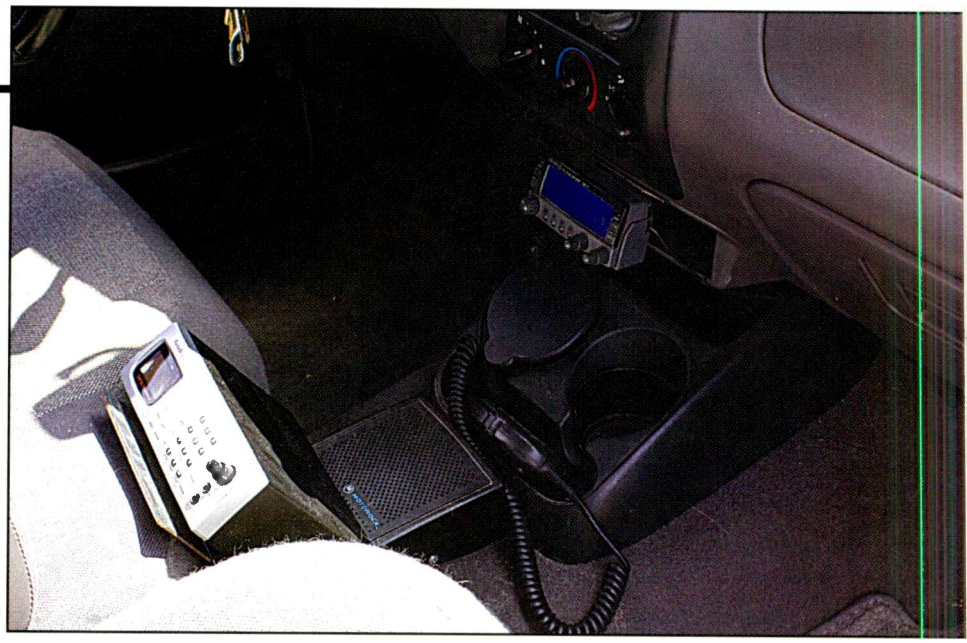
Miles Of Smiles

A Dozen Must-Know Mobile Radio Installation Tips

by Harold Ort, N2RLL



The ham transceiver is a Kenwood TM-V7A; the scanner is a RadioShack PRO-2096. The Kenwood is mounted using the Kenwood remote mounting kit, the control head is mounted on the dash, and the transceiver itself is mounted under the passenger seat. The scanner is mounted to a custom-made steel mounting bracket that slides under the front seat.

It's summertime and the drivin' is easy—except for those gas prices, of course—and you're ready to embark on a journey. Your bags are packed and you're ready to go, scanners and all, when you suddenly realize you're out of duct tape and your brother-in-law "borrowed" your last two bungee cords for his bicycle.

Not to worry, though. You're thinking you can always temporarily fasten that new handheld just above the glove compartment on the passenger airbag portion of the dashboard using some double-stick tape you got at the office superstore. After all, you're only going 100 miles and might be thinking that odds are the airbag won't deploy. Yeah, right. You probably also thought it would never cost you more than 50 bucks to fill your tank! Personally, I wouldn't take those odds to any bank, and you're crazy if you do. But the fact is, I've seen some pretty crazy mobile radio installations that can even be deadly. All it takes is a few "accidental" circumstances to occur and that improperly mounted radio becomes a deadly projectile.

It doesn't have to be that way; scanners and other mobile radios don't have to be mounted—even temporarily—like we're living in the Dark Ages. Let's take a look at how to mount that scanner in your vehicle so you're able to actually *use* the radio (what a novel thought!) and your hobby won't injure or kill yourself or a passenger.

If It Looks Easy...

Like most things in life, if it looks too easy or just doesn't "feel" right, it's your gut trying to tell you something. That something could be a duct tape-mounted radio stuck under the driver's side of a sloping dashboard that not only can't be seen but is also an accident waiting to happen when the tape fails and the radio falls—here comes Murphy's Law—under the brake pedal or elsewhere on the floor preventing you to brake or accelerate at just the right moment. So, **Tip No. 1** is to never mount *any* radio with duct tape, especially because when it falls (because it most certainly *will*) it will inevitably interfere with your vehicle's safe operation.

If you're laughing at the thought of using duct tape to mount a radio, join the Laughing Club, because I too laughed out loud at the recent Dayton Hamvention. There I spied plenty of strange radio installations, and yes, a couple with duct tape. Where there's one or two, chances are there are a hundred more! Don't do it.

One radio enthusiast once told me that he travels everywhere with his radio on the passenger seat. I nodded and moved on to talking about the weather. Fact is, though, while that small radio is sitting there minding its own business, in a minor crash it can—you guessed it—become a deadly projectile. If you have to make a sudden stop, chances are you'll also be concerned about the radio a little too much, perhaps even reaching over to keep it from sliding to the floor; in the meantime you've just rammed the vehicle in front of you! **Tip No. 2** has to be resist the temptation to put the radio on the seat. It's not worth it.

Possibilities

I do a fair amount of driving around the country with a trunkload of *Pop'Comm* and *CQ* magazine and sometimes I have to rent a vehicle. It's obviously never the same type of vehicle, so I've got to plan each temporary radio "installation." If the handheld scanner is coming along, it usually fits in one of the coffee cup holders, using the simple rubber duck antenna. It's not the best for good reception, but we must all compromise. On one particular trip to Virginia Beach I once worked around the less than desirable rubber duck by removing the antenna and attaching a simple six-foot length of coax that terminated with a BNC connector to the scanner. It worked a heck of a lot better than the rubber duck!

Tip No. 3 is use the coffee cup holder for small handheld radios, but don't pick it up to program the thing while you're driving. That's a lot like using a handheld cell phone while driving; in many places it's ticket time for *distracted driving* or other sim-

The Uniden BCT-8 with regular duty-type Velcro mounted at a good viewing angle in the Sonata.

ilar offense that simply means your mind isn't on the business at hand: driving.

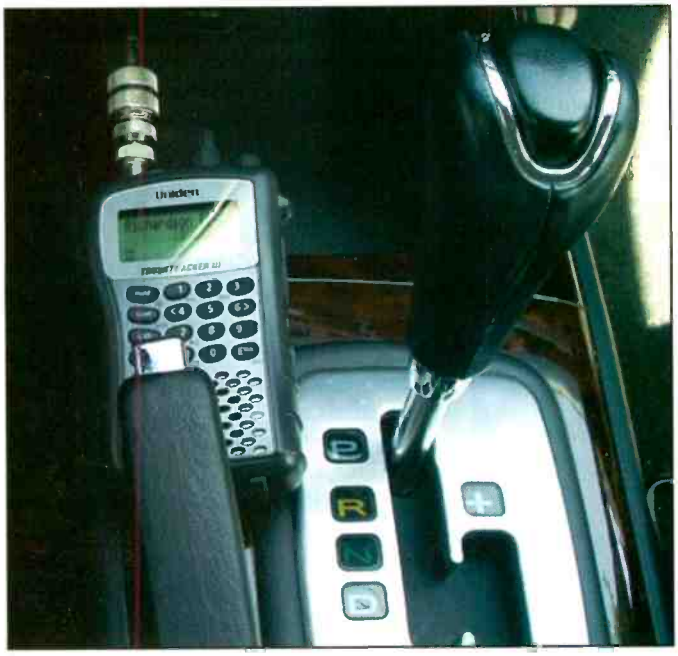
If you're able to fashion the coffee cup holder into a more permanent installation for your own vehicle, all the better. But always stay away from those vehicle cup holders that spring into action when you pull the small drawer where they're stored. They never should have passed inspection as a coffee cup holder, and they are *not* radio worthy!

Tip No. 4 is consider buying one of those inexpensive car "stuff" holders at your local department store. They hold just about everything, from soda cans and sunglasses to cell phones...and radios. You might have to rig an additional piece of plastic or wood in the holder to fit your radio, but it does have merit. If you're careful (which really means if you're not afraid to use a drill in your vehicle; or better yet, you know a good mechanic who knows *your particular* vehicle) one of those holders could be attached to the passenger side transmission hump, but don't forget to consider the passenger! Will the seat be moved back and forth?

See My Scanner?

Unless it's in some large vehicle like a truck or a hummer, I go Looney Tunes when I see a scanner or CB radio mounted on *top* of a dashboard. It's the same Looney Tunes for me when I see baseball hats and a Kleenex box on the rear deck of a vehicle. I can't explain it, it just makes me crazy.

Kleenex is something that fits nicely in that "stuff" holder or side door pocket so you can get to it when you need it, and if you want to wear a hat, *wear* it! So, **Tip No. 5** is not to mount your scanner on the top of your dashboard—if you



Here's the Uniden BC-246T scanner with an SO-239 to BNC coax mounted with Velcro on the plastic covering near the shifter.

The same mounting solution works perfectly for my Alinco DJ-G5T amateur HT using an MFJ-1716 rubber duck antenna. The viewing angle is nearly perfect, but it could be raised slightly with the addition of a small wedge of balsa wood or other material.

do, you're minutes away from a well-deserved ticket. Sure you can see the display, but there are other options. I've seen this mounting option done numerous times, complete with the DC power cable duct taped down to the dashboard. Talk about 19th Century mobiling!

Tip No. 6 is similar to No. 5: You get automatically turned in to the Tacky Police of whatever state you're traveling through if you ever mount your scanner either on the sun visor or the roof itself. You can't see it very easily, it's not safe, and it looks just plain goofy. It's okay for professional truck drivers to do this because they live in their big rigs, and chances are there's a large cubbyhole just for such things. Not so in your little Honda Civic or Volvo! It's okay for sunglasses and perhaps an old cheeseburger, but that's it.

Out Of Sight...

A friend once told me that the best place to mount a mobile scanner—especially in states that frown on mobile radio use—is in a cell phone or similar professional-looking "cradle" that's permanently mounted within arm's reach of the driver. Larry chose to mount his in a RAM mount (see www.ram-mount.com) on the plastic shift box. It didn't interfere with his driving because he mounted it on the passenger side of the box and simply positioned the easily adjustable ball mount for just the right viewing. He routed the antenna cable down and under the plastic with a protective plastic conduit, and under the metal runner and out to a trunk-lip mount antenna, a good 2-meter ham antenna that doubled as his scanner antenna.

So hats off to Larry for **Tip No. 7**: a good solid permanent vehicle mount can usually be accomplished using a combination of RAM mounting products that won't break the bank.

Looking Professional

If you've got the right vehicle and some extra room, the RAM-B-316-1U ($41.63) could be the answer to your mobile mounting dilemma. This large, sturdy assembly can be bent to just the right viewing position, preferably before mounting it to the seat bolt. I wasn't able to use this otherwise excellent mount in my vehicle (a 2003 Sonata) because once the seat nut was removed and the thick heavy-duty RAM bracket was positioned under the seat bracket (I had to also remove all four nuts), the seat wouldn't reattach because of the sheer thickness of the RAM mounting bracket. And mounting the bracket *on top* of the seat bolt didn't work either because of the construction of the seat bracket itself. Plus, even if I could have done that, then the seat couldn't be adjusted for other drivers.

But what's my "problem" might not be yours. I'm not completely writing it off in my vehicle; perhaps fashioning a thinner bracket to attach to the RAM bracket might work in my particular case. If I find a workable solution with this mount, I'll let you know in an upcoming issue of *Pop'Comm*. But if this one works for you, it's probably one of the better mobile mounting solutions. Plus, it'll certainly hold larger radios!

Don't sweat the small stuff, as they say, because RAM makes plenty of radio mounts, from the basic short RAM-111 on up to mounts that hold multiple radios. You're sure to find one that suits your needs.

Another *must check out* bracket is by IIX Equipment Ltd. They sent us the MM1101 single radio mount. The arm is nine inches high (other lengths are available) and it includes four hex mount bolts for attachment to your transmission hump or elsewhere in the vehicle, and it will keep the radio up and tilted for just the right viewing angle. It's only $55.50 (plus UPS shipping) from www.w9iix.com.

Our **Tip No. 8** is a standing request for you to check out not just this particular bracket, but all the other ones that the company offers. Why? Because they're sturdy, easily mountable to most vehicles—even mine—and you've got a lot of

The RAM or w9iix.com mounts can be bolted to the plastic transmission hump mount in this vehicle. It takes a cool day and some patience to drill the holes and reach up under the plastic with the nuts and lock washers.

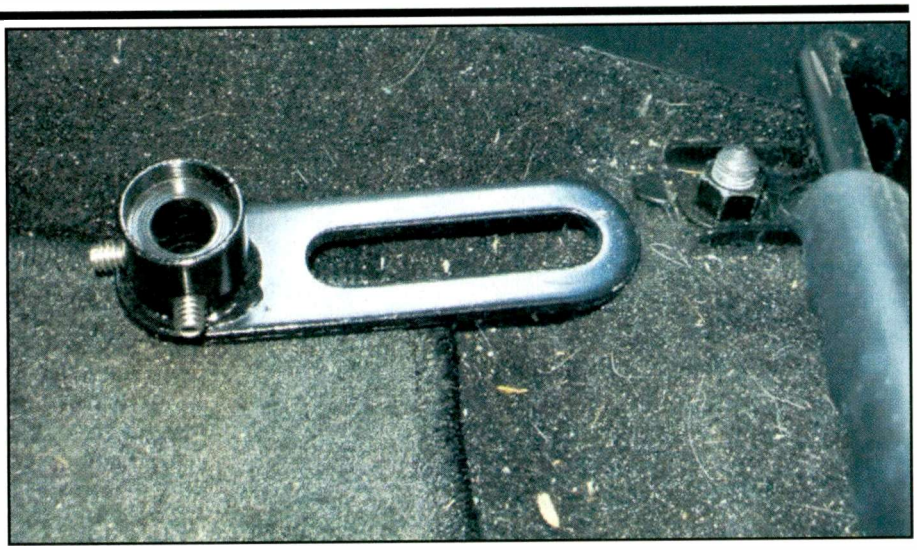
Mobile Mounting Guide—Tools Of The Trade

Here's a short list of some handy things you should consider to make that mobile mounting job a snap. Look at it this way—you might "need" these things for other projects, too!

Heavy duty (industrial strength) Velcro
Several assorted sizes of stainless steel nuts, bolts, and lock washers
Cordless Dremel power tool with assorted attachments
A good set of screwdrivers, especially with shorter screwdrivers for those hard-to-reach places
Small flashlight with stand
Package of double-stick picture-hanging squares to pre-position/hold brackets before drilling
Brightly colored permanent marker for marking hole positions and tracing brackets
A package of small cable holders

innovative mounting choices that are limited only by your careful, thorough planning and imagination.

I mounted mine on the driver's side of the plastic transmission hump, but didn't use the included hex bolts, instead using four one-inch stainless steel nuts, bolts, and lock washers. My mounting position only allows the driver's seat to be moved up to a certain point, but it works for both me and my wife, which is *very* good news! More good news: IIX also has many other mobile mounting bracket solutions that will hold one to lots of radios. (It also has a great item called the PM5 Power Connector Kit that allows you to connect up to five radios to the battery!) Call IIX in Hometown, Illinois, at 708-423-0605.



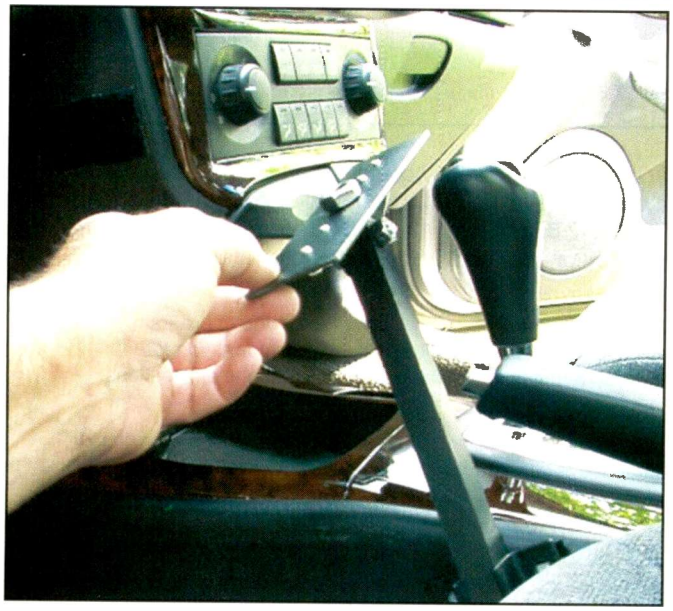
While I was unable to satisfactorily bolt the RAM pedestal bracket plate to the car's seat bolt, you might have better luck in your vehicle. A long flexible, yet sturdy, arm extends upward from this base to which you attach an optional RAM plate that conforms to most radios.

Hook And Loop Fastener, a.k.a. Velcro

Okay, this stuff works wonders when it comes to holding mops, brooms, garage tools, and assorted other everyday products, but how is it when it comes to holding your radios? The simple answer is **Tip No. 9**: Velcro *can* work—and quite well—*if* you get the right kind, know its limitations, and follow the directions. Sometimes we radio people like to think we can just run out, buy a quick-fix product, and skip the thinking process. Wrong answer!

I've found the best kind of this stuff is the industrial strength variety. It comes in a small box at your favorite hardware or office supply store and will only set you back three or four bucks. First thing to do is *think* about your radio mounting location. This product works best with small handheld scanners, CBs, or ham transceivers. Mounting a monster-size rig that weighs more than a couple of pounds using Velcro is an invitation to drop-testing your radio.

If you've got a radio larger and heavier than a typical handheld scanner or small CB, forget using Velcro. If your



Be sure to check out www.w9iix.com for a complete line of sturdy mobile mounts like this MM-1101, which is perfect for your CB transceiver or larger scanner. It can be tilted to just the right angle, and comes complete with the bracket you see here that attaches conveniently to most radios. Here it's bolted securely to the plastic housing over the transmission hump. I cut a small three-inch-square piece of aluminum sheeting, drilled four holes to match the mount's holes, and placed the aluminum under the plastic for extra support.

The Uniden BC-246T scanner standing upright thanks to its flat bottom and a small piece of industrial strength Velcro.

mobile rig is a Yaesu FT-2800M or ICOM IC-2200H, Velcro isn't for you simply because the rig is too heavy. Some enterprising folks have tried mounting this type of radio nearly vertically on the shift box mentioned earlier, but even in the vertical position, because of the intense heat in a closed vehicle during these summer months, there's a good chance the radio won't stay put.

For that typical handheld scanner, say a lightweight Uniden BC-246T, a small piece of industrial strength Velcro under the bottom of the scanner that's positioned in the catch-all box of the Sonata works great. My Alinco DJ-G5T amateur HT is also a perfect fit lying down to the left of the shifter, again fastened in place with Velcro. Don't forget to first clean the small area of your vehicle with alcohol and, if you can, roughen the surface by gently rubbing it with a small piece of fine grade sandpaper, remembering to wipe away the residue!

But for the hefty transceivers you'll want to skip the Velcro and—here's **Tip No. 10**—use the metal mounting bracket that came with the radio, attaching it in the good old-fashioned way with nuts, bolts, *and* lock washers to the transmission hump box. The only way it'll come off is when *you* remove it (as you should) when parking in the shopping mall parking lot to store it in your trunk.

A special reminder is in order here: Because years ago our dashboards were metal, when you mounted a transceiver it was grounded, but those days are gone. However, your transceiver should always be grounded for best operation, so run a wire or grounding strap from a bracket bolt to a ground. You might have to do a little work, but the time spent is well worth the effort!

You've Got The Power

Nothing is free, and of course that new scanner or transceiver needs power to operate. Thankfully in the case of scanners—at least the handheld variety—they operate from either alkalines or rechargeable batteries. But if your scanner needs 12 VDC, make sure you always adhere to **Tip No. 11**: Route the power cable as neatly and carefully as possible to the cigarette lighter receptacle (no, you don't need to run a scanner cable directly to the vehicle's battery!). Neatly means using those small inexpensive cable holders available at your favorite RadioShack; and carefully means ensuring the cable isn't placed between the carpet and the bottom of the plastic shift box or other sharp edge where it might be cut or entangled in your feet or your passenger's feet!

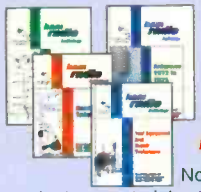
Many mobile radio enthusiasts I know use a quick-disconnect power cable (available at your local marine store or RadioShack), so when you want to remove the radio you don't have to re-route the cable; just unplug and go. Not a bad idea!

Sit in the vehicle in your driveway with a helper holding the scanner or radio positioned where you intend to mount it. Does it interfere with safe driving in *any* way? If it falls will it prevent you from driving?

An Even Dozen

Oh, yes, we did say we had 12 tips! **Tip No. 12** is have fun. Remember that driving is serious business, and that our radio hobby is just that—a *hobby*. But when you keep proper planning and safety paramount, you'll be enjoying mobile monitoring for many years to come! Please be sure to send us your mobile mounting solutions; a short article and a couple of photos are always welcome.

Have a great summer! ■



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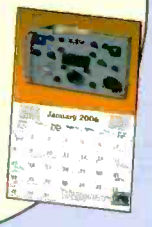

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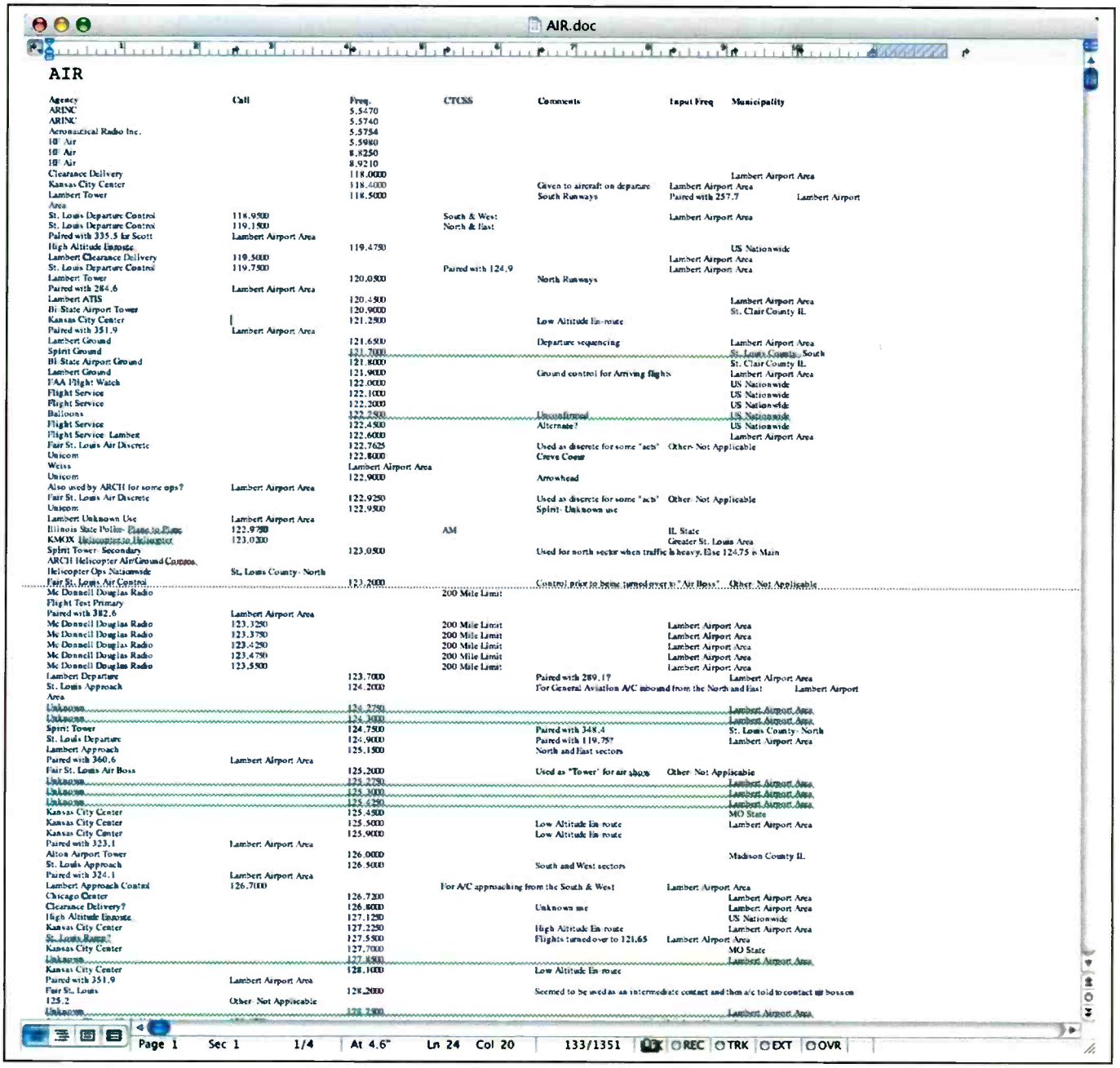
by Ken Reiss, radioken@earthlink.net

Managing Frequency Information 101

Last month we took a look at finding new frequencies, and I mentioned that you should keep track of the frequencies that you know about so you can spot *gaps* in your knowledge. Just by coincidence, I got an e-mail from reader Jack in St. Louis who was looking for suggestions on how to keep track of all the information he was beginning to collect. So let's take a look at some easy, and some not so easy, ways to keep all this straight.

Keeping track of frequency data, or more precisely user data, is really about half the game with scanning. Who's using what frequency and for what purpose? And in what memory position in which radio did I store that? The better job you do of keeping track of this essential information, the better you'll be able to program your scanner, and the more likely you'll be able to reprogram your radio when necessary to follow a major event. For the record, the absolute worst thing you can do is just program your



Even with a word processor and a few documents you can manage large amounts of information. The word processor has the advantage of being completely free form if you prefer. Most word processors do have a "find" function, so once you get the right document open you can search for the specific thing you're looking for.

"Keeping track of frequency data, or more precisely user data, is really about half the game with scanning."

radio without keeping any notes. Sooner or later, the power will fail or something will get corrupted and you'll have no data from which to reprogram the radio.

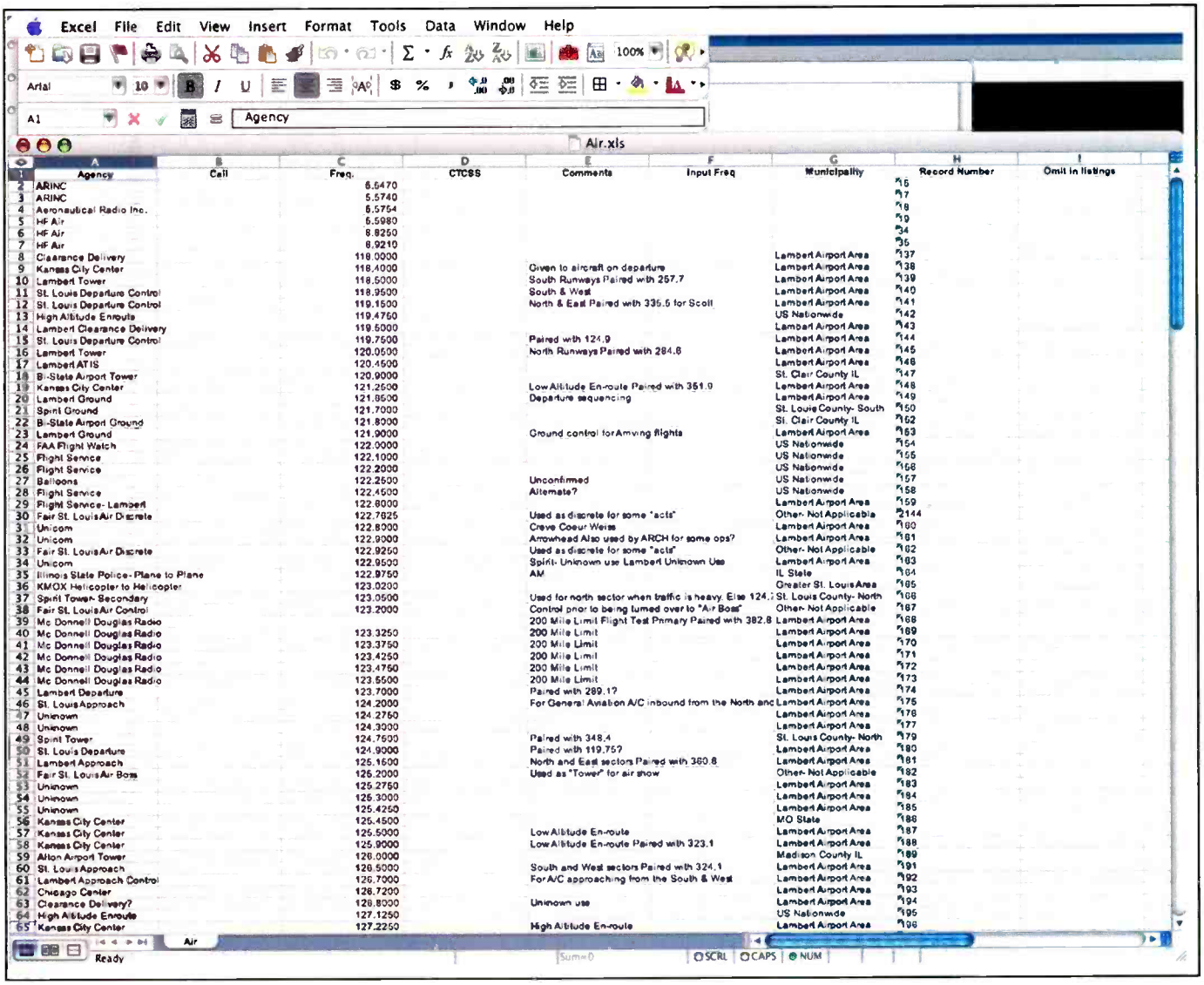
Most of us manage to keep this information. The question is how and where. At the most basic level, a disorganized mess of notes and lists that other folks may have given us over time gets collected someplace. It's not pretty, but a lot of us have operated that way for a long time. Sooner or later, probably at a time when you need to reprogram your scanner in a hurry, this system gets to you.

Perhaps the easiest system to get all of this organized is the good old fashioned three-ring binder. It's a tremendous leap forward over the lose-notes system, but it still can offer some challenges in finding information in a hurry. Most people I know organize their binders either by frequency or by the agencies they're interested in listening to. If you have a word processor to help you sort and reprint the information in several different forms, it can be extremely helpful.

Wanted: An Information Handler

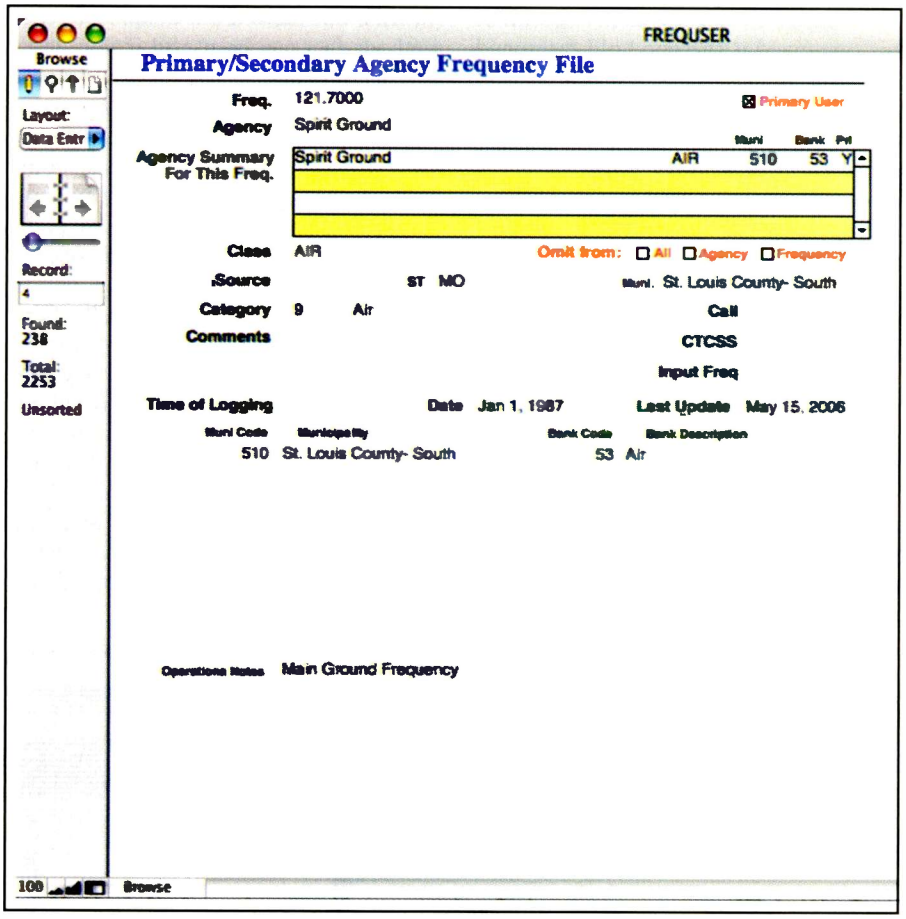
What we really need here is an information handler, something that's designed to take information in and spit it back out in any number of formats. A computer database is absolutely perfect for this, but there are a couple of other methods that can be useful if you don't have a computer.

The three-by-five (or four-by-six if you prefer) index card can go a long way toward helping out when there's no computer at your disposal. The best method I've seen (and believe me there are plenty of others if you don't like this one) is to use a card for each *frequency* you're interested in or have in your collection. Under the frequency, you can write the primary user of that frequency and any other information you might have about that user. On the back, you might list notes about what you've heard, 10-codes in use, or anything else that you might like to track. If you have more than one scanner, you might also indicate what radio has the frequency programmed into which channel.



Agency	Call	Freq.	CTCSS	Comments	Input Freq	Municipality	Record Number	Omit in listings
ARINC		6.6470					16	
ARINC		5.5740					17	
Aeronautical Radio Inc.		5.5754					18	
HF Air		5.5980					19	
HF Air		8.8250					34	
HF Air		8.9210					35	
Clearance Delivery		118.0000				Lambert Airport Area	137	
Kansas City Center		118.4000		Given to aircraft on departure		Lambert Airport Area	138	
Lambert Tower		118.5000		South Runways Paired with 257.7		Lambert Airport Area	139	
St. Louis Departure Control		118.9500		South & West		Lambert Airport Area	140	
St. Louis Departure Control		119.1500		North & East Paired with 335.5 for Scott		Lambert Airport Area	141	
High Altitude Enroute		119.4750				US Nationwide	142	
Lambert Clearance Delivery		119.5000				Lambert Airport Area	143	
St. Louis Departure Control		119.7500		Paired with 124.9		Lambert Airport Area	144	
Lambert Tower		120.0500		North Runways Paired with 284.8		Lambert Airport Area	145	
Lambert ATIS		120.4500				Lambert Airport Area	146	
Bi-State Airport Tower		120.9000				St. Clair County IL	147	
Kansas City Center		121.2500		Low Altitude En-route Paired with 351.9		Lambert Airport Area	148	
Lambert Ground		121.6500		Departure sequencing		Lambert Airport Area	149	
Spirit Ground		121.7000				St. Louis County- South	150	
Bi-State Airport Ground		121.8000				St. Clair County IL	162	
Lambert Ground		121.9000		Ground control for Arriving flights		Lambert Airport Area	163	
FAA Flight Watch		122.0000				US Nationwide	154	
Flight Service		122.1000				US Nationwide	155	
Flight Service		122.2000				US Nationwide	156	
Balloons		122.2500		Unconfirmed		US Nationwide	157	
Flight Service		122.4500		Alternate?		US Nationwide	158	
Flight Service- Lambert		122.8000				Lambert Airport Area	159	
Fair St. LouisAir Discrete		122.7625		Used as discrete for some "acts"		Other- Not Applicable	2144	
Unicom		122.8000		Creve Coeur Weiss		Lambert Airport Area	160	
Unicom		122.9000		Arrowhead Also used by ARCH for some ops?		Lambert Airport Area	161	
Fair St. LouisAir Discrete		122.9250		Used as discrete for some "acts"		Other- Not Applicable	162	
Unicom		122.9500		Spirit- Unknown use Lambert Unknown Use		Lambert Airport Area	163	
Illinois State Police- Plane to Plane		122.9750		AM		IL State	164	
KMOX Helicopter to Helicopter		123.0200				Greater St. Louis Area	165	
Spirit Tower- Secondary		123.0500		Used for north sector when traffic is heavy. Else 124.7		St. Louis County- North	166	
Fair St. LouisAir Control		123.2000		Control prior to being turned over to "Air Boss"		Other- Not Applicable	167	
Mc Donnell Douglas Radio				200 Mile Limit Flight Test Primary Paired with 382.8		Lambert Airport Area	168	
Mc Donnell Douglas Radio		123.3250		200 Mile Limit		Lambert Airport Area	169	
Mc Donnell Douglas Radio		123.3750		200 Mile Limit		Lambert Airport Area	170	
Mc Donnell Douglas Radio		123.4250		200 Mile Limit		Lambert Airport Area	171	
Mc Donnell Douglas Radio		123.4750		200 Mile Limit		Lambert Airport Area	172	
Mc Donnell Douglas Radio		123.5500		200 Mile Limit		Lambert Airport Area	173	
Lambert Departure		123.7000		Paired with 289.1?		Lambert Airport Area	174	
St. Louis Approach		124.2000		For General Aviation A/C inbound from the North and		Lambert Airport Area	175	
Unknown		124.2750				Lambert Airport Area	176	
Unknown		124.3000				Lambert Airport Area	177	
Spirit Tower		124.7500		Paired with 348.4		St. Louis County- North	179	
St. Louis Departure		124.9000		Paired with 119.75?		Lambert Airport Area	180	
Lambert Approach		125.1500		North and East sectors Paired with 360.8		Lambert Airport Area	181	
Fair St. LouisAir Boss		125.2000		Used as "Tower" for air show		Other- Not Applicable	182	
Unknown		125.2750				Lambert Airport Area	183	
Unknown		125.3000				Lambert Airport Area	184	
Unknown		125.4250				Lambert Airport Area	185	
Kansas City Center		125.4500				MO State	188	
Kansas City Center		125.5000		Low Altitude En-route		Lambert Airport Area	187	
Kansas City Center		125.9000		Low Altitude En-route Paired with 323.1		Lambert Airport Area	188	
Alton Airport Tower		126.0000				Madison County IL	189	
St. Louis Approach		126.5000		South and West sectors Paired with 324.1		Lambert Airport Area	191	
Lambert Approach Control		126.7000		For A/C approaching from the South & West		Lambert Airport Area	192	
Chicago Center		126.7200				Lambert Airport Area	193	
Clearance Delivery?		126.8000		Unknown use		Lambert Airport Area	194	
High Altitude Enroute		127.1250				US Nationwide	195	
Kansas City Center		127.2250		High Altitude En-route		Lambert Airport Area	196	

A spreadsheet makes it easier to categorize and sort information, but it may be a little harder to enter other little pieces of information that you tend to collect over time.



A data manager will allow for almost any type of data and also for free form places for notes or comments. Shown is a very simple layout in Filemaker Pro.

At any time, you can re-sort the cards into a different order if you prefer. As long as you consistently keep the cards filed and keep good notes, you'll find that a wealth of information builds up over a very short time. And information is the name of the game. By keeping them filed in an order that makes sense to you, you'll be able to quickly find a card and update the information as you learn or hear new things.

You can also consider a card for each memory bank, or even each memory position, just so you know what's where. This is a bit of redundant work and it's easy to let it slide, so don't do that—it's better to have one system that's completely up to date than two that are almost sort of correct.

Computerize The Process

A friend of mine used to say "If you don't have a system that works, putting it on a computer will only make it not work faster." There's a lot of truth to that, and it's something to keep in mind as we talk about getting this data moved over to the computer. There are a lot of different computer applications out there in the marketplace that will track information; some of them are even designed for scanner frequency information. But if they don't think the way you do, or don't provide enough flexibility, it's a waste of time. I'm going to focus on the programs that are generic, off-the-shelf information managers. If you find a "pre-built" system that works for you, great!

Many programs have the ability to handle information. At the most basic level, a word processor will work,

"The first thing to consider before you even start with the computer is what kind of information and reports you want to get out of the system."

although you'll have to do most of the sorting and formatting yourself. Many computers come with a program like Microsoft Works installed. Some of those programs have both a word processing module and a data handler in them. Do some experimenting and see what your existing software is capable of doing.

A word processor all by itself can help organize the information and allow you to quickly move things around even in a single document. However, you can create a directory in your documents folder that is reserved just for scanner info, and then create a separate document for anything that you think would be useful to track. What frequencies are in this radio? This bank? What are the frequencies in use by the police? The fire department? What are the itinerant frequencies? How much do you know about 155.145 and how its units are dispatched? Etc., etc., etc.

The Database

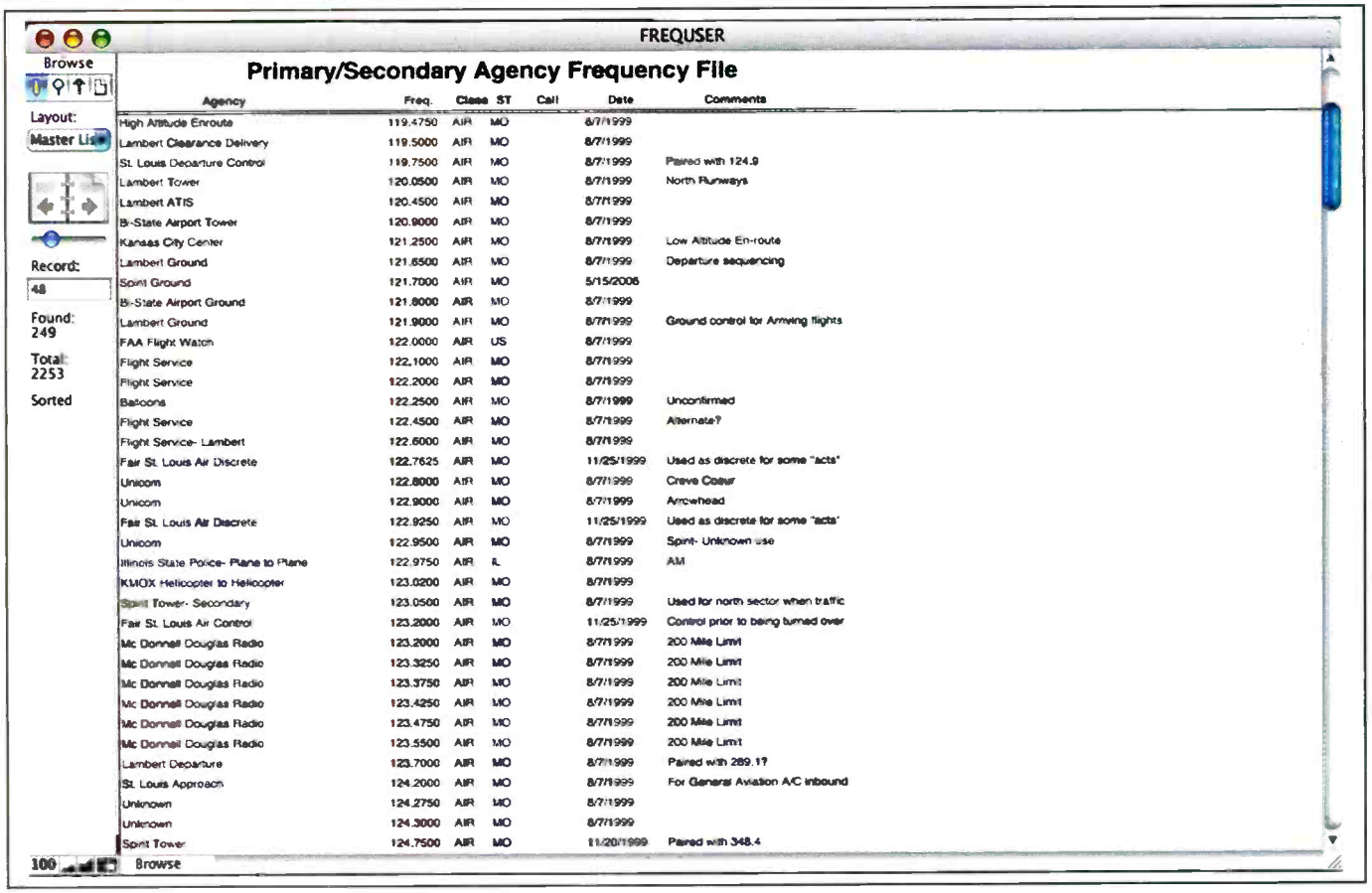
Many people like to use a spreadsheet program like Excel or Lotus. Those work fine, too, and do allow for sorting and searching information fairly rapidly. The reason I've never used one of these types of programs for scanner information is that they don't seem to offer enough flexibility in printing various reports, or enough room for notes and comments. A real database program works best, and there are many types of those, as well.

The first thing to consider before you even start with the computer is what kind of information and reports you want to get out of the system. How do you want it to

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.*

Since we mentioned it earlier, let's get some more information on **155.145**. Have a listen and let me know what you hear. Don't forget to keep your own notes, too! As you write in for the frequency entry, let me know what you've done with a data system, computer or otherwise? Send in your suggestions for fields and software. And don't forget to send in questions, information, or pictures of your shack. Send all this to Ken Reiss, 9051 Watson Rd. #309, St. Louis, MO 63126, or e-mail radioken@ earthlink.net. Until next month, good listening!



Agency	Freq.	Class	ST	Call	Date	Comments
High Altitude Enroute	119.4750	AIR	MO		8/7/1999	
Lambert Clearance Delivery	119.5000	AIR	MO		8/7/1999	
St. Louis Departure Control	119.7500	AIR	MO		8/7/1999	Paired with 124.9
Lambert Tower	120.0500	AIR	MO		8/7/1999	North Runways
Lambert ATIS	120.4500	AIR	MO		8/7/1999	
Bi-State Airport Tower	120.9000	AIR	MO		8/7/1999	
Kansas City Center	121.2500	AIR	MO		8/7/1999	Low Altitude En-route
Lambert Ground	121.6500	AIR	MO		8/7/1999	Departure sequencing
Spirit Ground	121.7000	AIR	MO		5/15/2006	
Bi-State Airport Ground	121.8000	AIR	MO		8/7/1999	
Lambert Ground	121.9000	AIR	MO		8/7/1999	Ground control for Arriving flights
FAA Flight Watch	122.0000	AIR	US		8/7/1999	
Flight Service	122.1000	AIR	MO		8/7/1999	
Flight Service	122.2000	AIR	MO		8/7/1999	
Balloons	122.2500	AIR	MO		8/7/1999	Unconfirmed
Flight Service	122.4500	AIR	MO		8/7/1999	Alternate?
Flight Service- Lambert	122.6000	AIR	MO		8/7/1999	
Fair St. Louis Air Discrete	122.7625	AIR	MO		11/25/1999	Used as discrete for some "acts"
Unicom	122.8000	AIR	MO		8/7/1999	Creve Coeur
Unicom	122.9000	AIR	MO		8/7/1999	Arrowhead
Fair St. Louis Air Discrete	122.9250	AIR	MO		11/25/1999	Used as discrete for some "acts"
Unicom	122.9500	AIR	MO		8/7/1999	Spirit- Unknown use
Illinois State Police- Plane to Plane	122.9750	AIR	IL		8/7/1999	AM
KMOX Helicopter to Helicopter	123.0200	AIR	MO		8/7/1999	
Spirit Tower- Secondary	123.0500	AIR	MO		8/7/1999	Used for north sector when traffic
Fair St. Louis Air Control	123.2000	AIR	MO		11/25/1999	Control prior to being turned over
Mc Donnell Douglas Radio	123.2000	AIR	MO		8/7/1999	200 Mile Limit
Mc Donnell Douglas Radio	123.3250	AIR	MO		8/7/1999	200 Mile Limit
Mc Donnell Douglas Radio	123.3750	AIR	MO		8/7/1999	200 Mile Limit
Mc Donnell Douglas Radio	123.4250	AIR	MO		8/7/1999	200 Mile Limit
Mc Donnell Douglas Radio	123.4750	AIR	MO		8/7/1999	200 Mile Limit
Mc Donnell Douglas Radio	123.5500	AIR	MO		8/7/1999	200 Mile Limit
Lambert Departure	123.7000	AIR	MO		8/7/1999	Paired with 289.17
St. Louis Approach	124.2000	AIR	MO		8/7/1999	For General Aviation A/C inbound
Unknown	124.2750	AIR	MO		8/7/1999	
Unknown	124.3000	AIR	MO		8/7/1999	
Spirit Tower	124.7500	AIR	MO		11/20/1999	Paired with 348.4

Looking through a list is a much faster way to find things, so any good data manager will have a" list" function as well.

Expanded

Frequencies by Agency

Agency	Freq.	CTCSS	Class	ST	Call	Prl. User	Date	Comments
ACARS	131.5500		AIR	US		Y	2/2/1994	
Aeronautical Radio Inc	130.6250		AIR	MO		Y	3/4/1994	TW Express- Ramp Control
Aeronautical Radio Inc.	5.5754		AIR	SW		Y	7/31/1995	
Aeronautical Radio Inc.	128.8250		AIR	US		Y	2/2/1994	
Aeronautical Radio Inc.	128.8500		AIR	MO		Y	11/25/1999	
Aeronautical Radio Inc.	129.0000		AIR	MO		Y	11/25/1999	Trans World Express
Aeronautical Radio Inc.	129.1250		AIR	US		Y	2/2/1994	ACARS Backup
Aeronautical Radio Inc.	129.2000		AIR	US		Y	2/2/1994	American Air Flight Ops
Aeronautical Radio Inc.	129.3500		AIR	MO		Y	7/31/1995	San Francisco Remote- Nationwide
Aeronautical Radio Inc.	129.3750		AIR	MO		Y	7/31/1995	Northwest
Aeronautical Radio Inc.	129.4250		AIR	MO		Y	7/31/1995	
Aeronautical Radio Inc.	129.4750		AIR	MO		Y	7/31/1995	
Aeronautical Radio Inc.	129.5000		AIR	MO		Y	7/31/1995	Delta- Nationwide
Aeronautical Radio Inc.	129.6250		AIR	MO		Y	7/31/1995	TWA Service & Catering
Aeronautical Radio Inc.	129.6500		AIR	US		Y	2/2/1994	
Aeronautical Radio Inc.	129.7250		AIR	MO		Y	11/25/1999	
Aeronautical Radio Inc.	129.7750		AIR	US		Y	7/31/1995	TWA- Ramp Control
Aeronautical Radio Inc.	129.8500		AIR	MO		Y	3/4/1994	TWA Maintenance

The data manager can automatically track some information for you. This report includes the date that the data was entered so you can tell how reliable it is. Fortunately, things in the air band don't change often!

look? What things do you want to be able to sort by? How much time are you willing to spend organizing and keeping up the system? Go back to our index card system and think about what you'd put on your cards.

There are probably as many kinds of information and ways to store it as there are scanner listeners. Because of this, I won't even begin to give you a suggested "best" way to do it, but I can suggest a few things I've seen over the years that you might want to consider.

Of course, you'll want to start with the frequency in question, and probably some listing of the primary agency or licensee on that frequency. You might also want to "categorize" the usage of the frequency (police, fire, dispatch, mobiles, air, etc.). This would be useful if you ever wanted to pull up all your fire frequencies, for instance.

You might also store the callsign of the agency to help you identify it later. Or maybe you want information about the input frequency for repeaters. How about any CTCSS or DCS squelch systems that are in use? What geographic area is served by a given agency? And you might want a date of your last modification so you know how current the information is (some systems can enter this for you every time the record is updated). Notes or comments regarding dispatch numbers and codes that are in use can prove to be some of the most useful information to store over the long run.

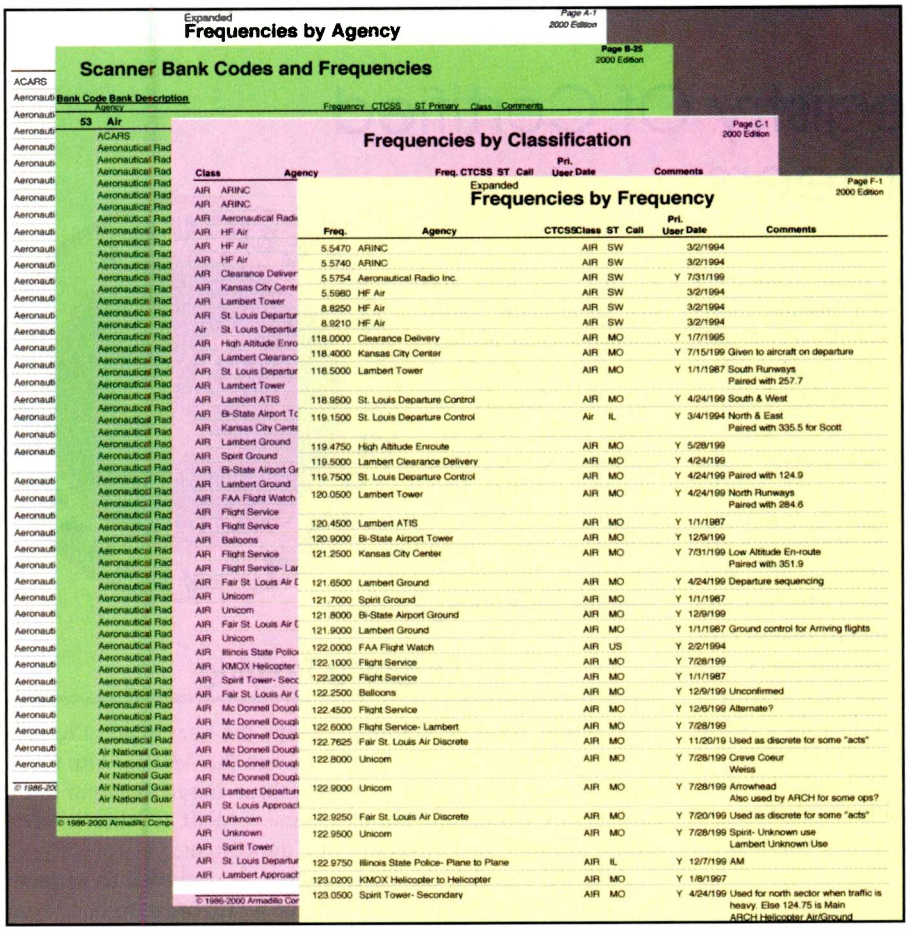
One of the things that database programs can do better than any other software is *reporting*—they give you the ability to sort and print information in a variety of ways with just a couple of mouse clicks. Some of the reports look like index cards, but printed on larger paper (although I guess if you were really dedicated, you could probably run index cards through your printer, too). And, just as easily, you can get "listing" reports which look more like a page from the phone book. Those are the reports that I find most helpful.

Using almost any database software, you should be able to get a listing of any, or all of, the information you've put on your "card," or as database people like to call it, your "record." Each piece of information on the card, such as frequency, agency, and callsign, is referred to as a "field." Some fields, like comments and notes for instance, may take up a fair amount of space, or at least be quite variable depending on how much information you have on a particular agency. Some database systems will allow you to deal with this quite easily, while others won't. You might decide that you don't want to print that information on a report that lists just frequency and primary user. Or perhaps you want to be able to run a report based on the scanner and channel number that the frequency is stored on in your radio. If you've put that information into the system, you should be able to get it out easily.

More advanced systems, like Microsoft Access and Dbase-type programs, allow you to not only store the information, but also to store search criteria and will report the results in a number of formats. You can also program these systems to do some very extensive searching of multiple files while looking for information.

Find What Works For YOU

That's all cool stuff, but for the most part, unless you're into databases for fun, it's way more than you need to manage your scanner information. What you do need is a computerized index card sys-



From this simple data, reams of paper can be produced if desired. Frequency information can be re-sorted and printed by frequency, or in alphabetical order by the agency that uses the channel, or by state, or by almost any other factor you desire. A printed list makes it quick to find information when you're away from the computer.

tem. The database pros call this a "flat" file system. Almost any data manager will work for this, including Microsoft Access, Filemaker, and those other high-end programs that can do the fancy stuff if you grow into it.

So where do you start? At the beginning, of course. Begin. Do something. Use whatever software you might have and try something, even if it's just a word processor. If you've never used it this way before you might be pleasantly surprised to find out what it can do.

A low-cost text handler that I like to use is Text Edit. In addition to basic (very basic) word processing tasks, it can be instructed to search all the text files in a particular folder, looking for text inside the documents. Some operating systems can do this now, too, so a special program may not be necessary.

You might need to have a look at the manual that came with your software to figure out what it will and won't do. Some software requires that you declare in advance the type of information that will be contained in a field. Some does not. If yours does, look at the choices available to you. It should be pretty obvious what kind of data goes where. Frequency data should be a number (a real number if you have a choice between real and integer). Agencies, callsigns, and notes fields all need to be text-based.

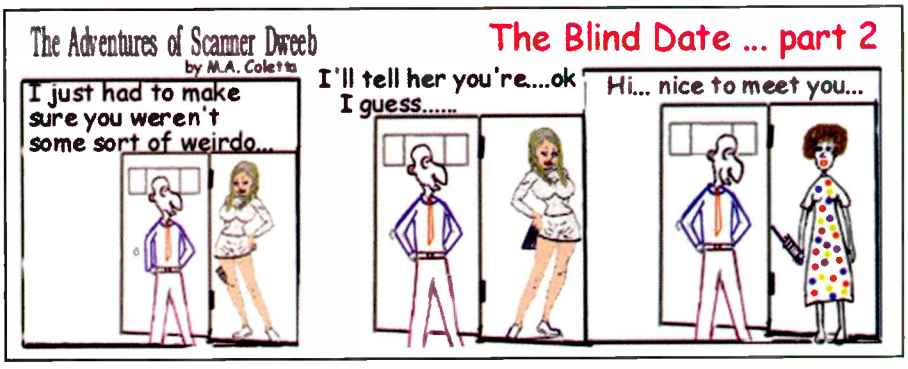
Some software makes a distinction between a "short" text field and a "long" one. Generally a short text field is good for agency and callsign-type information (usually anything up to a certain number of characters), while a long text field is good for notes and comments that can grow and grow. Even the long text field will have a limit, but it's usually high enough that you won't be bothered by it for a long time. My favorite program, Filemaker Pro, has a limit of 64,000 characters in a single text field. That's about 32 pages, which I think should be adequate for most things.

Be prepared to spend some time typing in the data. And be prepared to throw the whole thing away and start over when you figure out a better way, or if you find another program that suits your needs better. In the meantime, you can have a lot of fun cleaning out that stack of notes you have (and probably be reminded of several things you forgot about).

Have fun with this. Yes, it's a bit of a chore to get all the data in there, but in the long run it will prove worth the effort! If you're not sure of your abilities or your software, you might just enter a few records and play with them. See if anything becomes obvious that your system won't do before you spend all the time getting *all* the data in. And see if any of your friends are using a system like this. Perhaps you can all agree on a format and software so that you can exchange data easily. Wouldn't that be just too easy...

Share Your System

How do you manage your frequencies and data? Drop me a note (and a screen shot if you can), and we'll publish it right here in your favorite *Pop'Comm* column! See you again next month. ■



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

The National Registry Of Certified EmComm Volunteers

The National Registry of Certified EmComm Volunteers (NRCEV) is a term that Emergency Communications (EmComm) volunteers are going to become very familiar with over the next few years. NRCEV is the brainchild of several dedicated EmComm volunteers in Snyder County, Pennsylvania.

Chris Snyder, NG3F, and others are the prime movers in the endeavor to form a private organization that will test, certify, and maintain a standardized registry of emergency communicators on a nationwide basis. Their mission: to structure a private certification organization that will certify EmComm volunteers, Amateur Radio Communications Teams (ARCTs), and EmComm organizations in the basic and advanced areas of providing communications during emergencies and disasters.

The ultimate goal of the NRCEV will be for their certification process to be recognized on a *national* level by the Federal Emergency Management Agency (FEMA) and the Department of Homeland Security (DHS), along with all state and local governmental agencies, Volunteer Organizations Active in Disasters (VOAD) members and the amateur radio community.

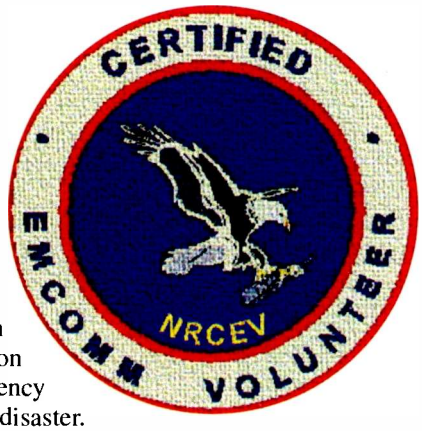
Changing Times

The days of the amateur radio operator grabbing his or her handheld VHF/UHF radio and a handful of batteries and running out the door to provide emergency communications during a disaster are over. Period!

The name of the game in the post-9/11 era of disaster mitigation is "certification." Just owning a truckload of sophisticated communications gear and participating in the American Radio Relay League's (ARRL) annual Field Day exercise the last weekend in June and the annual Simulated Emergency Test (SET) each fall is not enough. Today's EmComm volunteers need specialized training. They need to know the operations of the Incident Command System (ICS), the National Incident Management System (NIMS), the National Response Plan (NRP), as well as basic and advanced communications procedures, stress management techniques, how to allocate communications resources, and work with volunteers. And the list goes on.

In a nutshell, today's EmComm volunteers need on-going training along with a ***method of demonstrating their proficiency*** for served agencies and disaster mitigation professionals. It is not enough to get the "book learning." Now you must *demonstrate* your EmComm proficiency to be of any value to a served agency. Enter the NRCEV and EmComm certification.

Like it or not, if you're involved in emergency communications as an EmComm volunteer, supporting your local/county Emergency Operations Center, a served agency like the American Red Cross, the Salvation Army, etc., or even if you're just an individual who wants to volunteer your time and talents to help in a disaster, you're going to need to be certified by an organization like NRCEV. As I said before, simply owning a lot of comm gear, having an amateur radio license and the ability to build a transceiver out of a baggie of spare parts, or even simply completing any of the ARRL ECC courses does not mean that you can function effectively as an emergency communicator during a disaster.



Ongoing Training

Training, training, training...that's the buzzword of today's disaster professional. Several years ago the ARRL, with federal and private grant money, started a three-tiered Amateur Radio Emergency Communications Course (ARECC) that is taken online through the University of Connecticut.

ARECC Level-I, the basic course, is designed to acquaint the uninitiated radio amateur with the world of emergency communications. It provides only a starting point. Let me stress that: ***it provides only a starting point for further training and evaluation of EmComm skills***. The ARECC Level-II course builds upon the basic course, and trains students in net control operations, and acquaints them with the intricacies of disaster mitigation and managing communications resources and assets.

The Level-III course takes the student upward and provides an in-depth look at the management end of emergency communications. These three courses, along with evaluation of a volunteer's EmComm skills, provide a starting point that NRCEV certification uses to initially qualify an amateur radio operator as an EmComm resource.

The NRCEV certification takes one of several forms: Individual Certifications, Amateur Radio Communications Team Certification, and Organizational Certification. This covers all bases for individuals, teams, and organizations to become certified in their craft, regardless of their local club/served agency affiliation.

Assuring The Pros That We're Ready!

About now I'm sure some of you are asking yourselves, "Why should I become certified? I know what I'm doing and all I really want to do is help out in times of disaster."

The certification aspect of emergency communications should not come as a surprise to any radio amateur. Certification is mandated under Homeland Security Presidential Directive/HSPD-5 and HSPD-8. In other words, to be seriously considered as an asset by professional disaster officials, you ***MUST*** be certified and that's where NRCEV comes in. Its sole purpose is to certify and maintain a registry of trained/certified

"It stands to reason that a uniform and nationally standardized certification program is sorely needed within the EmComm community. The ARRL took the first step with its ARECC program."

EmComm volunteers who can be utilized on any level (national/state/county or local) during a disaster.

Essentially this is called "resource typing." It is a standardization procedure whereby the NRCEV assures the professional disaster mitigation community that the people that are sent into a disaster site to perform emergency communication duties are trained to a specific level of competency and are able to do the job in a professional manner.

Without a doubt, the NRCEV will encounter some "growing pains" in its attempt to certify and establish a registry of trained EmComm volunteers. Probably the single largest hurdle it will have to overcome is the EmComm volunteers themselves. First of all, it will cost an individual a $5 registration fee and an additional $25 individual application fee in order to be evaluated and certified. While this will definitely be a sore point with some folks, it's a necessity for EmComm volunteers to be assured a place at the table during emergencies.

When we look at the big picture, many professions, and even hobbies, have a certification process. Doctors, lawyers, police, fire, EMS, paramedics, SCUBA divers, etc., all have a certification process and they all have a price tag attached to them. Why, if we are going to be utilized in life-safety communications, should we, as EmComm volunteers, not be certified, too? It stands to reason that a uniform and nationally standardized certification program is sorely needed within the EmComm community. The ARRL took the first step with its ARECC program. The NRCEV is taking it a step further to certify and maintain an active registry of qualified EmComm personnel for use at all levels in disaster mitigation. It's not free, all this takes money.

The time, effort, and energy needed to devise and implement this certification program are immense. The costs associated with the administration of the program are also large. Of course, everyone who becomes certified will want: 1. a picture ID card (in color, naturally) for their wallet/purse; 2. a certificate (multi-color, suitable for framing) for their "I love me wall"; 3. a hard-copy listing of all their courses/training so they can present it to their respective served agency/radio organization for the agency's training records.

Well, you get the picture. If you want all these things and you want a certification process that is professionally done, it takes people and money to do it properly. These costs will have to be passed onto the individual and/or organization. Remember, the NRCEV is a ***PRIVATE*** organization and does not receive any government funding.

Good For Three Years

NRCEV certification is good for three years before EmComm volunteers, ARCTs, and related organizations have to be re-certified to remain current. Again, nothing new; professionals are required to update their certification regularly, and we will be no different. Of course, there will be a fee attached to accomplish this re-certification. In addition to the money,

the re-cert process will include further training and continuing education courses taken during the initial three-year certification period. All the additional training needs to be documented, signed off by someone in the program who is designated as the training coordinator, and submitted to the NRCEV at the time of re-certification.

Certification, re-certification, continuing education courses, documented training exercises—what does it all mean? Basically, it means that our role as EmComm volunteers has suddenly taken on a whole new dimension. We are now *expected* to be qualified to a minimum level and to have this training documented by a private certification agency (in accordance with Homeland Security Presidential Directive) in order to participate in the disaster communications business.

Like it or not, you're going to have to get on the certification bandwagon or be left in the dust. To quote the lyrics of an old song: "the times, they are a changin.'" Professional disaster mitigators expect a certain level of training, expertise, and professionalism from *everyone* who is in the game, and EmComm volunteers are no exception. To learn more about NRCEV and its certification program, go to visit www.nrcev.org.

Here's the Eton E-10 receiver—perfect as a second receiver or when you're traveling.

Summertime Is Radio Fun Time!

Traditionally summertime brings forth bikinis, beer, beaches, camping, hiking, and generalized outdoor fun for the entire family. Is there any reason that a dedicated radio enthusiast should not bring his or her comm gear along to have some fun in the sun? Absolutely not!

Believe it or not, RadioShack is clearing out a great little shortwave/AM/FM radio, the Eton E-10, for an impressive $50 while supplies last. This is a small, very compact, feature-packed general coverage receiver that you can stuff in your backpack, glove box, camper stowage, kayak, or what have you, allowing you almost unrestricted access to the HF spectrum. Couple the E-10 with a handheld scanner and you have a nice and highly portable monitoring post that can go anywhere.

Before we go any further: "No!" I don't own any stock or get any perks from RadioShack. My only purpose in mentioning the E-10 is that it's a stellar buy and can definitely be of use while you're away from your main station. It will not demodulate SSB or CW signals (it does not contain a BFO or product detector), however for 50 bucks, it's a steal of a deal. It does have a nice, large, easy-to-read digital display with selectable backlighting, direct keypad entry of frequencies via the 12-button front panel keypad. There's a digital S-meter on the display and an internal clock that you can set to local or Zulu (GMT/UTC) in 12/24-hour format for accurate logging.

The radio features dual timers for your convenience, too. It will scan memories or step through a band of frequencies. All 14 international shortwave bands are accessible with the E-10. This radio features a short (about 30-inch) whip antenna and an antenna jack on the side of the radio where you can attach an external antenna. Also featured is an antenna trimmer control to more properly match the antenna of your choice to the radio for the frequencies being use.

Speaking of memories, the E-10 has a total of 500 programmable memories (50 memories in 10 banks). That's a lot of room for frequency storage. The frequency range of the E-10 is AM Bcst: 520–1710 kHz; HF: 1711–29999 kHz; FM: 87–108 MHz. There's a "fast/slow" tuning rate for use with the manual dial tuning and a tunable wide/narrow IF switch to allow the user to reduce the IF bandwidth for crowded HF band conditions. There's a rudimentary RF gain control, a dual-position tone control, antenna sockets for FM/SW, earphone socket and 6-VDC input. The E-10 comes with a set of NiMH rechargeable batteries but I don't like to use rechargeables so I replaced them with standard Duracell "AA" alkaline cells, which I feel more comfortable using.

For the money, the Eton E-10 is a great buy and, if nothing else, could be used as a back-up receiver for general SW and broadcast listening.

Belenko Letter Blitz

That's all for this month. Point of interest: the June 2006 column regarding tube-type CB radios and Belenko's defection with his MiG-25 in 1976 certainly generated a lot of feedback for yours truly. That's a good thing. So far all the feedback has been very positive, and I have made contact with a former Air Force member who was an integral part of the Belenko debriefing after he defected. Inquiring minds want to know.

Until next month remember: Preparedness is not optional! ■

Our August Winner: Brian Limbach of Pittsburgh, Pennsylvania

Here's Pittsburgh's Brian Limbach at his neat monitoring post.

Pop'Comm reader Brian Limbach tells us,

I have been a shortwave listener for 32 years! Several receivers have been used during that time. I started in 1973 using a 4-10 mc portable shortwave receiver. There was no BFO, so sideband reception was not possible. However, I got my first taste of international broadcasting listening to the BBC, Peking, China, and WWV, which were my first stations heard.

My next receiver was a Heathkit SW-717, which my brother built for me in December 1973. International broadcast, some amateur radio station reception, and CB were received.

The Drake 2-C communications receiver arrived in June 1974. It was a birthday gift purchased from Tydings Radio in Pittsburgh. Much better reception of all modes could be had now, with Luxembourg, South Africa, and Vietnam received for the first time, along with stations in USB and LSB, including ham contest operations. I even got my first receptions of slow scan television on 14.230. Unfortunately I did not—and still don't—have the monitor with which to see their transmissions.

Starting in 1983, I got the opportunity to obtain and use for several years a Sony ICF 7600A. It had analog tuning of the 49-, 41-, 31-, 25-, 19-, and 16-meter bands that offered me many different stations. Reception was very good.

My latest receiver is a Kenwood R-5000 that I purchased in 1987. I have obtained several QSLs over the years, starting in 1973, with 53 total cards to date. Currently, I have 24 shortwave, 17 mediumwave, and 12 amateur radio contacts in my card collection. Maybe it's not the number of cards others have, but I treasure them all. The Voice of America was the first one I obtained.

I have enjoyed this hobby, with the new shortwave radio countries and exotic amateur radio operations I have heard over these many years.

Popular Communications invites you to submit, in about 300 words, how you got started in the communications hobby. Entries should be typewritten, or otherwise easily readable. If possible, your photo should be included.

Each month, we'll select one entry and publish it here. All submissions become the property of *Popular Communications*, and none will be acknowledged or returned. Entries will be selected taking into consideration the story they relate, and if it is especially interesting, unusual or even humorous. We reserve the right to edit all submitted material for length, grammar, and style.

The person whose entry is selected will receive a one-year gift subscription (or one-year subscription extension) to *Popular Communications*. Address all entries to: "V.I.P. Spotlight," *Popular Communications*, 25 Newbridge Road, Hicksville, NY 11801 or e-mail your entry to popularcom@aol.com

by Bruce A. Conti, BAConti@aol.com

Special: Outdoor Antennas That Will *Guarantee* You An Outstanding DX Season!

It's already August and summer will be over before you know it! However, mediumwave DXers look forward to this time of year as summer thunderstorm activity begins to subside. In addition, some of the best ionospheric conditions of the entire year for long-distance mediumwave reception occur as early as mid-August and continue through the autumnal equinox into November.

With the bottom of Solar Cycle 23 in progress, it should be an exceptional season for transcontinental and transoceanic mediumwave DX. Don't miss out on the action! Be prepared with these easy-to-build outdoor wire antennas, *guaranteed* to improve reception.

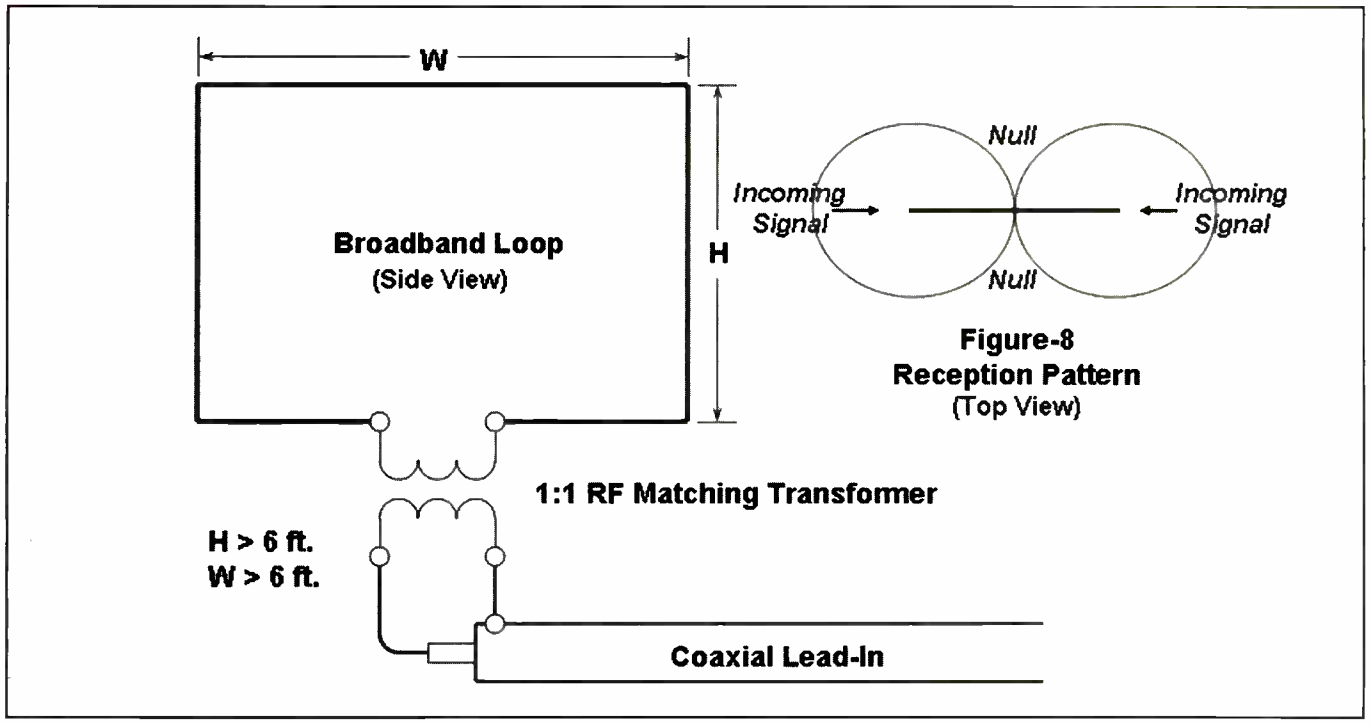
Basic Outdoor Antenna Design Criteria

Admit it. Most, if not all, beginner AM broadcast DXers, mediumwave and shortwave, have tried this "antenna." Hang a random length of wire out the window of your radio shack and connect it directly to a receiver. While there might actually be some degree of improved reception with such a simple outdoor antenna, in reality it's probably the worst thing you can do.

With so many sources of radio-frequency (RF) emissions in households today, radiating from televisions, computers, lighting, kitchen appliances, electrical wiring, etc., the "wire out the window" approach will not only improve broadcast signal strength, but it will also substantially increase noise pick-up. A noise-reduced lead-in consisting of coaxial cable and an RF matching transformer is crucial for successful implementation of any outdoor wire receiving antenna. Without it, many weak signals will be missed, buried under RF noise, eventually resulting in one discouraged DXer.

Secondly, the outdoor wire antenna itself should be located in an RF quiet position. Try to find a location away from overhead electric power and utility cables, and not too close to buildings and buried cables. Use a portable receiver to survey potential locations. Tune to locally empty frequencies at the low and high end of the AM broadcast band to check noise levels. Begin with testing for noise pick-up by placing the receiver close to where the electric power mains enter your house or close to a utility pole; the high noise level should be obvious. Noise should decrease as you walk away. This will give you a worst-case baseline relative to an RF quiet location for comparison. The search for the best antenna site should be conducted in the daytime without skywave interference, and then repeated at night as RF emissions from outdoor lighting and other sources may not be apparent during the day.

Last, consider the direction of reception. All outdoor wire antennas with a horizontal component are directional by nature. What is the desired target? Canada, Mexico, Latin America, the east or west coast of the United States? Or maybe you need to



Broadband loop antenna schematic diagram.

aim the antenna away from noise sources or a nearby radio station. No matter what, a directional antenna is almost mandatory to help sort out the number of signals on the congested AM broadcast band. If possible, erect a couple of antennas aimed in different directions.

Having considered the basics, now you're ready to choose the outdoor wire antenna that best fits your particular situation. Here are three relatively simple antenna designs, none of which require an engineering degree or acres of open land to build.

The Broadband Loop

Of the three outdoor wire antennas described in detail here, the broadband loop is the easiest and most versatile to install. The broadband loop is a "floating" antenna, meaning that it doesn't depend upon a physical connection to earth ground at the antenna. Therefore it can be installed just about anywhere. Quite simply it's a single loop of wire connected to the receiver via a 1:1 RF matching transformer and 50-ohm coaxial cable (RG-8 or RG-58). Although the design criteria require that an outdoor wire antenna be located away from buildings, in an urban environment it might not be possible. Sometimes the only practical location is a balcony or rooftop. The broadband loop is ideal for such an application. Still the loop should be located as far away as possible from electrical wiring to reduce noise pick-up.

The dimensions of the loop should be about six feet tall by six feet wide minimum, the larger the better to maximize antenna gain, especially for desirable long-distance, low-angle reception. The loop doesn't have to be exactly square. In fact, a rectangular loop with a horizontal dimension greater than the vertical will improve low-angle performance.

A loop antenna is bidirectional, receiving maximum signals in opposing directions or at 180 degrees of each other such as north and south or east and west. The nulls are also bidirectional with directions of minimum signal strengths at ± 90 degrees off the maximum. In other words, a loop aimed north-south will null east-west. The directions of best reception will follow the same direction as the horizontal sections of the loop. If the horizontal runs parallel to north-south, then that will be the beam of the antenna. Although low-angle directional performance might be slightly improved versus high-angle strong signals if the bottom horizontal section is located close to the ground, as mentioned, the performance is not significantly compromised when well above ground, such as on a rooftop. A front-to-side ratio of 10 dB is typical.

The Sloping Inverted L

The sloping inverted L antenna is close to omnidirectional, but with best reception at low angles that can incrementally favor a single direction. It consists of a wire that runs vertical from ground, then from the top of the vertical sloping back to ground at an angle, generally 45 to 60 degrees from the vertical. Minimum dimensions are about 20 feet tall by 50 feet long, the larger the better.

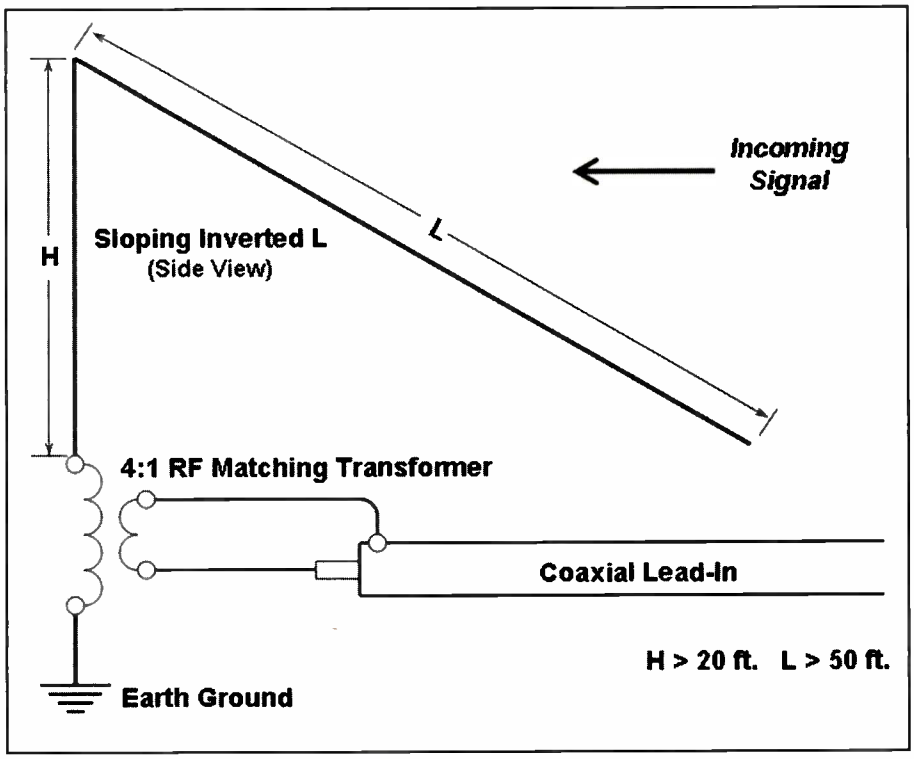
Unlike the broadband loop, the sloping antenna requires good ground conductivity to perform well. Use of a ground rod reinforced by ground radials at the connection point will improve performance where ground conductivity is poor, such as with sandy soil. The antenna is connected to the receiver via a 4:1 RF matching transformer and 50-ohm coaxial cable. The antenna can be connected to the receiver at the end of the sloping wire or at the bottom of the vertical. Either way the reception pattern is essentially the same, although connection at the bottom of the vertical might be slightly better for directional reception.

Best low-angle reception is in the same direction that the wire slopes from the top of the vertical. So, if the wire slopes from the top toward the east, then low-angle reception should favor signals coming in from the east. Increasing the sloping wire length should improve performance in the desired direction, while increased vertical height will improve overall low-angle performance. Because of its omnidirectional characteristics, the sloping inverted L is ideally suited for applications limited to one antenna, providing good overall performance while also improving low-angle reception essential for long distances.

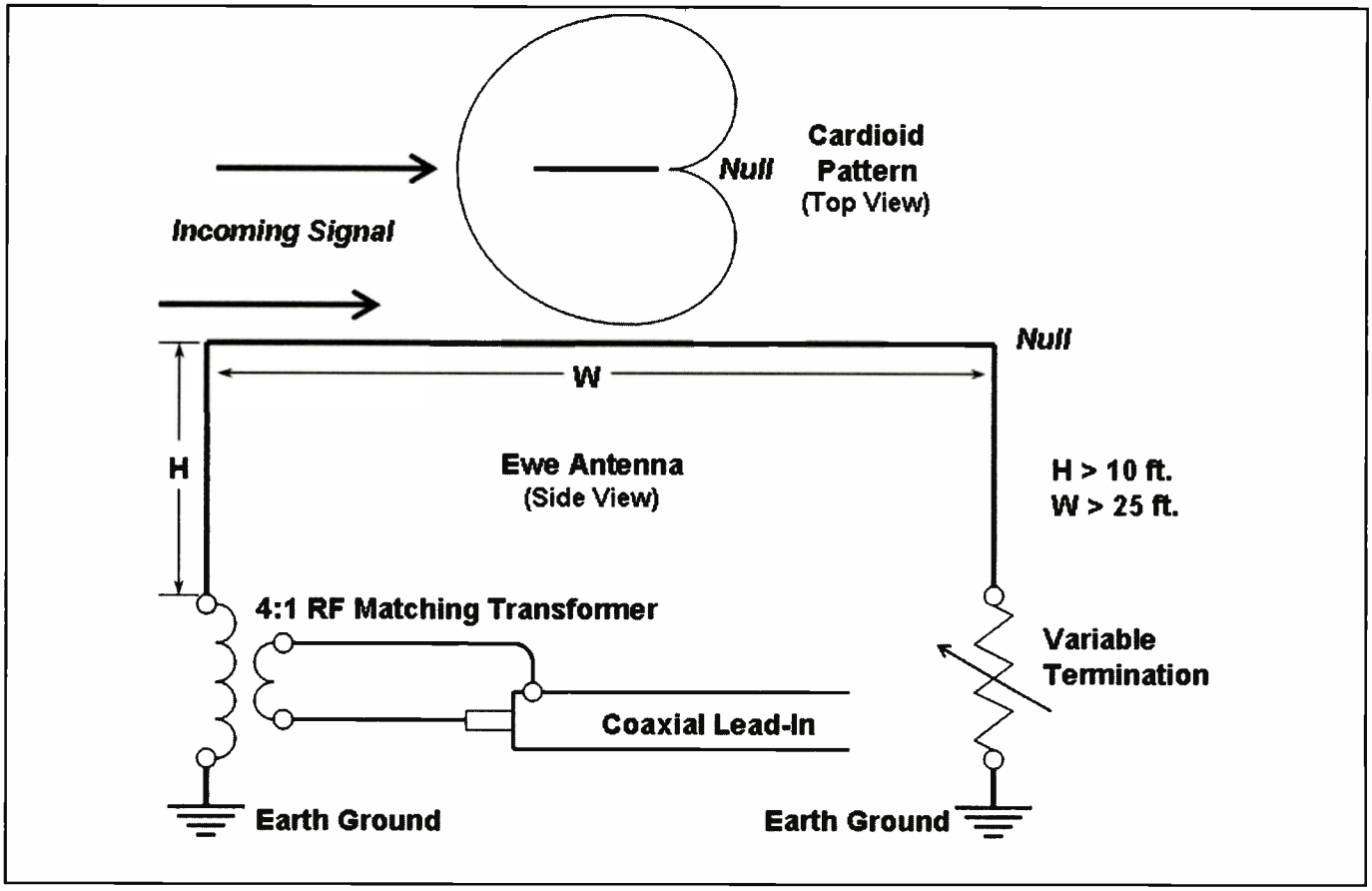
The Ewe

The Ewe antenna is unidirectional, favoring low-angle reception from a single direction with a distinct null in the opposite direction. Of all the antennas described here, this is the best for *directional* reception. Impressive front-to-back ratios of greater than 35 dB can easily be achieved.

The Ewe was first described by Floyd Koontz, WA2WVL, in the February 1995 edition of *QST* magazine. It was so-named because the antenna wire is shaped



Sloping inverted L antenna schematic diagram.



Ewe antenna schematic diagram.

like an upside-down U. Although originally designed for low-band amateur radio applications, the Ewe has recently been rediscovered by mediumwave DXers for its highly directive low-angle reception characteristics.

The Ewe consists of two separated vertical wires connected at the top by a horizontal wire. The bottom of one vertical wire is connected to the receiver via a 4:1 RF matching transformer and 50-ohm coaxial cable. The bottom of the other vertical wire is terminated to earth ground. Koontz determined the optimal dimensions to be 15 feet tall by 38 feet wide for directional reception in the 80- and 160-meter amateur radio bands, yet good directional performance could be achieved with an antenna only 10 feet tall, thus the Ewe is an ideal candidate where available land is limited. A minimum vertical to horizontal ratio of 2.5 is required for best directional performance. For example, if the vertical height is 10 feet, then multiply by 2.5 to determine a minimum horizontal width of 25 feet.

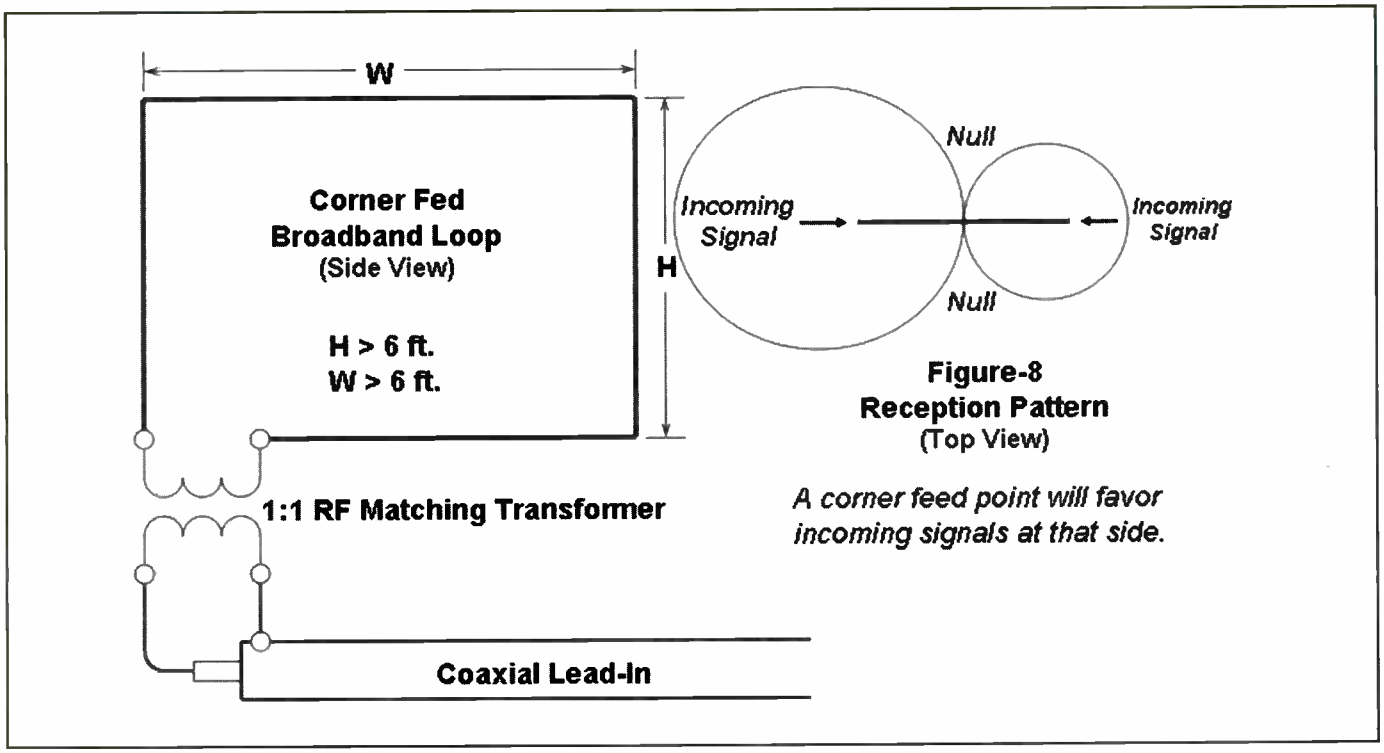
The Ewe produces a cardioid, or heart-shaped, reception pattern with a deep null in a narrow direction. Best reception is in a direction parallel to the horizontal section, strongest at the vertical connected to the lead-in. The deep null is in the opposite direction, at the far end of the antenna. So if the horizontal wire runs parallel in an east-west line, and the receiver is connected to the vertical at the west end, then the best reception will be from the west, or more accurately there will be a deep null to the east because the wide cardioid pattern provides good reception off the sides as well.

Ewe performance is highly dependent upon earth ground conductivity. This is where completion of Ewe antenna installation can be tricky, as the value of the terminating resistor at the far end of the antenna will vary with ground conductivity. Not only will prevailing ground conductivity affect performance, but weather extremes, such as heavy rain or drought, can change Ewe antenna characteristics, requiring readjustment of the termination resistance for peak performance. In cases where ground conductivity is very poor, the Ewe may actually perform best with the far end connected directly to a ground rod.

To determine the termination resistance, begin with a 1 k-ohm potentiometer connected between the far end of the antenna and a ground rod. Tune the receiver to an AM graveyard frequency clear of a local radio station, such as 1230, 1240, 1340, 1400, or 1450 kHz. There should be more than one signal received on each frequency. Pick a frequency where signals from the general desired direction of reception and the null direction are received. Adjust the potentiometer for peak reception from the desired direction, or to null out signals from the opposite direction. Repeat the procedure on a few other frequencies, including regional channels, to get a feel for the best overall setting. This should be done during the midday hours to avoid variable skywave propagation conditions.

Noise-Reduced Lead-In

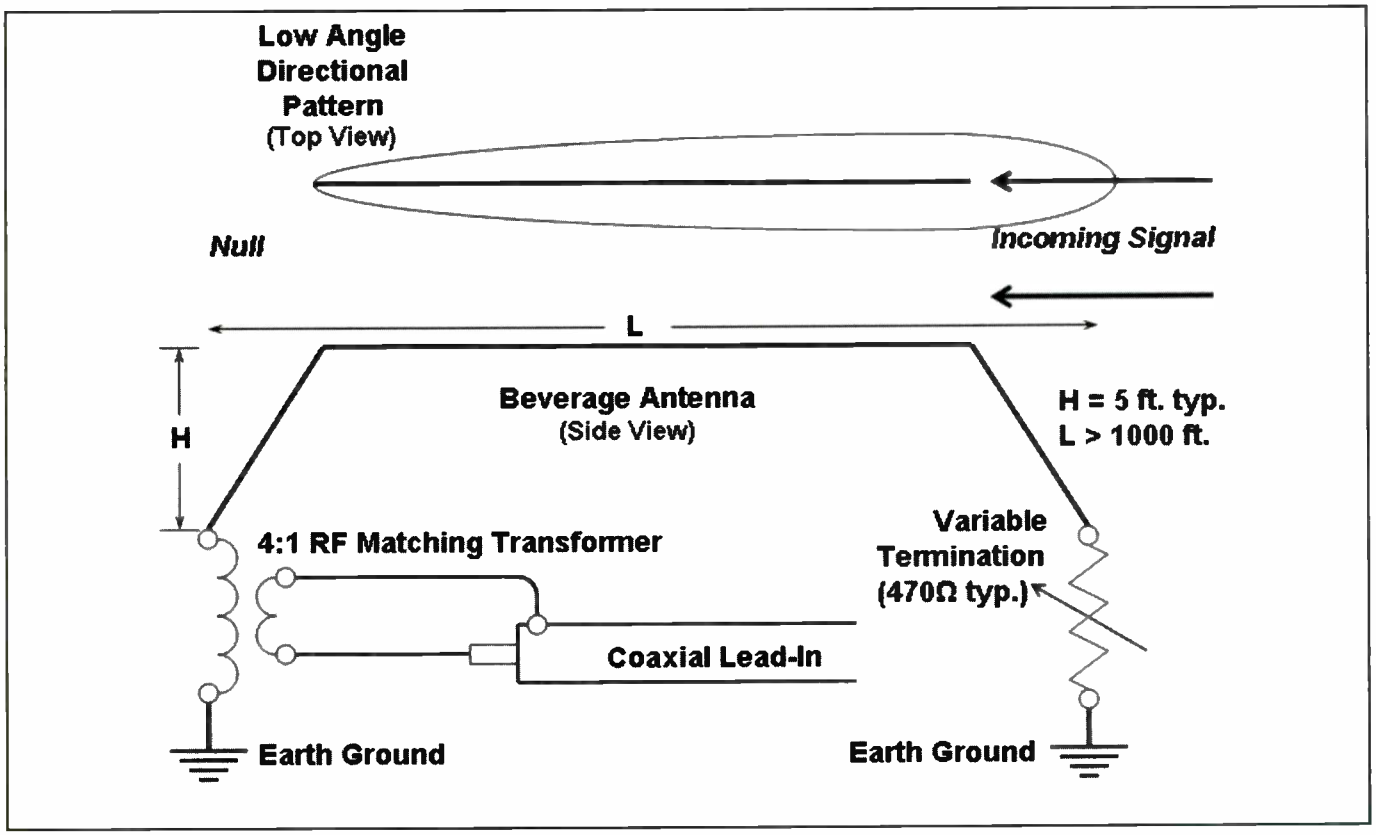
The importance of a noise-reduced lead-in can't be stressed enough for any type of outdoor wire antenna. The key component for noise reduction is an RF matching transformer with isolated primary and secondary windings. This means that there is



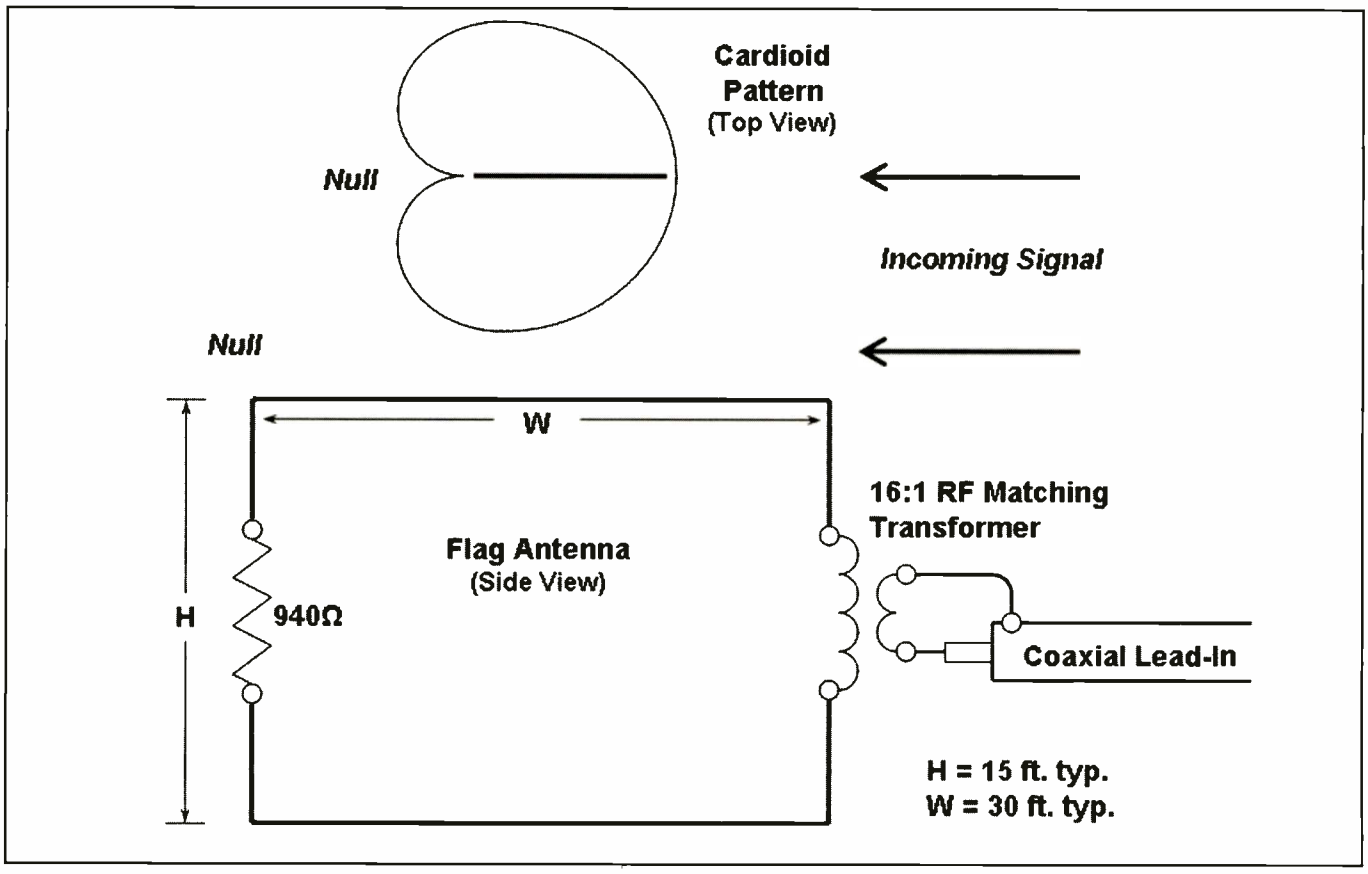
A corner-fed broadband loop.

no physical connection between the primary and secondary, so the ground shield of the coaxial cable is not physically connected to the antenna or its earth ground. Ground separation by this technique helps prevent ground loops that can cause noise problems, it and isolates the antenna from household noise sources. The transformer is located outdoors at the antenna.

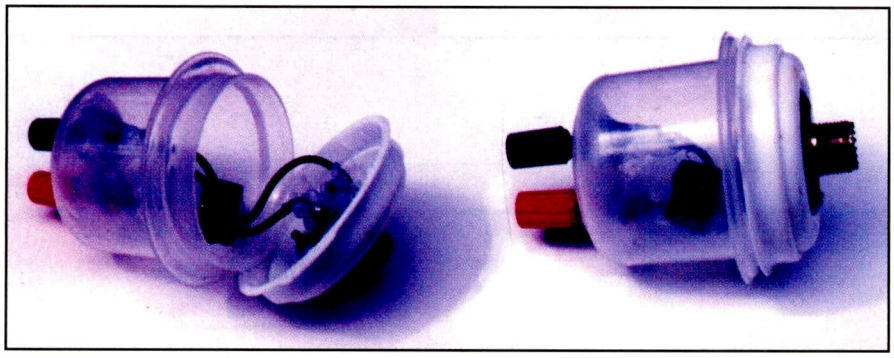
For any type of end-fed wire antenna, including the sloping inverted L and Ewe, the coaxial lead-in is attached to the



A beverage antenna schematic..



A flag antenna schematic.



It's an open and shut case: The RF matching transformer in a water-tight food storage container chassis.

low-impedance winding of the transformer, with the center conductor connected to one leg and the shield connected to the other. The antenna wire is connected to one leg of the high-impedance winding, and a ground rod is connected to the remaining leg. (In the case of the broadband loop, the coax is across one winding while the wire loop is across the other.)

There are many sources of fully assembled RF matching transformers, often referred to generically as "baluns" that, by definition, match a balanced antenna like a loop to an unbalanced coaxial lead-in. However the sloping inverted L, Ewe, or any end-fed wire is an unbalanced configuration that requires a "unun," for unbalanced-to-unbalanced, matching. In the real world, though, it's only the application that differentiates between unun and balun, as the actual RF transformer is the same. Just make sure that there is no internal connection or common ground between primary and secondary windings.

I prefer to build my own using Mini-Circuits RF matching transformers (www.minicircuits.com), completing assembly in a water-tight food storage container with binding post antenna/ground connectors and a female BNC or UHF coax connector. Holes for mounting external connectors are easily drilled out or cut with a utility knife, and then sealed with caulking once connectors are mounted and wired. Mini-Circuits transformers are available in a 6-pin DIP (dual inline package) that can plug into a standard 14- or 16-pin DIP socket for easy replacement or experimenting with various impedances. Use model T1-6T for 1:1 and T4-6T for 4:1, specify plug-in case style X65. These Mini-Circuits transformers feature low insertion loss over a wide frequency range, covering the entire range of long, medium, and shortwave frequencies. The pop-top chassis makes access to the internal wiring and transformer a snap!

How Did You Do?

Now you're ready for action. Next month we'll feature potential targets and lots of your broadcast loggings in final preparation for the bottom of Solar Cycle 23. In the meantime, if you decided to attempt building a noise-reduced outdoor wire antenna, let us know the results. Until then, 73 and good DX! ■

by R.B. Sturtevant, KD7KTS

Radio Fun And Going Back In Time

Q. What's changing at RadioShack?

A. RadioShack started as a Boston-based mail order business in 1921. Its primary customers were ham radio operators and electrical experimenters. It issued its first catalog in 1940. In 1954, it brought out products under the Realistic brand name. By the early 1960s, it was practically bankrupt.

In 1963 the Tandy Leather Company bought it out when Charles Tandy wanted to build a chain of leather craft and hobby stores. Tandy began by collecting almost $800,000 owed to the company, expanded the chain with quick turnover items, and pumped nine percent of the sales revenue into advertising. Between 1961 and 1969 the sales grew from $16 million to $180 million. In 1968 there were 172 Radio Shack stores and in 1973 Tandy had grown the company to 2,294 stores.

When the CB craze hit three years later, sales were up 125 percent and another 1,200 stores opened. Anyone looking at radio magazines from that period knows that building articles included parts lists with their RadioShack part numbers already supplied. It was also the first to bring out a mass-marketed personal computer.

Charles Tandy died in 1978. A year later there were 7,353 RadioShack stores and only 5,530 McDonald's restaurants. RadioShack seems to have changed its direction since it's decided to get out of the electronic parts business, and the stores have almost stopped carrying ham gear. In fact, I once said to a RadioShack manager, "I am a ham radio operator and I'd like to buy a key." I was directed to a nearby hardware store and told, "They make them up for you while you wait."

Q. During World War II how did the military and civilian authorities find enough radio operators to do all the communications that was needed?

A. It was a serious problem. Six months after the war started, the military was buying more radio equipment then they ever had before. Training radio operators in CW, which was the most common mode of transmission, takes time. Finding operators who could handle high-speed traffic (40 wpm or more) was even harder. Civilian organizations had similar problems. The natural place to find skilled operators and instructors to train the newcomers was among the ham operators who had been taken off the air when war was declared.

The Amateur Radio Rely League (ARRL) set up a Personnel Bureau to assist government agencies and the military find the operators they needed. They even assisted in finding personnel for secret and top secret programs being started.

Q. What does the military do to keep up morale among the personnel stationed in Antarctica? Do they get to use ham radio?

A. Yes they do. Part of an active Hobby Crafts Program is the use of amateur radio by licensed personnel. Among the first amateur stations were KC4USA at Little America and KC4USV at McMurdo Sound. Through those circa 1957/58 stations (both now dark) almost everyone involved with Operation Deepfreeze II was able to talk to people at home.

Surprisingly most of the chatter from "Down South" involved the guys trying to cheer up their family and friends in the States, rather than the other way around. Other major topics coming from the South Pole were talk about the good *esprit de corps*, the excellent food, and, of course, the weather. The folks at home also got a lot of questions about trivia, which was causing bets and arguments among the "Pole Sitters." The questions included "Who wrote the song, 'I'll Never Smile Again'?" and "When were gold stripes removed from khaki uniforms?" Family and friends were asked to settle arguments by supplying answers.

Want to work current Antarctic stations? Check out the website of the World Wide Antarctic Programs at www.ddxc. net/wap/. They've got the latest callsigns and frequency schedules for you.

Q. Did Radio Free Europe ever effect "real" political change in the old Soviet Union?

A. Yes, but slowly. One example is one of Radio Free Europe's greatest propaganda coups. On December 5, 1953, Colonel Josef Swiato of the Polish Secret Police defected to CIA personnel while on a shopping trip in West Berlin. The Colonel had been Deputy Director of the Department of Party Security in the Polish Ministry of Public Security. His job had been to compile and oversee the private files of all the leading communists in Poland.

Between September and December 1954, over 100 interviews with Swiato were broadcast over RFE. Swiato revealed accurate and detailed information on the corruption and rivalries that surrounded the Polish Communist Party leadership. The State Department believed the broadcasts were the single most effective political warfare operation since 1945.

On December 23, the Chief of the Secret Police was fired and three of his leading executives were arrested. The powers of the security forces and police were curbed. The shake up lasted until the autumn of 1956, when a more moderate regime was brought in.

Looking Back...

Five Years Ago In *Pop'Comm*...

Back in August 2001 we showed readers a great way to "Say No To Blackouts" with an article on portable solar power. Of course little did we know that a scant month later our nation would be plunged into darkness, not knowing what was around the corner. The article is, of course, still relevant today. One of the best antennas for ham activity and shortwave listening is the loop antenna. Beginning on page 24, writer Joe Carr walked us through a simple construction of this quiet antenna!

Ten Years Ago In *Pop'Comm*...

The big radio news was the brand new FRS (Family Radio Service), but it came with a bag of warnings from the radio community, especially the potential for interference to licensed GMRS users. As it turned out, the interference issue wasn't the big bad bear we thought it would be. Interestingly those small unlicensed FRS radios were selling for $100 to $180; today you can get a pair for under $20.

Twenty Years Ago In *Pop'Comm*...

Editor Tom Kneitel sure said a mouthful back in August 1986 in his "Beaming In" editorial when he stated, "Without a sufficient number of newcomers the hobby will stagnate and eventually wither." Imagine that? And those were the *good* years! We also learned about something that never quite took off with gusto: Hi-Fi shortwave. The "new" LINIPLEX F1 HF receiver was featured in a "Product Spotlight," but it also never took off. The receiver was manufactured by Phase Track Limited and the "review" said its, "...features are worth noting, but one which cannot be adequately described is the crispness and clarity of both speech and music that comes out of this little box."

by Tom Swisher, WA8PYR, milcom65@yahoo.com

Listening Is Easy—Here's Where To Catch Those Military Comms!

Have you ever wondered what kind of military/government transmissions are out there to listen to? Here's a basic primer of the bands to monitor and what you might hear. Hang on to your hats, you might be surprised!

Below High Frequency

Starting off at the bottom of the spectrum are the very low frequency (VLF, 10 kHz–30 kHz), low frequency (LF, 30 kHz–300 kHz), and medium frequency (MF, 300 kHz–3 MHz) bands. These bands don't hold much for the average listener, but there *is* activity there. In addition to the AM broadcast band, various navies use the VLF band to pass alert messages to submerged submarines. Also found here is air navigation beacons, as well as VLF propagation beacons which will give you an idea of band conditions.

High Frequency, 3 To 30 MHz

Often overlooked, yet a fairly simple band to monitor is the high frequency band, from 3 to 30 MHz. Often used by military and government agencies all over the globe, it's fun to monitor as you can hear transmissions from every part of the world, depending on the frequency and band conditions at the time. Covering the frequencies from 3 to 30 MHz (the portion from 28 to 30 MHz is often thought to be part of the VHF band, but it's actually the upper end of the HF band), it's action on steroids!

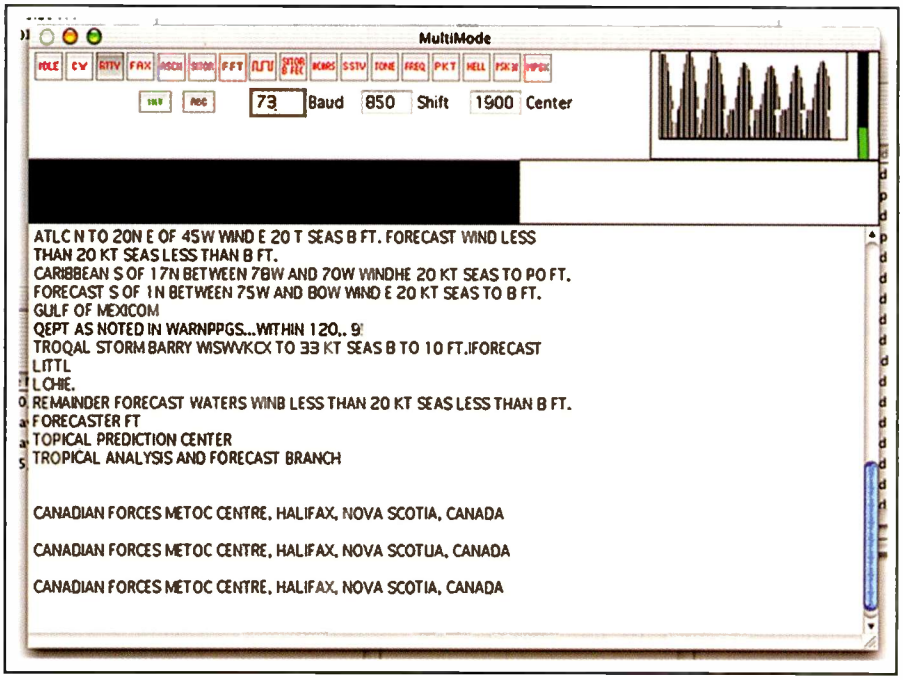
The most popular monitoring target for newcomers (besides shortwave broadcast) is the high frequency Global Communications System. Known under a variety of names over the years, the HF-GCS is also known as GHFS, for the Global High Frequency System. This is a worldwide U.S. Air Force communications system created during the 1950s during the watch of Air Force Chief of Staff General Curtis LeMay, who as a ham radio operator knew well the capabilities of HF radio for long-distance flights.

But there's more to HF than just HF-GCS. Another interesting monitoring target is SHARES (SHAred RESources). Part of the National Communications System, SHARES is a program for sharing frequencies allocated to federal agencies. SHARES provides agencies with extended HF coverage and capabilities and a survivable backup communications system that can help take the place of leased lines and satellite systems in the event of a major disaster. Here are some common SHARES frequencies:

3216.0	Night primary
3361.0	Night alternate
4513.0	Night alternate
5901.0	Night alternate
7632.0	Night primary
9064.0	Night alternate
14396.5	Day primary
14455.0	Day alternate

Also interesting to monitor is the Military Affiliate Radio System (MARS). Providing heath and welfare and other communications support for the military, MARS can often be found providing communications during natural disasters in support of the National Guard and federal agencies like FEMA. Some MARS frequencies include:

3311.0	Air Force MARS
3348.5	Army MARS
4041.0	Navy-Marine Corps MARS
4590.0	Air Force MARS
6826.0	Army MARS
6997.5	Army MARS
7381.0	Navy-Marine Corps MARS
7498.5	Navy-Marine Corps MARS
7540.0	Air Force MARS



From the Macintosh program Multimode OSX receiving weather teletype from the Canadian military. (Image courtesy Black Cat Systems, www.blackcatsystems.com)

13506.5	Army MARS
13910.5	Army MARS
13927.1	Air Force MARS
13993.0	Air Force MARS
14383.5	Navy-Marine Corps MARS
14389.0	Air Force MARS
14390.5	Army MARS
14403.5	Army MARS

During disasters, also make sure to tune in to amateur frequencies. While they're certainly not military, these frequencies *are* used by hurricane support nets, the Salvation Army, and other disaster support nets.

Finally, some very interesting monitoring can be had by decoding the various data systems in use. These may include RTTY or RATT (Radio Teletype), SITOR (Simplex Teletype Over Radio), WeFax (Weather Fax), and ALE (Automatic Link Establishment). While RTTY is not used heavily any longer, other modes, such as SITOR and WeFax, can still be found in daily use.

ALE is a newer mode that provides automatic channel selection for voice and data communications circuits based on propagation, signal strength, and other factors. If you would like to try data monitoring, there's plenty of free software out on the Web.

Some interesting data frequencies include:

2054.0	U.S. Coast Guard Wefax, Kodiak
4235.0	U.S. Coast Guard Wefax, Boston
4298.0	U.S. Coast Guard Wefax, Kodiak
4317.9	U.S. Coast Guard Wefax, New Orleans
4346.0	U.S. Coast Guard Wefax, Point Reyes
6340.5	U.S. Coast Guard Wefax, Boston
8459.0	U.S. Coast Guard Wefax, Kodiak
8503.9	U.S. Coast Guard Wefax, New Orleans
8682.0	U.S. Coast Guard Wefax, Point Reyes
9110.0	U.S. Coast Guard Wefax, Boston
9982.5	National Weather Service Wefax, Honolulu
10255.0	Electronic Intelligence testing
11090.0	National Weather Service Wefax, Honolulu
12412.5	U.S. Coast Guard Wefax, Kodiak
12750.0	U.S. Coast Guard Wefax, Boston
12786.0	U.S. Coast Guard Wefax, Point Reyes
12789.9	U.S. Coast Guard Wefax, New Orleans
16080.0	Electronic Intelligence testing
16135.0	National Weather Service Wefax, Honolulu
16172.0	Electronic Intelligence testing
16303.0	Electronic Intelligence testing
17146.4	U.S. Coast Guard Wefax, New Orleans
17151.2	U.S. Coast Guard Wefax, Point Reyes
22527.0	U.S. Coast Guard Wefax, Point Reyes
23331.5	National Weather Service Wefax, Honolulu

By the way, there's some great information about the Coast Guard's Communications Area Master Station, Atlantic (CAMSLANT) at www.uscg.mil/lantarea/camslant/default.htm.

Finally, here are some favorite HF frequencies sent in by our *Pop'Comm* readers:

5696.0	U.S. Coast Guard CAMSLANT Chesapeake
8971.0	USN HF Hicom
8983.0	U.S. Coast Guard CAMSLANT Chesapeake
8992.0	HF-GCS night primary
11175.0	HF-GCS day primary
10204.0	USAF Strategic Command
11217.0	Various military users
11232.0	Various military users (including Canadian Forces)
11494.0	U.S. Coast Guard CAMSLANT Chesapeake
13907.0	U.S. Coast Guard Air Rescue

Very High Frequency, 30 To 300 MHz

Along with UHF, this is the band most monitoring hobbyists begin monitoring. Here you'll find military and federal government aviation, as well as federal agencies such as the FBI, U.S. Marshal Service, and FEMA. Most scanners produced in the last 10 years or so cover this spectrum and provide interesting monitoring even with the stock antenna.

Low band (30–50 MHz) can often provide the most interesting listening, as you'll hear a variety of units, especially Army and Marine Corps tactical ground communications. Transmissions can often be heard over long distances when sporadic-*E* skip is active (the *E* layer is one of the layers of the ionosphere that reflects radio transmissions).

The low-band military frequency ranges are:

30.00–30.55
32.00–32.95
34.00–34.95
36.00–36.95
40.00–41.95
49.61–49.95

Military communications can also be found in the 138.000- and 143.995-MHz and 148.000- and 150.775-MHz ranges, as well as the 162.000- to 174.000-MHz range. Between 138 and

144 MHz you'll frequently hear air-to-air tactical communications in AM, as well as FM land mobile transmissions. The 162.000- to 174.000-MHz range often hosts military base communications like military police, fire, and services, although many bases are changing over to UHF systems for these functions.

Ultra High Frequency, 300 To 3000 MHz

UHF is the single most popular monitoring target for military aviation enthusiasts. Here you'll find military and federal government aviation at bases and facilities all over the country, as well as Air Traffic Control and civilian airports. You'll also hear a variety of missions ranging from aerial combat training, midair refueling, drug interdiction, and a host of other activities. Like VHF, many scanners produced in the last 10 years or so cover this spectrum and provide interesting monitoring, even with the stock antenna.

There are many, many things to hear, but here's a selection of interesting UHF frequencies to start off monitoring:

243.000	Distress/guard
251.900	Air National Guard
255.400	Military to FAA
281.000	Air Tanker Common
282.800	Search & Rescue
287.400	Refueling air-to-air nationwide
303.000	Air National Guard
311.000	STRATCOM (Strategic Command) primary
319.400	AMC (Air Materiel Command) Command Posts
321.000	STRATCOM secondary
359.125	Refueling air-to-air nationwide
361.700	Refueling air-to-air nationwide
381.300	ACC (Air Combat Command) primary

Above Ultra High Frequency

With SHF (Super High Frequency, 3–30 GHz) and EHF (Extremely High Frequency, above 30 GHz), we're getting into the frequency ranges which are difficult for the average listener to access. There are few, if any, commercial receivers available and the antennas are very highly specialized, requiring dishes, waveguides, and other special equipment. These bands are used primarily for satellite communications.

Let's Hear What You Hear

So there you have it, a basic primer on what you can hear and where you can hear it. I've only scratched the surface, so get out there and start monitoring! Don't forget that I'd like to hear about your monitoring experiences and share those frequencies so everyone can be part of the military radio monitoring action! ■

POP'COMM's AUGUST SURVEY QUESTIONS

My mobile radios consist of the following: (mark all that are appropriate)

Mobile scanner	1
Handheld scanner	2
CB	3
Ham dual band mobile transceiver	4
Ham HT	5
Portable shortwave	6
GMRS (General Mobile Radio Service)	7
FRS (Family Radio Service)	8
MURS (Multi-Use Radio Service)	9
The in-dash AM/FM stereo	10

My mobile scanner, CB or ham transceiver is mounted using:

Bungee cord	11
Duct tape	12
The metal bracket that came with the radio is screwed to the dash	13
A homemade mount	14
Gravity; it's not mounted, it's on the passenger seat	15
Velcro™	16
A professional mounting system of pedestals/brackets	17

Most of my mobile radio activity is done: (mark all that are appropriate)

Parked at specific locations	18
On the road to and from work	19
On the road after work	20
On the road during the weekend	21
Only on vacations; a couple of times annually	22
Rarely, because it's difficult to mount the radios	23
From my second vehicle; our family vehicle doesn't have radios installed	24
On business trips using a rental vehicle	25

My mobile radios are powered by:

Wiring directly to the vehicle battery	26
Internal batteries	27
The cigarette lighter outlet	28
A separate 12 Vdc battery	29

by Gordon West, WB6NOA, WB6NOA@arrl.net

Automatic Identification System For MURS!

The U.S. Coast Guard says "e-navigation" means safety for all boaters, and the Automatic Identification System (AIS) is the latest and greatest (relatively) new VHF service to help achieve that goal. AIS is used for ship-to-ship and ship-to-shore identification and tracking, and offers a brand new twist for the Multi-use Radio Service (MURS) land-on-land position fixing.

AIS is a marine radio broadcast system that acts like a transponder, receiving GPS information and transmitting on marine VHF duplex shore channels 87B and 88B (161.975 and 162.025 MHz). These two *international* marine shore station duplex channels carry 9,600 bits/s data. If you live near a seaport, you'll hear is a one-second data burst every few seconds coming from commercial ships, towboats, and ferries within 30 miles of your outside scanner antenna. The data will sound somewhat "pinched" because your receiver's filters and de-emphasis circuits lop off a portion of the incoming data burst. The dedicated AIS receiver picks the signal off the discriminator and processes the entire 25-kHz data bandwidth.

The two-channel AIS dedicated receiver, which is not much larger than a big handheld radio, processes the 9600 bits/s GMSK (Gaussian Minimum Shift Keying) FM using HDLC (High-level Data Link) packet protocols. If you're using a communications receiver capable of passing a wide FM signal to your computer sound card, software alone could allow you to decode one channel of AIS information. Most of the time, one channel of reception is all that's necessary to decode exciting vessel traffic in your area, much like aircraft controllers tracking aircraft in the sky.

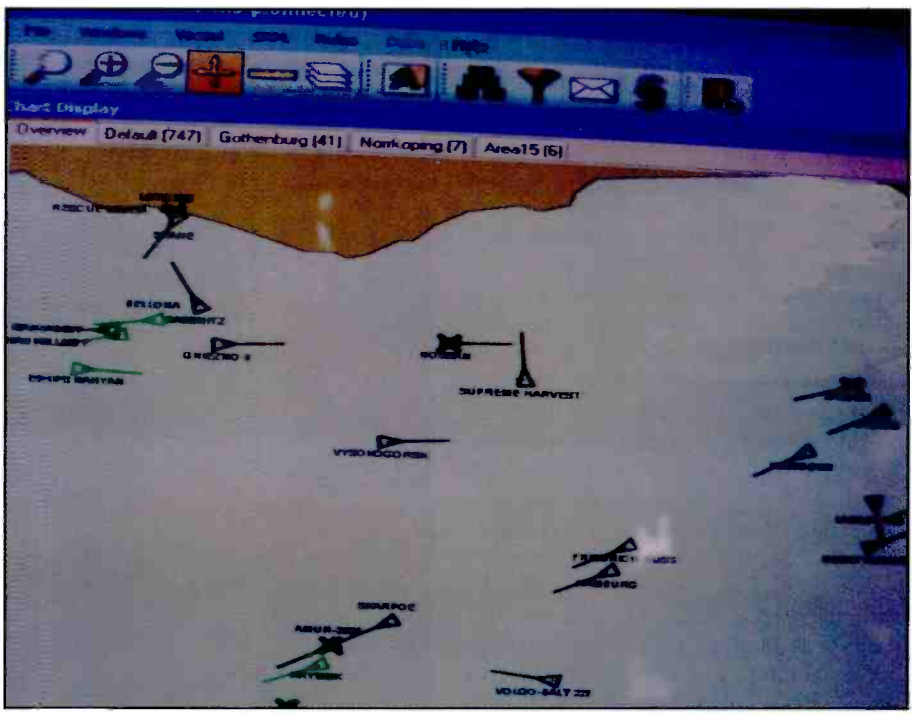
Here's what you might find on a typical AIS packet:

STATIC INFORMATION: vessel callsign, name, MMSI (Maritime Mobile Service Identity) number, dimensions, and type;

VOYAGE RELATED INFO: draft, cargo type, destination, and estimated time of port arrival;

DYNAMIC INFO: Universal time, GPS derived latitude/longitude position,

Ship AIS positions seen on a simple computer program.



Twelve ships are shown in motion on the AIS display.

course over ground, speed over ground, heading, rate of turn, navigational status.

If you're located near a busy seaport, you may also find vessel traffic system (VTS) stations relaying pertinent navigational data that these ships need to see on their AIS readouts. This could include tidal warnings in case a major river is flowing out to sea well above local tidal rates.

The basic AIS readout could be lines of text seen on your computer or the basic AIS text screen. Not very exciting to look at! Does your computer have a land-mapping program? Are you a boater who uses the computer with marine charting? Got a laptop with an outline of the United States and some general cartography of the coastline and rivers? If so, AIS marine information will take on the look of air traffic control radars. You'll see ship icons, arrow directions, speed and course, and a host of other "layered" information that's part of each AIS packet. The area around your port no will no longer be just a blue-colored ocean—it will come alive with vessel traffic movements.

Who Are You Going To See?

The wealth of information in front of you will include boats over 65 feet of length, commercial ships like tankers and cruise ships, passenger ferries, tugboats, fireboats, and port police. These types of vessels are required by law to "squawk" AIS at specific intervals as follows:

Everyone every six minutes
At anchor every three minutes
Slow speed ahead every 10 seconds
Changing course every three seconds
At sea every six seconds

Some of the AIS "targets" you might see could be fixed aids to navigation, such as buoys, lighthouses, ends of piers, automated weather stations, hazards to navigation markers, and harbor pilot piers.

The VHF transmitting AIS equipment, class A for compulsory equipped ships, has its own transmission time slot based on data link history. A position report from any one AIS station fits into one time slot established every 60 seconds. AIS stations continuously synchronize themselves to avoid simultaneous transmissions. Slot selection by an AIS station is randomized within a specific interval and tagged with a random timeout between 0 and 8 frames. This allows thousands of ships to squawk their AIS data within the local harbor area without collisions of their data packets.

Three ships in port and one ship, Lady Mary, heading down the channel to dock.

The U.S. Coast Guard has developed rules, applicable to both U.S. and foreign flag vessels, which require owners and operators of most commercial vessels to install and continuously run their AIS equipment. The U.S. Coast Guard says AIS will improve security as the Guard monitors those vessels approaching U.S. ports.

The AIS corroborates and provides identification and tracking of vessels that would not be possible through voice radio communication or radar alone. In the past, the vessel traffic system (VTS) might only see a radar echo on its scope without knowing exactly which target it was tracking. With AIS, every big target is identified.

A new low-cost category of AIS equipment will be available soon for small ships, all the way down to kayaks! It will be called Class B non-compulsory equipment, and it will give your little kayak or rowboat the same size target identification as the big boats around you, so people will indeed know there's a small boat operating in their area. A kayak or small sailboat would be almost invisible to a big ship's *radar*, but that same recreational craft would get equal visibility on an AIS display.

Here I would add a word of caution for all ship captains, however. Using electronic charts of a local marine area combined with a screen full of AIS targets does NOT relieve the prudent skipper of

The two-channel AIS receiver for shipboard collision avoidance.

continuously watching *radar* while keeping a good lookout on the bow. There are always thousands of pleasure boats moving around the harbor WITHOUT AIS, and they will only appear with a good watch or with a properly operating radar on short range. Relying *only* on AIS with a chart overlay puts everyone *WITHOUT* AIS in jeopardy!

What About Land Use?

What about purchasing a pair of inexpensive recreation-type AIS transponders for your kids' desert 4-wheelers, with a companion receive-only system tied into your computer at the motorhome? As with ham radio APRS (Automatic Position Reporting System), each land transponder would have a 12-channel GPS, just like the big *ship* units, and a smart 9600-baud transmitter, but it wouldn't be authorized for the 160-MHz marine band. Rather, land use would operate on MURS frequencies (151.820 MHz, 151.880, 151.940, 154.570, and 151.600). Power output is 2 watts, with a one-second maximum transmit period selectable for approximately every one minute or faster.

"MURS allows us to not only send position data back to all receiving stations, but also allows for short text messaging activity. MURS channels using inexpensive equipment could be used for tracking on land, on a small lake or river, or even aeronautical for hang gliders and soaring enthusiasts," says Stephanie Johnson of Shine Micro, Inc. (www.shinemicro.com), manufacturers of low-cost compulsory and voluntary AIS signaling equipment and receivers. They call their AIS equipment "RadarPlus TRACKER."

Shine Micro has also teamed up with Rose Point Navigation Systems (www.RosePointNav.com) for computer overlay cartography. If you regularly want to track the kids out on the desert or in an area not covered with good mapping and charting, contact Jeff Hummel at Rose Point to see if local cartography might be available.

The Tip Of The Iceberg

You're going to be hearing a lot more about marine e-navigation and AIS. Just think of the possibilities of using it on MURS frequencies on land! For more information check out www.navcen.uscg.gov/enav/ais/AISFAQ.HTM. ■

by Harold Ort, N2RLL, Editor

Pro Tech's NoiseBuster NB-FX Active Noise Reduction Headphones

Headphones of all sizes, colors, and weights are everywhere. And they all come with a price tag, sometimes costing nearly as much as our scanners or amateur HTs. I'm talking $299 for headphones! If you think that's a hefty sum for headphones, regardless of the great sound you get, join me for a moment as we check out a $69 pair of headphones from Pro Tech: the NoiseBuster.

The company tells us that, "NoiseBuster contains patented ANR technology...and delivers 18dB of active noise reduction across a wider frequency range than any competitive consumer audio headphone available on the market today." That's certainly a pretty lofty claim, so we decided to check it out with the equipment we use most, in an environment that has its share of noise—using a handheld scanner in the local mall.

Lightweight And Comfortable

Just wearing these headphones is a pleasure; the soft ear pads fit comfortably and the headband doesn't smash the ear pads against your head. There's nothing worse than good headphones that don't fit properly, and these fit perfectly!

The NoiseBuster headphone comes with a standard 3.5-mm stereo plug at the end of a four-foot straight black cord. A single "AAA" battery that's included powers the headphones. A simple slide switch on one earpiece turns them on/off and a small red light lets you know they're powered. When you're finished for the day, tuck them in the provided pouch. Travel on the plane with them and you'll be able to use the included airline adapter plug!

How They Work

Here's the scoop: On the inside and outside of each ear cup is a small microphone used to capture noise. Inside, that junk noise is used to create, as NoiseBuster says, "...a noise wave that is identical to, but directly opposite of, the one coming into the ear. The 'anti-noise' wave is output through a speaker located in the ear cup. When the two waves (the offending noise wave and the anti-noise wave) meet, the noise is significantly reduced."

How significantly? Well, they can print all the specs they want and do hours of lab tests, but real-world use is what ultimately counts. I hate shopping malls, and not just because they cost me money every time I go in one, but because they're one of the noisiest places on the planet! Between ringing cell phones, music, and the din of people talking, it's really quite loud, as we all know.

It's no secret that low-frequency ambient noise degrades what you're listening to with headphones, particularly speech and certain music tones. Use that scanner or other small audio device (CD players, etc.) in an especially noisy environment, say outside on the street or waiting for a bus or train, and you'll likely have to crank up the volume just to overcome the noise (what you're doing is distorting the audio and ultimately, over time, damaging your hearing).

The NoiseBuster headphones' on/off switch is located on the edge of one earpiece.

Now cut that out! Kiss noise good-bye and get more enjoyment from your scanner with these great-looking headphones!

With the Uniden BC-246T in my pocket and headphones on, I began the trek on the first level of the Monmouth Mall in New Jersey. Just wearing these comfy headphones, even with the scanner off, helped cut out plenty of noise, but I could still hear announcements from the "Mall Voice," that omnipresent raspy PA system that nearly wakes the dead!

I flipped on the scanner, with the NoiseBuster headphones "off," and immediately caught the tail end of mall security talking about a shopper who had walked out of a nearby store with-

Fold 'em up and tuck 'em in the provided pouch or toss them in a purse or your carry-on bag. Don't forget your radios!

out paying. Turning around to go back in the *opposite* direction more comms came through the headphones from the nearby Eatontown PD. I quickly reached up and turned on the headphones and waited a moment.

This was a busy Saturday afternoon with hundreds of shoppers all gathered in one place, dragging the kids along for some extra fun. I got some good comms now, with Eatontown PD again repeating info on a license plate check, but this time all that outside noise around me was significantly reduced. By how much? If I said about *half*, you'd probably think it couldn't be, and maybe I had just put cotton in my ears. Not so—these headphones worked, and quite well.

I'll admit that I was quite surprised at the quality of the audio. I've never been an audiophile; the old Walkman and simple dual-speaker cassette/CD player works for me. But the fact is the audio from the 246T through the NoiseBuster headphones was much better than I had expected, and better than some so-called communications headphones I've used in the past. With the NoiseBuster headphones switched on, the audio has less bass and is slightly tinny, but remember we're listening to voices over public safety radio systems that aren't known for superb stereo sound! Not bad for $69—*and*, honestly, a whole lot better because now I'm hearing a lot less of Gloria Gotadozenkids screaming at the top of her lungs for the kids to stop asking for more candy and ice cream! How sweet it is!

One of my favorite places to eat with my family, and even occasionally with local radio personalities (yes, there are still some if you look for them!), is the Americana Diner. There's great food inside, but the outside-the-dining area waiting hallway is a noise nightmare. You'll sometimes wait a few minutes to be called for a seat—and in pretty close proximity to "loud talkers," some with cell phones! Tuesday was no different, except this time I was packin'! I had my 246T with the NoiseBuster headphones turned on as we walked into the place. Funny thing is, I could see their lips move and hear some of what others were saying, but a good portion of the blab was gone, replaced instead with good audio from the Shrewsbury and Red Bank PD.

Three And A Half Cotton Balls Out Of Five

A better way to check how these things work is by tuning in the nearby NOAA weather broadcast, which we're all familiar with, wherever we live. It's average sounding audio that's definitely not designed for quality, but speed of dissemination and content. They're very loud and clear on 162.475 MHz and they're on continuously, providing me a chance to really check out these headphones!

Listening in on NOAA, I'd have to give the headphones three and a half cotton balls out of five! What better way to say the NoiseBuster is a worthy investment? The good news is they measure up to the advertised noise-reducing performance PR, and they do so at an affordable price. That NOAA broadcast voice changed only slightly when turning on the headphones. Remember, you don't *have* to turn on the headphones; they're darned good as standard headphones!

I said earlier they're collapsible and once folded and readied for the carrying pouch, they're only about the size of my RadioShack cordless phone. I would have designed the pivot point for each folding side to be a bit sturdier; the plastic appears to be heavy enough for repeated openings and closings, although I'm not so sure about the pivot point. I've given it dozens and dozens of opening and closing tests, with some very quickly simulating the need to put 'em away post-haste, and they survived.

The 3.5-mm plug appears to be as good as any medium-duty VOX headset I've used in the past. In other words, my bet is that the wire going into the plastic piece that holds the plug will last as long as anything you've used recently, provided you take care of it and don't yank it from the radio or CD player. Also, the wire leading into each earpiece appears to be reasonably protected against breakage by a small piece of flexible plastic.

When you consider what the NoiseBuster headphones are designed to do—and that they do it quite well for a good price—you can't go wrong! (Plus they make a great gift for your wife and kids who might need their *own* headphones so they don't hear your radio blaring when they just want to relax with some tunes!)

For more information contact Pro Tech online at www.noisebuster.net or call Pro Tech Communications, Inc., at 800-468-8371. You can also write to them at 4492 Okeechobee Road, Fort Pierce, FL 34947. Please tell them you read about their NoiseBuster headphones in *Popular Communications*. ■

NoiseBuster Specs

Frequency range: 20–20,000 Hz
Noise cancellation range: 40–1,200 Hz, maximum 20 dB at 100–200 Hz
Impedance: 15 Ohm/active, 36 Ohm/ passive
One "AAA" battery (included)
Carrying pouch
Airline adapter plug

by Richard Fisher, KI6SN

Capitol Hill And FCC Actions Affecting Communications

House Committee Calls For BPL-interference Study

The FCC will be required "to conduct a study of the interference potential of broadband over power lines (BPL) on amateur radio and first responder radio communications systems" within 90 days after legislation designated the Communications Opportunity, Promotion and Enhancement (COPE) Act becomes law.

The directive came in an amendment in April to a bill drafted by the U.S. House of Representatives Committee on Energy and Commerce. With unanimous committee support, the amendment "would guarantee that valuable public safety communications and amateur radio operators are not subject to interference and ensure that the service provided by over 600,000 amateur radio operators and many more first responders are protected," U.S. Rep. Mike Ross (D-Ark.) said in a statement. He proposed the amendment calling for the study.

"This puts the House Energy and Commerce Committee on record as having concerns about BPL interference," American Radio Relay League CEO David Sumner, K1ZZ, said. "If we are vigilant in protecting it against deletion on the House floor—assuming the bill is approved by the House—the BPL language will be included in the legislation that goes on to the Senate."

"In today's evolving world, technological advancements are being made at a previously unimaginable pace," Ross said. "The Telecommunications Act of 1996 is outdated and must be revised to reflect today's rapidly evolving needs." Ross continued that, "technological change is driving the convergence of a number of previously distinct telecommunications and media markets. Digital technologies are being deployed in and carried over wire line, cable, and wireless networks that are increasingly capable of providing voice, data, and video services over a single broadband platform.

"By streamlining the franchising process, the COPE Act will bring more products, options and competition thereby reducing cost to consumers. As the highest-value telecommunications service, video is the driving force of infrastructure development. More infrastructure is desperately needed in the 150 small towns I represent. A national franchise agreement will enable rural Americans to have access to the latest technology," said Ross.

APCO Announces Appointment Of Executive Director

The Association of Public-Safety Communications Officials (APCO) International announced the appointment of George S. Rice, Jr., as the organization's new executive director. In a news release on APCO's Internet website, the organization said "Rice comes to APCO International from the Metropolitan Washington Council of Governments, a non-profit association of local governments where he currently serves as assistant executive director." His appointment became effective May 1.

Rice has a B.A. in Criminal Justice Administration from Alvernia College and a Certified Public Management designation from George Washington University and "has more than 10 years of public safety experience, including time with the Federal Bureau of Investigation (FBI) and with the Drug Enforcement Administration (DEA)." Rice also spent nine years in a combination of association and public administration management, and served as the associate director of law enforcement relations at the Brady Center, "where he oversaw mobilization of law enforcement and public safety officials nationwide in support of legislative policy, developed coalitions with law enforcement agencies and community groups, and directed lobbying and mass media public safety education campaigns."

APCO, in its announcement, also reported that Rice served as a director at the Enterprise Foundation with focuses on community safety, youth justice, and crime prevention. "Furthermore, Rice served as director of public affairs and homeland security and as executive director of the Center for Youth Resources at the National Crime Prevention Council."

"The APCO International members and staff are pleased to welcome George to the APCO International family," said APCO International President Wanda McCarley. "His public safety background, public administration management practice, and association experience are a perfect match. We could not be more confident in his desire and ability to further advance APCO International and its mission."

Plain Speech Endorsed In Emergency Response Situations

In agreement with the National Incident Management System Integration Center, the Associated Public Safety Communications Officials (APCO) International has agreed that the use of plain speech in emergency response situations is "a matter of public safety, especially the safety of first responders and those affected by the incident," according to a report in the ARRL's "ARES E-Letter." "To best assure the use of common, universal language during a major event, its daily use is required."

"APCO said the entire Incident Command System (ICS), an effort of NIMS to provide a common organizational structure for the immediate response to emergencies involving the coordination of personnel and equipment on-site at an incident requires resources to be managed and functioning under a planned approach that diminishes the risk created by unclear, unfamiliar or misunderstood codes and signals," the "E-Letter" said. "Using plain speech is a simple remedy to reduce communication failures. This common approach is essential to achieving functional interoperability across all jurisdictions and disciplines."

FCC Statistics Show Small Market Share For BPL

FCC statistics show a very small market share for broadband over power line (BPL) when compared to other high-speed

Internet services. The FCC Wireline Competition Bureau report, "High-Speed Services for Internet Access: Status as of June 30, 2005," reported 4,872 business and residential "Power Line and Other" connections that deliver at speeds greater than 200 kbps in at least one direction. The data was reported in the American Radio Relay League's *ARRL Letter*.

"The total number of high-speed lines for all technologies is 42,866,469—the vast majority DSL, cable and traditional wireline connections," the *Letter* said. "This puts the share for "Power Line and Other" at a bit more than 0.01 percent of the total."

The FCC report said that the number of residential BPL "advanced services" lines—greater than 200 kbps in both directions—is 3,916 out of 34,259,411.

"Although some data have been withheld as proprietary, the FCC report indicates there are 18 'Power Line and Other' high-speed providers nationwide," the *Letter* said. "Facilities-based broadband providers must report the number of high-speed connections in service to the FCC twice a year."

Radio Operators Participate In Disaster Drill

A mass casualty disaster drill called "Operation Trifecta," incorporating a scenario including a bomb and two trains, was conducted in March involving members of the New York City District Amateur Radio Emergency Service (ARES) team and the Salvation Army Team Emergency Radio Network (SATERN).

According to the *ARRL Letter*, the "exercise got under way with the mock explosion in Maspeth, Queens, of a chemical bomb aboard a freight train that occurs just as a commuter train passes. The scenario called for 100 people dead or wounded. Police academy recruits covered in blood acted as victims. The elaborate simulation involved 1,500 emergency workers. ARES supported the American Red Cross."

"We were an integral part of the Red Cross response, and the folks in charge were duly impressed with our capabilities and deeply grateful for our participation," said New York City ARES District Emergency Coordinator Mike Lisenco, N2YBB.

"ARES' role was to provide communication support for the Red Cross at its emergency operations center, its on-site command vehicle—making its inaugural run—and a shelter set up to care for area residents affected by the incident. ARES also maintained liaison with SATERN," Lisenco said, "and we had additional volunteers standing by had there been a request for more operators."

Operation Trifecta referred to the fact that, during the seven-hour drill, responders not only had to deal with the explosion and hazardous materials but potential saboteurs hiding in the railroad freight cars.

With amateur radio's emergency role following the Gulf Coast hurricanes, emergency responders again are looking to radio amateur volunteers as "a resource that is desperately needed in a disaster situation," Lisenco said in the ARRL's *ARES E-Letter*. ■

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	7300	Voice of Turkey	TT
0030	7165	BBC relay, Cyprus	Dari
0030	11665	Radio Prague, Czech Rep. via Ascension Is.	SS
0030	9415	Radio Cairo, Egypt	SS
0030	9705	All India Radio (Goa)	
0030	9770	Radio Budapest, Hungary	HH
0030	11605	Radio Free Asia, USA, via Taiwan	unid
0030	3310	Radio Mosoj Chaski, Bolivia	SS
0030	9715	VOA relay, Thailand	
0030	9430	Deutsche Welle, Germany	GG
0100	11780	Radio Nacional da Amazonia, Brazil	PP
0100	9645	Radio Bandeirantes, Brazil	PP
0100	11800	RAI, Italy	II/EE
0100	7230	Radio Slovakia Int., Slovakia	
0100	11620	All India Radio	
0100	9570	China Radio Int., via Albania	
0100	4915	Radio Nacional-Macapa, Brazil	PP
0130	4819	La Voz Evangelica, Honduras	SS
0130	7205	Radio Republica, USA, via UK	SS
0130	11550	Radio Nederland, via Madagascar	unid
0130	9345	Kol Israel	HH
0145	6115	Radio Tirana, Albania	
0200	5970	Radio Belarus	
0200	7285	Voice of Croatia, via Germany	
0200	7270	Radio Cairo, Egypt	
0200	4919	Radio Quito, Ecuador	SS
0200	4800	Radio Buenas Nuevas, Guatemala	SS
0200	4780	Radio Cultural Coatan, Guatemala	SS
0200	9345	Kol Israel	HH
0200	9495	VOIRI, Iran	
0200	7110	Radio Republica, USA, via UK	SS
0200	7180	Voice of Russia, via Moldova	
0200	9440	Radio Slovakia Int.	FF
0230	6973	Galei Zahal, Israel	HH (usb)
0230	9795	Radio Budapest, Hungary	
0230	9575	Radio Medi Un, Morocco	AA
0230	9780	Rep. of Yemen Radio	AA
0230	3320	Radio Sonderegrense, South Africa	Afrikaans
0230	9675	BSKSA, Saudi Arabia	AA
0230	9605	Vatican Radio	FF
0230	9840	RAI Int., Italy	II
0230	3250	Radio Luz y Vida, Honduras	SS

UTC	Freq.	Station/Country	Notes
0300	11700	Radio Bulgaria	
0300	6200	Radio Prague, Czech Republic	SS
0300	9625	CBC Northern Service, Canada	
0300	3340	Radio Misiones Int., Honduras	SS
0300	11675	Radio Kuwait	AA
0300	15720	Radio New Zealand	
0300	4910	Radio Zambia	
0300	7390	Channel Africa, South Africa	
0300	5890	Radio Thailand, via USA	
0300	4976	Radio Uganda	
0300	9805	Radio Farda, USA via Morocco	Farsi
0330	9660	Radio Japan/NHK, via Fr. Guiana	JJ
0330	6005	Deutschland Radio, Germany	GG
0330	7215	Trans World Radio via South Africa	unid
0400	5020	Radio Albania	
0400	6210	Radio Fana, Ethiopia	Amharic
0400	5052.5	Radio Verdad, Guatemala	SS
0400	4915	Radio Ghana	
0400	5960	Radio Japan/NHK, via Canada	JJ
0400	5500	Voiced of the Tigray Revolution via Ethiopia	vern
0400	6080	Radio Monte Carlo, via Canada	AA
0400	9690	Radio Romania Int.	
0400	4775	Trans World Radio, Swaziland	GG
0400	7300	Voice of Turkey	
0400	3200	Trans World Radio, Swaziland	GG
0400	4780	Radio Djibouti	FF
0430	7275	RTT Tunisienne, Tunisia	AA
0430	6175	Voice of Vietnam, via Canada	VV
0430	4930	VOA relay, Botswana	
0430	4960	VOA relay, Sao Tome	PP
0500	4777	Radio Gabon	FF
0500	4770	Radio Nigeria	
0500	5005	Radio Nacional, Equatorial Guinea	SS
0500	7190	RTT Tunisienne, Tunisia	AA
0500	7375	University Network, Costa Rica	
0500	7255	Voice of Nigeria	
0600	5030	Radio Burkina, Burkina Faso	FF
0630	6185	Radio Educacion, Mexico	SS
0700	5025	Radio Rebelde, Cuba	SS
0700	4845	Radio Mauritaine, Mauritania	AA
0800	9675	Radio Cancao Nova, Brazil	PP
0800	6010	La Voz de su Concencia, Colombia	SS

UTC	Freq.	Station/Country	Notes
0830	4985	Radio Brazil Central, Brazil	PP
0845	9765	Radio Tikhy Okean, Russia	RR
0900	6135	Radio Santa Cruz, Bolivia	SS
0900	9580	Radio Australia	
0900	3291	Voice of Guyana	
0900	9885	Radio New Zealand	
0900	4387	Radio Imperio, Peru	SS
0930	6160	CKZN, Canada	
0930	3280	Radio Maria/LV del Napo, Ecuador	SS
0930	2310	VL8T-Australia	
1000	4885	Radio Clube do Para, Brazil	PP
1000	7140	Voice of Korea, North Korea	KK
1030	9970	RTBF, Belgium	FF
1030	5055	TIFC, Costa Rica	SS
1030	4775	Radio Tarma, Peru	SS
1100	6020	Radio Australia	
1100	6070	CFRX, Canada	
1100	7280	Voice of the Strait, China	CC
1100	11865	BBC via French Guiana	
1100	4955	Radio Cultural Amuata, Peru	SS
1100	6075	Radio Rossii, Russia	RR
1100	7295	RTM, Malaysia (Traxx FM)	
1100	7120	Wantok Radio Light, Papua New Guinea	
1100	7320	Radio Rossii, Russia	RR
1100	15580	FEBC, via Northern Marianas	II/EE
1130	4605	Radio Republik Indonesia-Serui	II
1130	3925	Radio Nikkei, Japan	JJ
1130	3205	Radio Sanduan, Papua New Guinea	
1130	4890	NBC, Papua New Guinea	EE/Pidgin
1130	5020	Solomon Islands Broadcasting	
1130	3335	Radio East Sepik, Papua New Guinea	
1130	9730	Radio Veritas Asia, Philippines	CC/EE
1130	3245	Radio East New Britain, Papua New Guinea	
1200	7220	Voice of Vietnam	RR
1200	7290	China National Radio	CC
1230	5075	Voice of Pujiang, China	CXC
1230	4780	Radio Republik Indonesia-FakFak	II
1230	17630	Africa No. One, Gabon	FF
1230	9930	Sound of Hope, Taiwan, via Hawaii	CC
1300	9525	Radio Polonia, Poland d	
1300	21455	HCJB, Ecuador	
1300	9335	Voice of Korea, N. Korea	
1300	15400	YLE/Radio Finland Int.	Finnish
1300	9525	Voice of Indonesia	II
1330	6350	AFN/AFRTS, Hawaii	usb
1330	9865	The Voice-Africa, Zambia	
1330	6150	Radio Singapore Int.	
1330	9325	VOA relay, Sri Lanka	unid
1330	15240	Radio Sweden	
1330	12133.5	AFRTS, Florida	usb
1330	11870	Radio Veritas Asia, Philippines	Hindi
1400	13740	China Radio Int., via Cuba	
1400	17850	Radio Jamahiriya, Libya, via France	V of Africa
1400	9900	Voice of Russia	
1400	9690	All India Radio	
1500	15630	Voice of Greece	GG
1500	10330	All India Radio	Hindi
1500	11690	Radio Jordan	
1530	13775	Radio Austria Int., via Canada	
1530	15560	RDP Int., Portugal	PP
1530	15140	Radio Sultanate of Oman	AA
1530	13675	Vatican Radio	
1600	9940	VOIRI, Iran	
1600	11570	Radio Pakistan	
1600	15735	Radio Sweden	Swedish
1630	15715	CVC Int., Australia	
1630	15420	BBC Relay, Seychelles	
1700	17850	Radio Exterior de Espana Relay, Costa Rica	SS
1700	11920	BSKSA, Saudi Arabia	AA
1730	15580	Voice of America relay, Botswana	
1730	11615	Radio France Int.	FF
1800	15695	Radio Free So. Cameroon via Russia	
1830	11590	Kol Israel	
1830	9630	BBC relay, Singapore	
1830	11720	Radio Pilipinas, Philippines	
1900	15400	BBC relay, Ascension Is.	
1900	15275	Deutsche Welle, Germany	GG
1900	9730	Voice of Vietnam	
1900	15140	Adventist World Radio via South Africa	
1930	9965	Voice of Armenia	unid
1930	15455	Voice of Russia	FF
1930	12005	RT Tunisienne, Tunisia	AA
2000	9500	Radio Bulgaria	SS
2030	11735	Radio Tanzania Zanzibar	Swahili
2033	15120	Voice of Nigeria	
2100	11760	Radio Havana Cuba	
2100	11660	Radio Taiwan Int., via Florida	
2130	9990	Radio Cairo, Egypt	
2130	9580	Africa No. One, Gabon	FF
2130	15205	Deutsche Welle, Germany, via Rwanda	
2130	15345	RTV Marocaine, Morocco	AA
2130	9635	Voz Cristiana, Chile	SS
2200	15345	Radiodifusora Argentina al Exterior	SS
2200	7450	Radio Makedonias, Greece	GG
2200	6165	RNT , Chad	FF
2200	7590	AFRTS, Iceland	usb
2230	5025	ORTB, Benin	FF
2230	7360	China National Radio	CC
2230	15180	Radio Canada Int.	
2230	7320	Radio Jamahiriya, Libya, via France	AA
2230	5470	Radio Veritas, Liberia	
2230	9435	FRBC, Philippines	
2300	17680	Voz Cristiana, Chile	PP
2300	9410	Voice of Greece	GG
2300	7325	Radio Vilnius, Lithuania	
2300	9665	Radio Marumby, Brazil	PP
2300	9435	FEBC, Philippines	
2330	11775	Caribbean Beacon, Anguilla	
2330	5010	Radio Cristal Int., Dominican Republic	SS
2330	11970	Radio Nederland, via Bonaire	DD
2330	11940	Radio Romania Int.	
2330	15385	Radio Exterior de Espana, Spain	FF
2330	5960	Voice of Turkey	
2330	11760	Radio Nacional Venezuela, via Cuba	SS
2330	9855	Radio Kuwait	AA

by Harold Ort, N2RLL, and Peter Bertini

New, Interesting, And Useful Communications Products

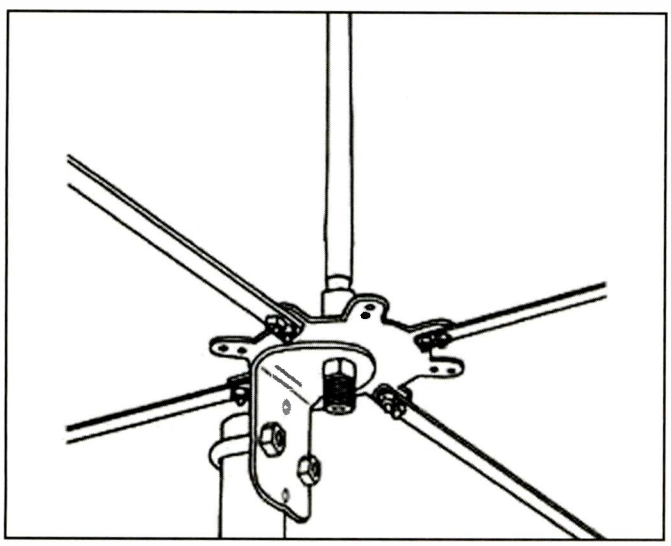
British DX Club Summer Broadcasts In English

The Summer 2006 (A06) edition of *Broadcasts in English* is now available from the British DX Club. It was compiled by Dave Kenny and includes details of all known international broadcasts in English on shortwave and mediumwave for the A06 schedule period, as well as selected domestic English-language broadcasts on shortwave. The 32-page booklet is organized in time order and covers all target areas. Transmitter sites are given where known. It also includes a comprehensive guide to "DX and Media Programs," schedules for Digital Radio Mondiale (DRM) transmissions, and World Radio Network services in English to Europe.

Copies are available at the following prices (postage included): United Kingdom, 2 pounds sterling; Overseas, 5 Euros, 6 International Reply Coupons or 6 U.S. Dollars. Sterling payments may be made by check/postal order to British DX Club, with Dollar or Euro payments in cash or via Paypal. Please e-mail for Paypal payment details to bdxc@bdxc.org.uk. All orders and questions can be sent to British DX Club, 10 Hemdean Hill, Caversham, Reading RG4 7SB, UK or visit the BDXC-UK website at www.bdxc.org.uk.

Firestik's MURS 5/8-Wave Base Antenna

Firestik's Model MURS-BASE, which sells for $38.99 MSRP, is based on the company's high-performance 2-meter, 5/8-wave design. The radiating element is a 5/8-wave design with a center frequency of 153.210 MHz. The core material is 3/8-inch solid fiberglass that's wound with 19-gauge insulated copper wire. The radiating element is approximately 45 inches long and is covered with white, UV-stabilized PVC shrink tubing. The antenna base threads are the common 3/8"-24.



The Firestik MURS 5/8-wave base antenna has a center frequency of 153.210 MHz.

A combination angle bracket, u-bolt, hub plate, and antenna stud is central to the assembly of the base antenna. This assembly will mount to the top of any mast up to 1.5 inches in diameter. The kit comes with four structural aluminum radials that measure 1/8 x 1/2 x 20 inches. Each is pre-drilled to mount to the hub plate. The antenna stud uses a standard SO-239 base for easy hook-up with any UHF (PL-259) terminated coaxial cable.

For more information, visit www.firestik.com or write to them at Firestik Antenna Company, 2614 E. Adams St., Phoenix, Arizona 85034-1495; Phone: 602-273-7151; Fax: 602-273-1836.

N2VZ Enterprises' new Turbo Tuner is an automated screwdriver antenna controller.

New Turbo Tuner From N2VZ Enterprises

N2VZ Enterprises' new Turbo Tuner is an automated screwdriver antenna controller that allows one-button tuning for screwdriver antennas using your radios tune button. Turbo Tuner tunes the screwdriver antenna by SWR and requires no calibration, and it automatically finds the lowest SWR. Versions are available for ICOM, Yaesu, and Kenwood radios. It works with most screwdriver antennas.

For more information visit the company's website at www.n2vz.com or call 609-249-3875.

MFJ's MFJ-4602 Antenna Feedthrough Panel

This new MFJ weather-proof window feed-though panel brings three coax-fed HF/VHF/UHF antennas, balanced line, random wire, and ground into your shack without drilling through walls. The new MFJ-4602 is $59.95 and mounts in your window sill, letting you feed three coax-fed antennas, balanced line, random wire, and ground. Simply place it in your window sill and close the window. One cut customizes it for any win-

MFJ's new MFJ-4602 weather-proof window feed-through panel brings three coax-fed HF/VHF/UHF antennas, balanced line, random wire, and ground into your shack without drilling through walls.

dow up to 48 inches. Use it horizontally or vertically.

The MFJ-4602 is constructed of high-quality pressure-treated wood with 3/4-inch-thick insulating properties and is painted with a heavy coat of white outdoor enamel paint. The inside/outside stainless steel plates bond all coax shields to ground and a stainless steel ground post brings outside ground connection inside. Edges are sealed by weather-stripping, insulating it against all weather conditions for years of trouble-free service; dimensions are 3 1/2 x 48 x 3/4 (HWD) inches.

For more info contact MFJ Enterprises, Inc., at www.mfjenterprises.com.

Gordon West Audio CD Training Courses

Gordon West, WB6NOA, announced a new Element 2 Technician Class four-set CD training program, complementing his new Technician Class Element 2 license manual. The new four-set CD audio course is valid for July 2006 to June 2010.

West has also recorded four audio CDs for General Glass, valid until July 2007, and has an in-depth technical audio course consisting of six CDs for Extra Class, valid until 2008. He also offers a six audio cassette set for commercial radio-telegraph code, as well as a two-set series of CD courses to learn Morse Code. West allows all of his recordings to be played over the air for ham class-at-home study.

Gordon West's new set of four audio CDs cover the new amateur theory questions.

For more information on the availability audio products including computer CD interactive test preparation programs, go to www.MasterPublishing.com or call 800-669-9594. Instructor discounts are available for class purchases.

Mil Spec Radio Gear By Mark Francis, KIØPF

Back when the surplus markets were flooded with war surplus electronics following the end of WWII and the Korean conflict, *CQ* Magazine was *the* premiere source for the latest info on modifying surplus military gear for ham use. Fast-forwarding 60 years, CQ Communications is continuing the tradition with its latest book offering, *Mil Spec Radio Gear*, by Mark Francis, KIØPF.

Interest in military radio gear is rapidly growing, and fortunately there's no shortage of premium military radio sets available on the surplus market! Today, military radio buffs are more concerned with getting these sets running, while at the same time preserving their original condition for historical reasons. These old sets have seen a lot of history!

Mark's book is an ambitious undertaking, the softbound edition spans 232 pages, with chapters covering HF mobile radios, HF fixed radios, VHF manpacks and portables, and much of the related supporting ancillary equipment and accessories for those sets. There's a practical side to collecting these radios, as shown in *Pop'Comm*'s April 2006 "Homeland Security" column, titled "Military Gear: Perfect For Emergencies." Mark reveals what's needed to operate, repair, or align many of the radios covered in his book. It's a great resource and is available direct from the publisher for $27.95.

Contact CQ Communications at 25 Newbridge Rd., Hicksville, NY 11801; Toll-free order line: (800) 853-9797; Web: www.cq-amateur-radio.com.

by Bill Hoefer, flacap388@hotmail.com

The Air Traffic Control Position With The Most Washouts

Anyone who's followed my column over the last five years will notice I'm a little eclectic in my pursuits. I'll quote odd authors and movies, and even try to throw in a little *Star Trek*. (Watch me quote from an *ST* film later.)

A few years ago I instituted an embarrassing award that would be bestowed on the film that most poorly portrayed aviation and air traffic—the "BARTCC SAVAGE" award. It was based on a real statue given to the losing team in sports competition between the controllers of West Berlin, Germany, and the pilots of Pan Am who flew the corridors between West Berlin and free West Germany. The first, and at the time presumably last, recipient was the entire *Iron Eagle* movie series. Except for the movie from circa 1972, *This Is a Hijack*, I didn't think I could find a worse one—but I did.

In 1951 the legendary George Pal produced the film *When Worlds Collide* for Paramount. There are only a couple of flying scenes, the first within two minutes of the opening credits when the hero of the film, Dave Randall, played by Richard Derr, was making out with an unnamed female in what appears to be an old Bellanca. He gives his name to the control tower operator (who also gives his name) and all but ignores the command of the controller. The film only shows just a bit of ATC, but it's clearly a poor rendition of even early 1950s control. It's currently in the lead for the next BARTCC SAVAGE award.

The old joke goes (and I'll use the no longer existing Eastern Airlines as the victim):

An Eastern Airlines B727 had just arrived at the airport and inadvertently made the wrong turn onto a taxiway. The pilot was then nose-to-nose with a Republic Airlines DC9 and had to stop. All of a sudden, the ground controller, a female, just started to berate the Eastern Pilot: "Eastern 123, what are you doing? I told you to turn on taxiway Alpha, and you crossed that and turned on Bravo! My God, you've screwed everything up! It's going to take an eternity to straighten this out! I've got planes lined up in front and behind you that are now stuck where they are! Now you just sit there and don't move until I tell you to move! Do you understand me?"

The embarrassed Eastern pilot said yes and sat there, with no one else bothering to say a thing. After a few tense moments an unidentified pilot keyed his mic and said, "Wasn't I married to you once?"

Which brings me to this month's column topic on what is truly the most difficult part of air traffic control—the ground control. A lot of people assume that en route controlling is the most difficult, and it is indeed difficult. There are the local control positions trying to balance small Cessnas doing 85 knots and Lear Jets that can't be slower than 125 to 145 knots, and successfully doing that often with just one runway.

But the position that garners the most washouts is ground control. While those working in Towers, Approaches, and Centers

Glossary Of Terms And Acronyms

ARTCC (Air Route Traffic Control Center)—A facility established to provide air traffic control service to aircraft operating on IFR flight plans within controlled airspace, principally during the en route phase of flight.

ATC (Air Traffic Control)—Means what it sounds like.

FSS (Flight Service Station)—Air traffic facilities that provide pilot briefing, en route communications and VFR search and rescue services. They also assist lost aircraft and aircraft in emergency situations and relay ATC clearances. Similar is *AFSS (Automated Flight Service Station).*

ICAO (International Civil Aviation Organization)—Headquartered in Montreal, Canada, this agency of the UN develops the principles and techniques of international air navigation and fosters the planning and development of international air transport to ensure safe and orderly growth.

IFR (Instrument Flight Rules)—A set of rules governing the conduct of flight under instrument meteorological conditions.

ILS (Instrument Landing System) Approach Plate—Diagram published by the FAA and privately that depicts the procedure pilots need to follow to execute an ILS approach.

NAVAID (Navigational Aid)—Transmitter that helps pilots navigate from one point to another.

NOTAM (Notices To Airmen)—A notice of information that contains timely data concerning the establishment, condition, or change in any component (facility, service, or procedure of, or hazard in the National Airspace System) which is essential to personnel concerned with flight operations.

UNICOM—An aeronautical advisory station primarily for private aircraft.

VFR (Visual Flight Rule)—A set of regulations that a pilot may operate under when weather conditions meet certain minimum requirements. They are to be followed when there is sufficient visibility for aircraft to be seen and avoided.

VORTAC—The VOR system is the backbone of air navigation in the US and most other countries. It is composed of usually round buildings, about 30-feet in diameter, with a cone sticking out of the top. Many are painted in a red and white checkerboard pattern. VOR is an acronym for Very high frequency Omni Range. VORTAC is the same with TAC, standing for TACAN, a military designation for its distance information on a VOR signal.

WSI (Weather Services International)—Headquartered in Andover, Massachusetts with offices in Birmingham, England,WSI provides weather-related products and information to professionals in the energy, aviation, and media markets, as well as multiple federal and state government agencies.

Spot The Not

Each column I attempt to put in a series of fixes in the aviation spectrum pilots use. I also try to throw you off by throwing in a bogus en route fix. Can you "spot the not" here? All are based in U.S. and Canadian demo teams.

TBIRD BLUUE ANGEL SNOWW BIRRD REDDD BARON

have the option of moving planes in up to nine possible directions (up/left, up, up/right, left, straight ahead, right, down/left, down, down/right), giving the pilots plenty of room to avoid collision, the ground controllers have only *four* possible movements (left, straight ahead, right, stop) in two dimensions.

The only advantage a ground controller has over other controllers is the ability to stop the movement of an airplane on the ground to satisfy safety requirements. The unfortunate problem is that there are limitations on the movement of these aircraft. You just can't put an Airbus or an L-1011 in a ditch to keep aircraft moving on the ground. You must have an out for your movements or you'll be stuck, like in the anecdote above.

In the 1980s I had seriously thought about transferring to Chicago O'Hare (ORD). Local control was the easy part, as all airliners were sequenced and compatible. Puddle jumpers just didn't fly through there. The problem I would have had was ground control.

A Delicate Ballet

As you can see from the map of O'Hare (**Figure 1**), there are three pairs of parallel runways with numerous taxiways crossing over them. I was even told of a "penalty box" at O'Hare that was used to put errant pilots out of the way if they screwed up. Ground control at O'Hare, as well as at most of the larger airports, is a delicate ballet that will prove the controllers' mettle, take the wind out of their sails, and sometimes break a controller's confidence enough that he or she may quit. I've seen it happen.

Look again at the map of O'Hare. Unfortunately, the map here is quite unclear. Not only are there six parallel runways, the taxiways that move the ground traffic are given slightly different identifiers. It may not be very visible, but the taxiway north and parallel to 9R/27L is called 9R/27L parallel. Go figure. Near the northeast Air Force hangars is the Air Force Scenic Taxiway. Most taxiways at most airports are lettered, as in A, B3, T west, etc. But having it this way at O'Hare, makes it not only different, but difficult for those not familiar with the O'Hare system.

Now look at the map for Thompson Field, Jackson, Mississippi (JAN), in **Figure 2**. Only two parallel runways exist

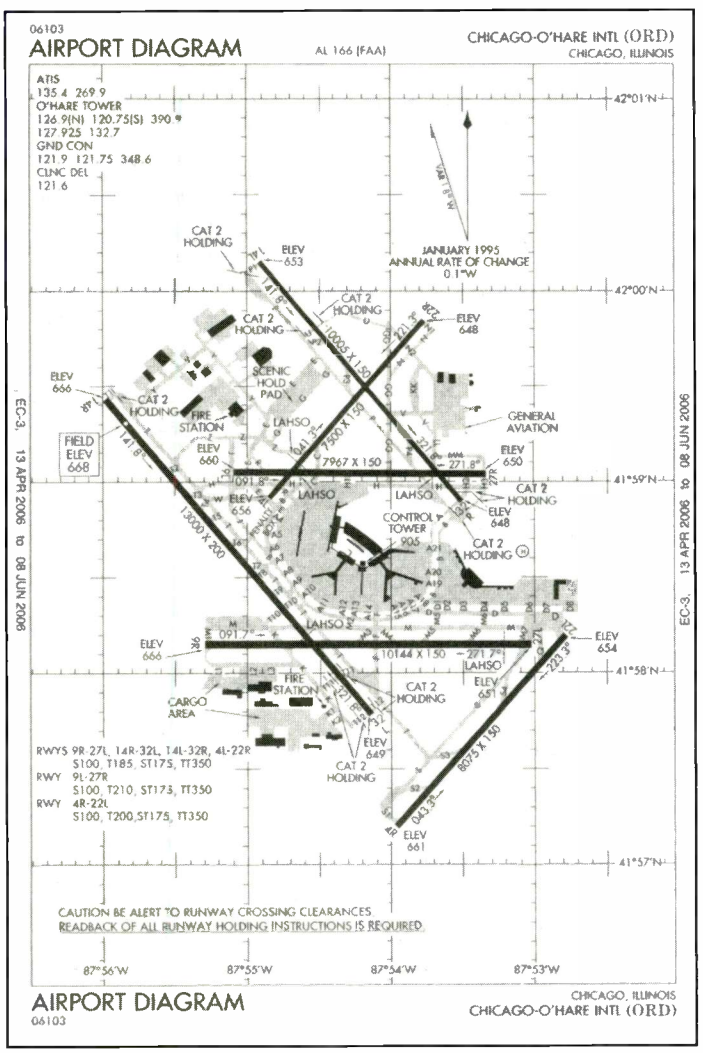


Figure 1. Chicago's O'Hare. (Figures not for navigational use)

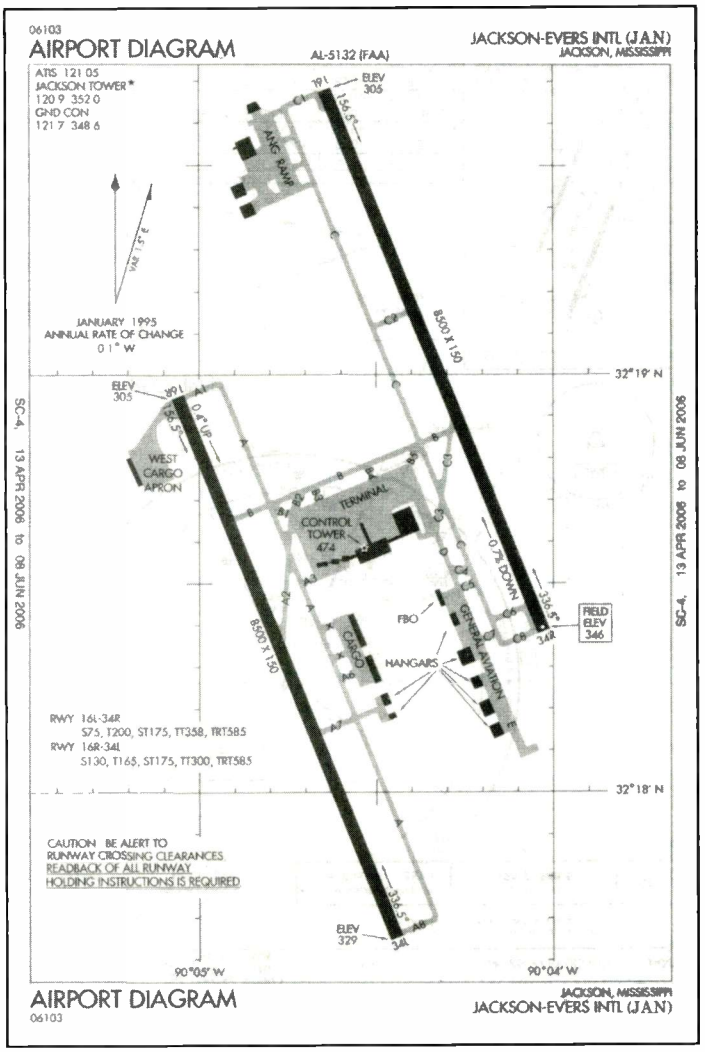


Figure 2. Thompson Field, Jackson, Mississippi (JAN).

NEW/CHANGED/DELETED FREQUENCIES

NEW

AK
Big Delta, Ft Greeley (BIG/PABI)
ATCT 125.325

AR
Jonesboro Municipal (JBR)
Jonesboro AFSS RCO 122.075

CA
Trona Airport (L72)
CTAF 122.9

CO
Erie Municipal (EIK)
AWOS-3 133.825/303-604-4339

GA
Athens, Ben Epps (AHN)
Atlanta Large TRACON CD 127.5/316.05, when AHN ATCT closed

Lafayette, Barwick (9A5)
AWOS 119.775/706-639-1976

IL
Lawrenceville, Vincennes International Airport (LWV)
Mount Carmel Municipal (AJG)
Terre Haute International (HUL)
Washington, Daviess County (DCY)
Hulman Apch 267.9

IN
Rensselaer, Jasper County (RZL)
AWOS-3 119.175/219-866-7167

LA
Bastrop, Morehouse Memorial (2F8)
Eunice (4R7)
Houston ARTCC GCO 135.075

MA
Lawrence Municipal (LWM)
ASOS 126.75

MS
Brookhaven-Lincoln County Airport (1R7)
AWOS-3 118.125/601-833-3207

NY
Seneca Falls, Finger Lakes Regional Airport (0G7)
AWOS-3 120.0/315-568-5362

NC
Mooresville, Atwell Airport (1NC2)
UNICOM 122.75

OR
Bend Municipal (S07)
AWOS-3 134.425/541-382-1477

PA
New Castle Municipal (UCP)
ASOS/AWOS-A 124.175

SC
Bennettsville, Marlboro County Jetport (BBP)
AWOS-3 123.825/843-479-5817
North AF Aux Airport (XNO)
CTAF 235.775

TN
Lexington, Parsons, Beech River Regional (PVE)
ASOS 118.125
Apch (ZME ARTCC) 125.85/379.25
CTAF 123.0
Smyrna Airport (MQY)
ASOS 119.125/615-223-7716

WA
Seattle-Tacoma International (SEA)
Ramp Tower 126.875/North, 122.275/South

CHANGED

AL
Troy Municipal (TOI)
Gnd Ctrl was 294.7, now 263.125

AR
Fort Smith Regional (FSM)
RTR was 380.15, now 353.57

CA
Hollister Municipal (3O7)
NORCAL TRACON Apch Ctrl was 133.0/251.15, now 124.525/348.675

FL
Cocoa Beach, Cape Canaveral AFS Skid Strip (XMR)
Cocoa Beach, Patrick AFB (COF)
Melbourne International (MLB)
Merritt Island (COI)
Titusville, NASA Shuttle Landing Facility (TTS)
Titusville, Arthur Dunn Air Park (X21)
Titusville, Space Coast Regional (TIX)
Apch Ctrl was Daytona Apch 134.95/239.275, now Orlando Apch 134.95/281.425

IN
Indianapolis ARTCC (ZID)
Portsmouth OH Low was 135.57, now 135.575

IA
Fort Dodge Regional (FOD)
AWOS-3 was 119.275, now 118.775

IN
Frankfort Municipal (FKR)
AWOS was 118.325, now 134.325
Porter County Municipal (VPZ)
CD was 135.2, now 120.525

MD
Camp Springs, Andrews AFB (ADW)
Command Post was 378.1, now 349.4

MI
Benton Harbor, Southwest Michigan Regional (BEH)
ASOS was 124.175, now 121.55
Detroit, Coleman A Young Municipal (DET)
ATIS was 133.0, now 124.875
Escanaba, Delta County (ESC)
AWOS was 126.475, now 121.425

MS
Kosciusko-Attala County (OSX)
Memphis ARTCC (ZME) RCAGwas 135.75, now 132.75
Pascagoula, Trent Lott International (PQL)
PCL was 118.575, now 122.8

here and the airport is set up so no runways are crossed by taxiways. Ground control here is much easier. The relative simplicity, as well as the lower amount of traffic, makes things much easier on ground here, in spite of everything being in only two dimensions. Which brings me to my obligatory *Star Trek* quote.

Near the end of *Star Trek II—The Wrath of Kahn*, Kirk and Kahn are in their final battle in a nebula. Clearly Kahn's fallacies are shown here when Spock says to Kirk: "Kahn is intelligent, but not experienced. He demonstrates two-dimensional thinking" (like a ground controller), giving Kirk the idea to move down beneath Kahn's ship to come up behind him, to off him as it were (three-dimensional thinking of other controllers).

And you thought I couldn't get *Star Trek* in here.

What's Not...

The answer to our "Spot the Not" is ANGEL.

TBIRD is 15 WSW of Stuart FL (SUA)
BLUUE is 35 NE of Beaufort NC (MRH)
SNOWW is 40 SE of Oscoda MI (OSC)
BIRRD is 8 W of French Lick IN (FRH)
REDDD is 30 SSW of Auburn Opelika AL (AUO)
BARON is 16 NNE of Gainesville GA (GVL)

Monitoring Challenge

In closing, I have a challenge for you: monitor frequency 123.45 MHz and tell me what you hear. It's some of the most interesting comms you'll find anywhere!

Till next time, have fun monitoring the air bands! ■

NM
Roswell Industrial Air Center (ROW)
CD was 127.775, now 132.875

TN
Memphis ARTCC (ZME)
Fort Smith AR LOW RCAG was 119.25/380.3, now 126.1/269.0

TX
El Paso International (ELP)
ATCT was 118.3, now 126.05

WV
Wheeling, Ohio County (HLG)
RTR was 127.95, now 118.65

DELETED/DECOMMISIONED

CA
Trona Airport (L72)
UNICOM 122.8

IL
Lawrenceville, Vincennes International (LWV)
Mount Carmel Municipal (AJG)
Evansville Apch 339.8

IN
Vincennes, O'Neal Airport (OEA)
Evansville Apch 339.8

WI
Blair Airport (WI49)
CTAF 122.8

NEW/CHANGED ID'S/CLOSED AND ABANDONED AIRPORTS
NEW

AK
Clam Gulch, Hackney Landing Seaplane Base 96AK
Talkeetna, Carl's Landing Airport AK19
Wasilla, Sunset Strip Airport AK16

AZ
Gilbert Emergency Hospital Heliport 17AZ
Maricopa, Hidden Valley Airport AZ43
Morristown, Thunder Ridge Airpark AZ28

CO
Agate, Metrogro Farm Airport CO25
Carr, Black Hollow Heliport 5CO5
Lafayette, Fox Hole Stolport 0CD7
Lamar, Powers Medical Center 0CD8
Littleton, Swedish S W Medical Heliport 0CD9

MD
Galena, Schlosser Airport 29MD
Oakland, Whalen Field 25MD
Sudlersville, Roseland Airport 32MD

MI
Brooklyn, Michigan International Speedway Heliport MI66

NV
Carson City, Tahoe Regional Medical Center Heliport NV15

NJ
Clayton, The Plant Place Heliport 23JY
Waterford, Heli-Ray Heliport 25JY

NC
Mooresville, Atwell Airport 1NC2
Mt Pleasant, Willow Creek Airport 9NC7

SC
Woodruff, Green Pond Airport SC39

VA
Abingdon, ANR Heliport 22VG

WV
Grafton City Hospital Heliport 22WV

CHANGED IDs

MI
Onsted, Loars Field was 83G, now MI51

WI
Blair Airport was 5E6, now WI49

CLOSED/ABANDONED AIRPORTS

IL
Byron, Lunn Seaplane Base IL48

MT
Broadus BDX

NH
Wolfeboro, Lakes Region Airport 69NH

WI
Darlington Aviation Inc Airport 9WN8

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

Propagation Model Reliability

In previous months, we've explored the commonly asked question, "When will good propagation occur?" That simple question has a difficult answer, so difficult in fact that powerful computer models are required to predict when HF circuits are likely to connect. And when various system variables are added, such as frequency, transmitter power level, antenna gains, and sunspot numbers, the problem becomes difficult indeed.

Last month, we discussed how HF propagation models use statistics to determine the reliability, or *time availability*, of a given circuit. Most models create circuit predictions for monthly intervals, and then find the reliability of the prediction in terms of the days of the month when that condition can be expected to prevail. For example, when the user specifies a 50-percent required reliability, then the prediction is for 15 days out of a 30-day month, or better. If the user specifies 90-percent reliability, then the resulting predictions will be as shown, or better, during 27 days of the month. The model uses its statistical database to produce more accurate, and more conservative, predictions as the specified reliability level is increased.

This month, we will explore the history of the popular VOACAP model and will show how the SWL enthusiast or ham radio operator can use new tools to make his or her predictions agree more closely with on-air experiences.

HF Propagation Models: A Brief History

HF propagation models had a long history of development, going back to the U.S. Army's Ionospheric Radio Propagation Technical Report #9, published by the National Bureau of Standards in 1948. The Institute for Telecommunication Sciences and Aeronomy released the first computer prediction program, called ITSA-1, in 1966. A second generation of ionospheric prediction programs, known as ITS-78 or sometimes HFMUFES-4, was developed in 1969. This led to continued work by the National Telecommunications and Information Administration's Institute for Telecommunication Sciences (ITS), and the well-known IONCAP model—the third generation of HF predictions programs—was eventually released to the public.

In 1985, the Voice of America selected IONCAP for its modernization program and launched a model improvement project with development by the Naval Research Laboratory (NRL), ITS, and the VOA staff led by Mr. George Lane. The

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.

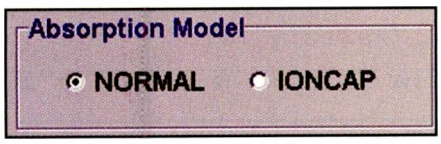


Figure 1. Absorption Model control in ACE-HF V2.05.

NRL effort found many coding errors in IONCAP and, together with ITS, added new capabilities, such as area coverage predictions. The result was named VOACAP, for Voice of America Coverage Analysis Program, and was released to the public in 1993. Since that time, VOACAP has been maintained by ITS in Boulder, Colorado.

VOACAP: The Gold Standard

Because of its decades of historical development and due to the many years of validation through VOA listener reports, VOACAP has emerged as the gold standard of HF propagation models. VOACAP is used throughout the world by government and amateur radio operators, as well as by international broadcasters. The popular ACE-HF software for hams and shortwave listeners (see www.acehf.com), which was reviewed in this column two months ago, selected VOACAP for its computational model. The programmers of ACE-HF work directly with ITS personnel to develop new capabilities, and ACE-HF funded ITS to implement the new reception area coverage predictions, so important to SWL enthusiasts.

Other ham radio programs use VOACAP as well, and all are offered at different prices, with some even free. It's clear when you compare them side by side that you do get what you pay for, however. In future issues, I'll compare some of the main differences between the various VOACAP-based programs. For the purpose of illustrating concepts, I have chosen ACE-HF because of its close tie with current VOACAP development.

Low-Frequency Signal Predictions

IONCAP, and thus VOACAP, was based on HF ray-trace theory, but the programs are not theoretical models. Rather, they are Operations Research (OR) models. OR models became popular in the early 1960s and include precise definitions of all system variables, with resultant acceptable ranges called *boundary conditions*. For accurate predictions, the model's input variables must remain within the defined boundaries, which were established through an extensive database of field measurements. Use of inputs outside those boundaries is said to be in the model's *noise level* and is ill advised.

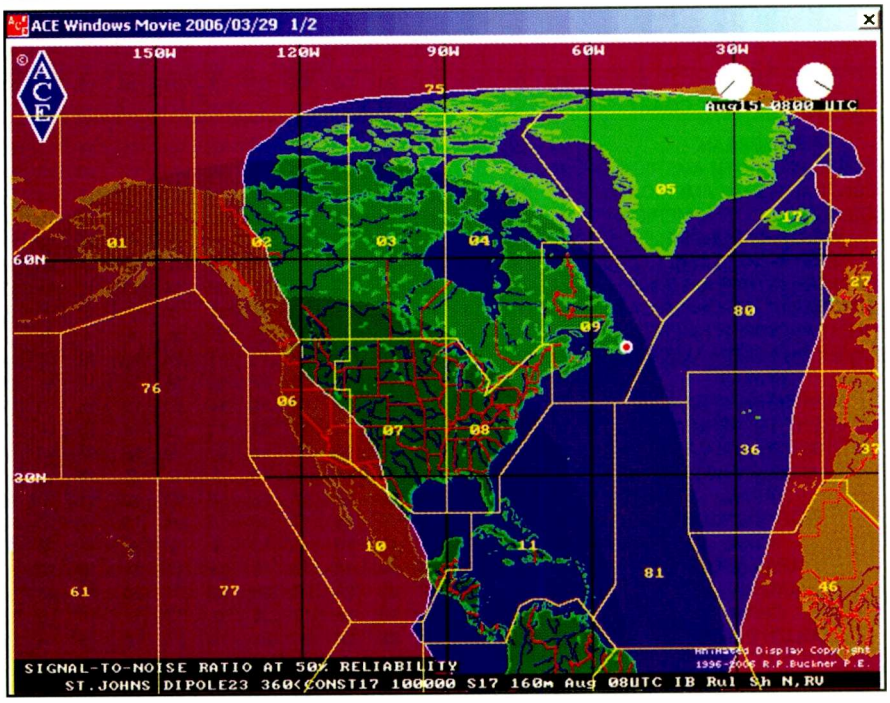


Figure 2. St. John's Reception Area Coverage at 3.21 MHz, August, 08 UTC, 50 percent Required Reliability, for the NORMAL Absorption Model.

One of the most complicated areas of the VOACAP model is the computation of signal power at the receiver, which involves a frequency-dependent absorption model. In 1999, VOACAP was changed to include a more conservative model of nighttime signal absorption for frequencies below about 4 MHz. The previous IONCAP absorption algorithm was replaced because it was feared to be in error since very little measured data supported the low-frequency predictions. Without a strong database, it was thought best to err toward the conservative, if at all.

Since then, however, anecdotal experiences by hams and other HF operators have indicated nighttime signal reception where the VOACAP model computed no connectivity. Recently, Dick Buckner of ACE-HF, working with ITS personnel, conducted comparative tests of the IONCAP versus the standard VOACAP absorption models and has concluded that indeed, for some circuits the IONCAP model results in higher signal predictions.

ACE-HF Version 2.05, recently released, now permits the original IONCAP absorption model to be invoked if the user wishes to experiment with this different computation. The model selection, shown in **Figure 1**, defaults to the "NORMAL" VOACAP setting to emphasize that the standard VOACAP absorption model should always be used by those desiring more conservative predictions.

Testing the Absorption Model

Faithful readers will recall our June column, in which we reviewed the new Version 2.05 of ACE-HF. To test the new Absorption Model adjustment, I again used ACE-HF in the "SWL" user mode and computed path conditions from the WWCR International Broadcasting transmitter in Nashville, Tennessee, to CIRAF Zone 9. I assumed a shortwave listening station in St. John's, Newfoundland, and in order to become oriented on this circuit, I produced the reception area coverage map of **Figure 2**, using the NORMAL Absorption Model.

The WWCR station was assumed to be operating on 3.21 MHz using its standard 100,000-watt transmitter. The CONST17.VOA transmit antenna model was used, and for good quality reception, I selected ACE-HF's recommended ser-

Optimum Working Frequencies (MHz) - For August 2006 - Flux = 70, 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	18	16	15	14	13	12	11	11	11	13	15	16	18	19	19	20	21	21	21	21
NORTHERN SOUTH AMERICA	27	27	26	24	22	20	19	17	16	15	14	13	13	15	18	20	22	23	24	25	26	26	27	27
CENTRAL SOUTH AMERICA	27	25	22	21	19	17	16	15	14	14	13	15	14	17	20	22	24	25	27	27	28	29	28	28
SOUTHERN SOUTH AMERICA	24	21	18	17	16	15	14	14	13	13	12	12	12	14	17	19	21	23	25	26	27	28	28	26
WESTERN EUROPE	12	10	9	9	8	12	14	11	10	9	13	15	16	17	17	18	18	18	18	18	18	17	16	15
EASTERN EUROPE	9	9	8	8	12	14	13	10	9	9	9	12	15	16	17	17	18	17	17	16	15	13	10	9
EASTERN NORTH AMERICA	24	24	23	22	21	19	17	16	15	14	13	12	14	17	19	21	22	23	24	24	25	25	25	25
CENTRAL NORTH AMERICA	14	13	13	13	12	11	10	9	9	8	7	7	7	8	10	11	12	12	13	13	14	14	14	14
WESTERN NORTH AMERICA	7	7	7	7	7	6	6	5	5	4	4	4	3	3	4	5	6	6	7	7	7	7	7	7
SOUTHERN NORTH AMERICA	22	22	22	21	20	19	17	16	15	14	13	12	11	12	14	16	18	19	20	21	22	22	22	22
HAWAII	19	19	19	19	19	18	18	17	15	14	13	12	11	10	10	9	11	13	14	15	16	17	18	18
NORTHERN AFRICA	14	13	12	11	10	10	12	11	10	10	13	15	16	17	18	18	19	19	19	19	19	18	17	15
CENTRAL AFRICA	16	15	14	13	12	13	14	12	10	12	14	15	16	17	17	17	18	18	18	18	18	18	18	17
SOUTH AFRICA	16	15	15	14	13	13	13	14	13	12	12	13	16	19	20	21	22	23	23	24	23	21	19	18
MIDDLE EAST	11	11	10	11	14	15	13	10	9	9	9	13	15	16	17	18	18	19	18	17	16	14	13	12
JAPAN	19	20	20	19	19	18	17	16	15	13	12	11	10	10	11	12	11	10	10	13	15	17	18	19
CENTRAL ASIA	20	20	20	19	19	18	17	16	15	13	12	11	10	10	12	14	16	15	14	13	12	13	16	18
INDIA	16	16	17	17	17	16	15	13	9	9	9	8	12	9	9	8	8	8	8	10	13	14	15	15
THAILAND	16	18	19	19	19	18	17	16	15	12	11	10	10	10	14	16	17	16	15	14	13	12	12	14
AUSTRALIA	26	28	29	29	29	28	27	26	23	21	20	18	17	16	15	14	15	14	13	13	15	19	22	25
CHINA	18	19	19	19	18	18	17	16	15	13	11	10	10	13	14	13	12	11	10	10	11	14	16	17
SOUTH PACIFIC	28	29	29	29	28	26	24	21	18	17	16	15	14	13	13	12	12	12	12	20	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	23	22	20	18	17	15	14	13	13	12	13	15	17	19	20	21	22	23	23	24	24	24
NORTHERN SOUTH AMERICA	25	24	24	22	20	18	17	16	15	14	13	12	12	15	17	19	20	21	22	23	24	24	25	25
CENTRAL SOUTH AMERICA	27	24	22	20	19	17	16	15	14	14	13	14	15	18	21	23	24	25	26	27	28	28	28	28
SOUTHERN SOUTH AMERICA	24	20	19	17	16	15	14	14	13	13	12	12	14	16	19	21	23	24	25	26	27	28	28	26
WESTERN EUROPE	15	14	11	10	12	12	11	10	10	11	14	16	17	18	18	18	18	18	18	18	17	17	16	16
EASTERN EUROPE	9	9	9	8	8	13	11	10	10	13	15	16	17	17	18	18	18	18	17	17	16	15	13	10
EASTERN NORTH AMERICA	18	17	17	16	15	13	12	11	10	10	9	9	11	13	14	15	16	17	17	18	18	18	18	18
CENTRAL NORTH AMERICA	8	8	8	7	7	6	6	5	5	4	4	4	4	5	6	7	7	8	8	8	8	8	8	8
WESTERN NORTH AMERICA	14	14	13	13	12	11	10	10	9	8	8	7	7	8	10	11	12	12	13	13	14	14	14	14
SOUTHERN NORTH AMERICA	16	16	15	15	14	13	12	11	10	9	9	8	8	9	11	12	13	14	14	15	15	16	16	16
HAWAII	22	22	22	22	21	21	19	18	16	15	14	13	12	11	11	11	13	15	17	18	19	20	21	21
NORTHERN AFRICA	18	16	15	14	13	12	12	11	10	10	13	15	17	18	19	19	20	20	20	20	20	20	20	19
CENTRAL AFRICA	16	15	14	13	12	12	11	11	10	10	13	15	17	18	19	19	20	20	20	20	20	20	19	18
SOUTH AFRICA	16	15	14	14	13	13	12	17	16	15	14	16	20	22	24	26	27	28	27	25	22	20	19	17
MIDDLE EAST	12	11	10	10	12	12	11	10	10	12	14	16	17	18	18	19	19	19	19	18	17	15	14	13
JAPAN	19	19	19	18	18	17	15	13	12	11	10	10	11	13	12	12	11	10	10	13	15	17	18	19
CENTRAL ASIA	19	19	19	18	17	16	15	13	11	11	10	10	13	15	16	17	16	15	14	13	12	13	16	18
INDIA	11	13	14	15	15	15	13	10	9	10	13	15	16	15	15	14	13	11	9	9	8	8	8	8
THAILAND	16	18	18	18	17	16	15	13	11	10	10	13	15	16	17	18	18	17	15	14	13	13	12	13
AUSTRALIA	27	28	29	28	28	27	25	23	21	19	18	16	15	14	15	15	14	14	13	13	15	20	23	25
CHINA	18	19	18	18	17	16	15	13	11	10	10	13	15	16	14	13	12	11	10	10	11	14	16	17
SOUTH PACIFIC	29	29	29	28	27	25	23	18	17	16	15	14	13	13	12	12	12	12	14	21	24	26	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	18	17	15	14	13	12	11	10	10	10	11	13	15	16	17	17	18	19	19	19	19	19
NORTHERN SOUTH AMERICA	22	22	20	19	17	16	14	13	13	12	11	11	12	14	16	17	19	20	20	21	21	22	22	22
CENTRAL SOUTH AMERICA	26	24	22	20	18	17	16	15	14	13	13	14	17	19	21	23	24	25	26	27	27	27	27	27
SOUTHERN SOUTH AMERICA	23	20	19	17	16	15	14	14	13	13	12	12	16	18	20	22	24	25	26	26	27	27	27	26
WESTERN EUROPE	13	12	11	10	9	9	10	10	9	12	14	16	17	17	18	19	19	19	18	18	18	17	16	15
EASTERN EUROPE	10	9	9	8	11	11	10	10	10	13	15	17	18	18	19	19	19	18	18	17	17	16	15	13
EASTERN NORTH AMERICA	8	8	8	7	7	6	5	5	5	4	4	4	5	6	7	7	8	8	8	8	8	9	9	8
CENTRAL NORTH AMERICA	18	18	17	17	15	14	13	12	11	10	10	9	12	13	15	16	17	18	18	18	19	19	19	19
WESTERN NORTH AMERICA	24	24	23	22	21	19	17	16	15	14	13	12	14	17	19	21	22	23	24	24	25	25	25	25
SOUTHERN NORTH AMERICA	19	19	19	18	16	15	14	13	12	11	10	10	11	13	14	16	17	17	18	19	19	19	19	19
HAWAII	24	24	24	23	22	20	18	17	15	14	13	13	12	13	12	12	14	16	18	19	21	22	22	23
NORTHERN AFRICA	18	17	15	14	13	13	12	13	12	13	16	19	20	22	23	24	24	25	25	24	24	23	22	20
CENTRAL AFRICA	16	15	14	13	12	12	13	13	12	13	16	19	20	22	23	24	24	24	24	24	23	21	20	18
SOUTH AFRICA	16	15	14	14	13	13	12	16	15	14	15	18	20	22	24	25	26	27	27	24	22	20	19	17
MIDDLE EAST	15	14	13	13	12	12	11	10	10	12	15	16	18	18	19	20	20	20	20	20	20	20	18	17
JAPAN	19	18	18	17	15	13	12	11	11	10	10	14	15	13	12	11	11	10	10	13	15	17	18	19
CENTRAL ASIA	19	18	17	16	14	12	11	11	10	10	13	15	17	18	18	18	17	15	14	13	12	12	16	18
INDIA	9	8	8	8	12	11	11	10	10	13	15	17	17	17	17	17	17	16	15	15	13	11	9	9
THAILAND	15	17	16	15	13	12	11	10	10	12	15	16	17	18	19	19	19	17	16	15	14	13	12	12
AUSTRALIA	27	28	28	27	26	24	21	20	18	17	16	15	14	17	16	15	14	13	13	12	16	21	24	26
CHINA	18	18	17	16	14	12	11	10	10	11	14	16	17	17	16	13	12	11	10	10	10	14	16	17
SOUTH PACIFIC	28	28	28	27	25	22	21	16	15	14	13	13	12	12	12	12	11	11	17	23	25	26	27	28

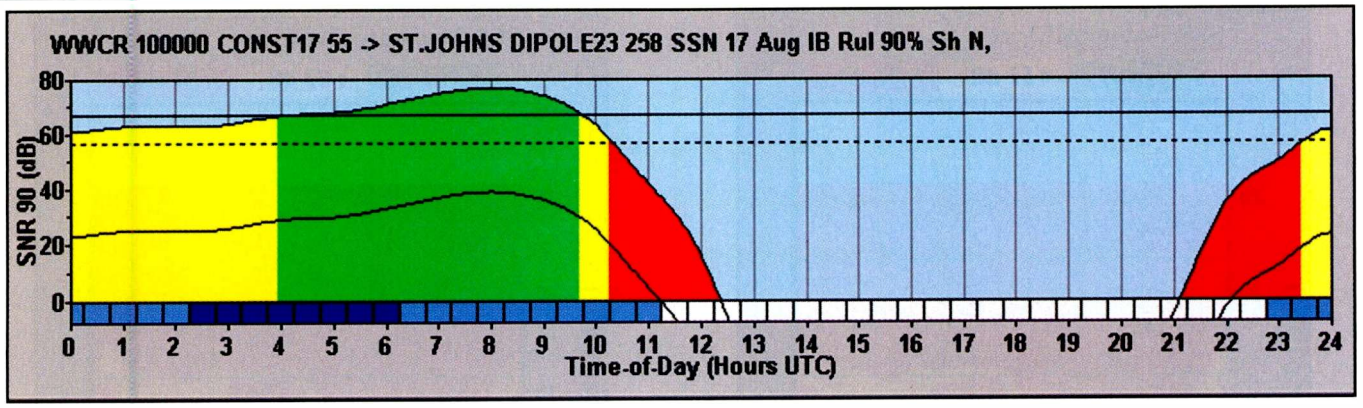


Figure 3. WWCR to St. John's at 3.21 MHz, 90-percent Reliability, for an SSN of 17, NORMAL Absorption Model.

vice type setting of 67 dB-Hz for International Broadcasting. I had selected WWCR's 3.21-MHz channel because I knew in advance that the Absorption Model changes would apply only to the lower frequencies, and would be seen only during nighttime conditions.

Mindful of VOACAP's mandate to stay within system boundary conditions, I purposely chose a conservative simulation for this test. I changed to 90-percent reliability and continued to use a high signal-to-noise ratio (SNR) threshold, the 67 dB-Hz service type. But most importantly I selected a relatively short path—the circuit from Nashville to St. John's is only 3060 kilometers long. I could have tested very long paths, say of 10,000 kilometers or more, but I knew that connectivity on such long circuits is "iffy" at best and would be dependent on short-term ionospheric conditions that might or might not exist in reality. It was better to test a short path where I knew conditions would be more stable.

An ACE-HF point-to-point prediction was run next, as seen in **Figure 3**, to confirm the connectivity suggested by the area map. The circuit was seen to be lousy except during nighttime. The results of my very conservative specifications (90-percent reliability and a high required SNR) were evident. Even the predicted SSN was only 17 at this period of the solar minimum, so this was indeed an assured circuit.

Effects Of The IONCAP Absorption Model

Now I was ready to invoke the IONCAP Absorption Model. I decided to use my favorite ACE-HF tool, the SNR Summary Chart, which shows all Frequencies and Times-of-Day for a Required SNR Threshold. **Figures 4** and **5** show the comparisons.

Clearly, the IONCAP model made a difference. The charts show that only the lower frequencies were affected and confirm that the effects apply only to the nighttime period, from roughly 00 to 12 UTC for this circuit.

But just to be sure, I used the Outputs selection on the Circuit Analysis screen to look at the raw VOACAP data. Selecting data for the 08 UTC hour of the previous area coverage map, I found that for 3.21 MHz, the computed SNR_{90} value was 77 dB using the NORMAL model, but rose to 82 dB when the IONCAP model was applied. Now 5 dB is a bunch, equating to a transmitter power increase of from 100,000 to about 316,000 watts! I can see why the VOACAP scientists were so reluctant to continue using the IONCAP absorption model when there was so little data to support the resulting predictions.

Out of curiosity, I decided to make another reception area coverage map, this time with the IONCAP model selected. **Figure 6** is the result. It's fun to compare **Figure 6** with **Figure 2** using the program, where the two images can be quickly animated back and forth. The daylight side of the coverage area never moves, but the nighttime part flicks back and forth, clearly showing the effect of the higher gain using the IONCAP absorption model. At even lower frequencies, such as the 160-meter ham band, the increased coverage improvement is expected to be even greater.

Which Model To Use?

So what should we do? Use the NORMAL or the older IONCAP Absorption Model? Hams and shortwave enthusiasts might want to leap at the "improvement" and always use the IONCAP model. But HF scientists and engineers would say "NO! Always use the more conservative NORMAL model. After all, that's why VOACAP was changed in 1999!" The fact is, there is very little data to support the higher signal gain of the IONCAP model, and until there is, such changes cannot be recommended for everyone. Here's what ACE-HF says:

For the NORMAL Absorption Model: "The NORMAL selection uses the standard Absorption Model that was included in VOACAP in 1999 because of a perceived error in IONCAP. This selection results in higher nighttime signal attenuation below 4 MHz. Use of this NORMAL setting for more conservative predictions is recommended."

For the IONCAP Absorption Model: "The IONCAP selection restores the VOACAP Absorption Model to the earlier IONCAP design. This selection will produce higher nighttime signal predictions below 4 MHz. WARNING: This selection should be used experimentally, because there is little measured data to support the change. Use of the NORMAL setting for more conservative predictions is recommended."

But isn't it fun to experiment? After all, that's what HF ham operation and shortwave listening is all about! In fact, I would be delighted to accumulate a body of user reports, where the two absorption models are compared with your on-air experiences. Please don't hesitate to write and let me know what you find out about this interesting subject.

HF Propagation

Propagation on the higher frequencies will fluctuate less drastically during August, as the hours of sunlight are quite long and the ionosphere has very little time to recombine during the hours of darkness. Higher HF frequencies are going to be unusable over most paths, but

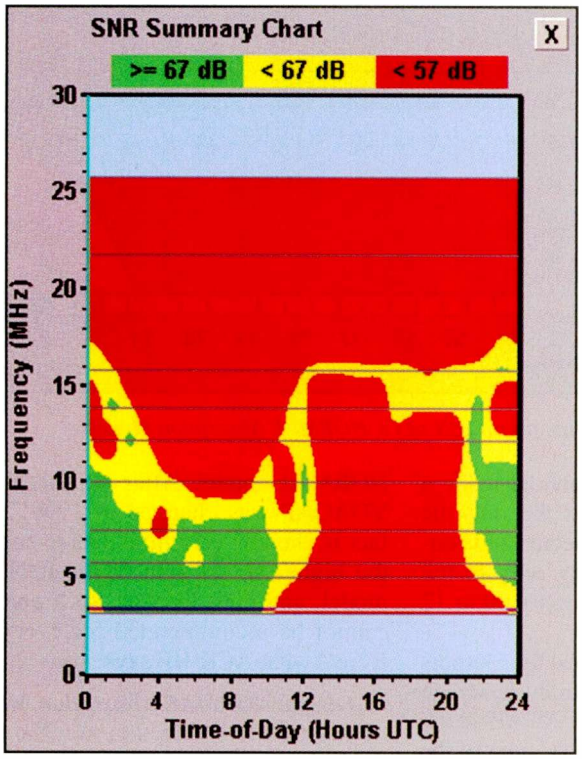


Figure 4. SNR Summary using NORMAL Absorption Model.

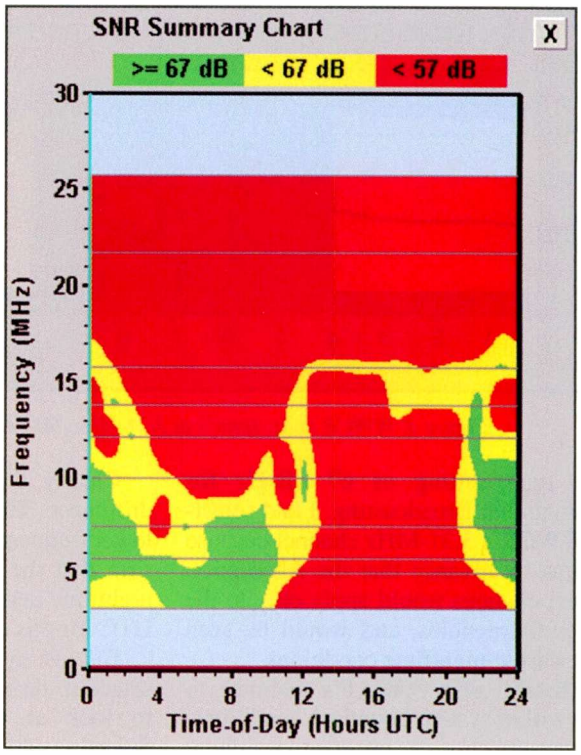


Figure 5. SNR Summary using IONCAP Absorption Model.

when sporadic-*E* (*Es*) openings occur, expect good domestic signals. These *Es* openings will be strong at times, and fairly common, but might be short-lived.

Nineteen and 22 meters will compete with 16 for the best daytime DX band during August. These bands will open for DX just before sunrise and should remain open from all directions throughout the day, with a peak in the afternoon. Nighttime conditions will favor openings from the south and tropical areas. Look for gray-line propagation from Asia, with long-path common from southern Asia, the Middle East, and northeastern Africa as well as the Indian Ocean region via the North Pole.

The 25- and 31-meter bands have an incredible amount of activity since many broadcasters target their audiences during prime times (morning and early evenings) in the target areas. Expect 11 MHz to be an excellent band for medium-distance (500 to 1,500 miles) reception during the daylight hours. Longer-distance reception (up to 2,000 to 3,000 miles) should be possible for an hour or two after local sunrise, and again during the late afternoon and early evening. Heavy congestion will occur here, too, as many international and domestic broadcasters make use of 25 meters.

The backbone of worldwide shortwave broadcasting, 31 and 41 meters, will provide medium-distance daytime reception ranging between 400 and 1,200 miles. During August, reception up to 2,500 miles is possible during the hours of darkness, and until two to three hours after local sunrise. Forty-one and 49 meters should be best for worldwide DX from sunset to sunrise. Early evening and into darkness, increasingly longer paths develop, up to several thousand miles. As propagation conditions don't change much on the lower HF bands through the solar cycle, a high number of HF broadcasters rely on these bands. International and domestic broadcasts compete with amateurs on the 41-meter band and with each other on both. This makes for a lot of interference, especially during the late afternoon and evening hours, making reception of weak, exotic signals a bit more of a challenge.

Don't expect any improvement in nighttime DX conditions on 41 through 120 meters during August, since we are not yet close enough to the seasonal decrease in the static levels of winter. The 5-, 3-, and 2-MHz shortwave bands are used mostly in designated tropical areas for domestic broadcasting. The entire 4-MHz band is set aside for domestic broadcasting in Asia, and some of this band is used throughout Europe. On all of these bands, during daylight, reception should be possible from up to 500 miles away. After sunset until an hour or so after sunrise, reception of signals from 1,000 to a possible 2,000 miles away is possible. There will still be a high level of static during August, so these bands will be a challenge to those looking for long-distance DX of exotic tropical stations. The best time to search for these would be just before sunrise and an hour or so after daylight.

VHF Conditions

Statistical studies show that a sharp increase in *Es* propagation takes place at mid-latitudes during the late spring and summer months. During August, short-skip propagation over distances as great as 1,400 miles should be possible about 10 percent of the time on 6 meters. Higher VHF (2-meter) openings may also be possible during periods of intense *Es* ionization.

In addition, conditions for tropospheric ducting begin to form over wide areas of North America and over the Atlantic and Pacific Oceans. Watch for stalled high-pressure cells between your location and the DX. Each summer season in North America, weather systems develop that produce conditions favorable for VHF DX. Stalled high-pressure weather cells,

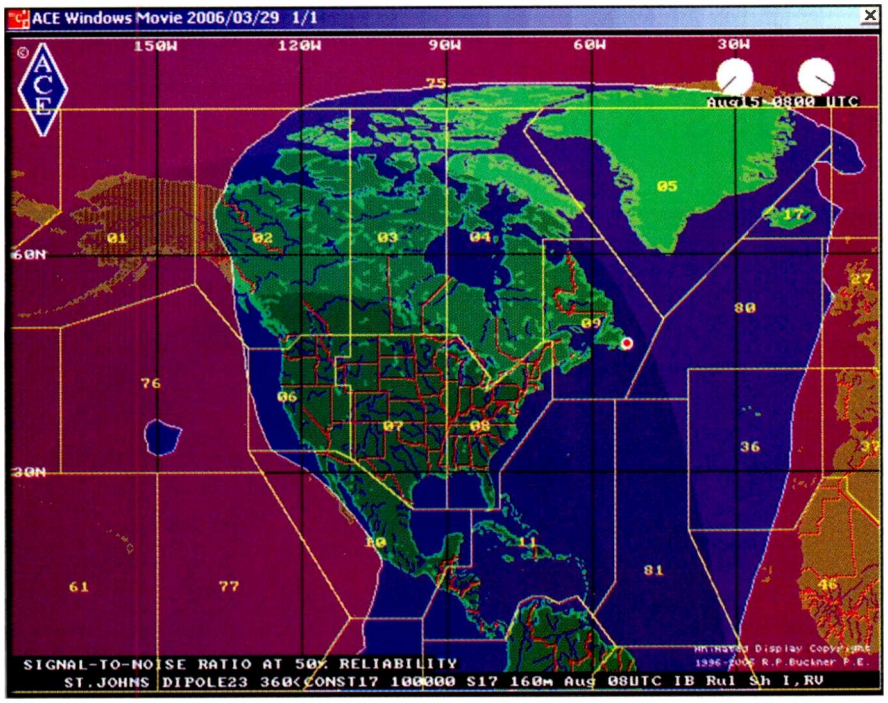


Figure 6. St. John's Reception Area Coverage at 3.21 MHz, August, 08 UTC, 50-percent Required Reliability, for the IONCAP Absorption Model.

with pressures reaching above 1025 millibars, are known to cause ducting of VHF radio signals. When ducts occur, VHF radio signals may propagate through these ducts far beyond the normal line-of-sight distances.

Tropospheric ducting forms each year between Hawaii and the U.S. West Coast, and from San Francisco to Los Angeles, Denver to Dallas, Texas to Florida, the Great Lakes to the eastern seaboard, from the Great Lakes to Texas, Nova Scotia to Miami, and from the Midwest to the Southeast.

Advanced visual and infrared weather maps can be a real aid in detecting the undisturbed low clouds between the West Coast and Hawaii or farther during periods of intense subsidence-inversion band openings. This condition occurs also over the Atlantic. There is a great resource on the Internet that provides a look into current conditions. Bill Hepburn has created forecast maps and presents them at http://home.cogeco.ca/~dxinfo/tropo.html, which includes maps for the Pacific, Atlantic, and other regions.

Current Cycle 23 Progress

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7-centimeter observed monthly mean solar flux of 89.0 for April 2006, up a bit from 75.5 for March 2006. The 12-month smoothed 10.7-centimeter flux centered on October 2005 is 87.4, and on September 2005 is 87.8, both down from August's 89.3. The predicted smoothed 10.7-centimeter solar flux for August 2006 is about 73 with a range from a high of 91 to a low of 60.

The Royal Observatory of Belgium reports that the monthly mean observed sunspot number for April 2006 is 30.2, a huge jump up from March's 10.8, and the highest since August 2005. This shows you that there can still be some life at the bottom of the solar cycle! The lowest daily sunspot value during April, recorded on April 18, was 7. The highest daily sunspot count was 54 on April 6. The 12-month running smoothed sunspot number centered on October 2005 is 42.6, and on September is 42.9, both down from August's 45.4. A smoothed sunspot count of 9 is now expected for August 2006, but can be anywhere from a high of 22, down to zero, which is more and more likely as we near the very end of Solar Cycle 23.

The observed monthly mean planetary A-Index (Ap) for April 2006 is 11. The 12-month smoothed Ap index centered on October 2005 is 11.6, and on September 2005 is 11.8. Expect the overall geomagnetic activity to be quiet to unsettled during most days in August, with one or two possibly stormy periods.

Have You Written?

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

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

by Kirk Kleinschmidt, NTØZ, kirk@cloudnet.com

Radiosporting—That's A Sport?

In Russia—and the extreme parts of Scandinavia—darn near everything's a sport. For example, some adventurous souls take perfectly good dirt bikes, twist a few hundred sheet metal screws into the tire treads and race on frozen lakes at 100 mph. For even more excitement the riders may opt to play "polo" by adding sticks and a ball, plus the occasional spectacular collision. And I'm sure that's not the worst of it! Our drive to compete will always find expression.

German contest op Stefan Baltz, DL1IAO, is shown here visiting stateside at W2UP. You can see this photo and many others as well as Stefan's contest-related stuff at his rather nice web site, www.dl1iao.com/index.htm.

Even In Ham Radio!

In Russia, in keeping with this month's impromptu theme, they call ham radio competition "Radiosporting." Actually, they call it that in many parts of Europe that don't necessarily see ice-racing dirt bikes. In that neck of the woods you can train hard, become famous, and even become state-sponsored by winning amateur radio on-air contests! You can become famous (or infamous) here in the United States, but you can almost certainly forget about being honored as a champion by the state.

So, what's up with ham radio competitions, anyway? To get started, let's get a few definitions out of the way. Radio *contests* are usually on-air events in which hams work as many different stations as possible in a defined period of time, often a weekend. Depending on the particular contest, a premium is placed on working stations in different geographical regions (states, countries, ARRL sections, *CQ* magazine zones, grid squares, islands, and so on) or stations with different call-sign prefixes (KA2AAA, KB2AAA, KC2AAA, and so on).

These geographical regions or differing prefixes are called "multipliers." In the simplest sense, contest scores are determined by multiplying the number of two-way contacts (QSOs) by the number of multipliers, subject to the fine points of each particular contest, of course!

When the dust settles, the contestants with the highest scores (there are usually several categories of competition, such as power level, number of station operators, and bands used) receive certificates or plaques and have their scores listed in *CQ*, *QST*, and other ham magazines.

But even if you're just kicking the tires and not competing whole hog, there are still plenty of reasons to get into the fray, even for just a little while. During a contest weekend, for example, of which there are many, you can work dozens of new states, countries, or grid squares, all while improving your amateur operating skills as you progress.

Contest operating is fast and furious. Sometimes, thousands of signals from every comer of the globe are crowded into a relatively small part of the band. A typical SSB contest QSO may only last a few seconds. Ops exchange signal and location reports, and perhaps consecutive serial numbers or power-level identifiers. At first, the whole scene may seem overwhelming, but once you get your feet wet, you'll get the hang of it in no time.

Look at it this way: You could spend days looking for a Wyoming or New Hampshire contact to finish your Worked All States (WAS) Award, or you could work them both in one afternoon in the ARRL Sweepstakes contest. The same thing holds true for DX contacts and DX awards. Contesters regularly work all 50

Table 1. HF Contests Beginners Will Enjoy

Month	Contest	Activity
February	School Club Roundup	All stations work all others
March	ARRL DX Contest, SSB	W/VE stations work DXCC Countries
March	CQ WPX Contest, SSB	All stations work all others
June	ARRL Field Day	Mostly W/VE
July	IARU HF World Championship	All stations work all others
October	CQ Worldwide DX Contest, SSB	All stations work all others
November	ARRL Sweepstakes, SSB	W/VE stations work W/VE only
December	ARRL 10-Meter Contest	All stations work all others

states and 100 or more DX countries in one weekend by participating in the right contest! Although you may not finish your certificate's requirements in one sitting, you'll probably be amazed at your progress.

Table 1 lists several major contests that are suitable for beginners. There are many more contests spread throughout the year. *CQ* and *QST* have monthly contesting columns, and many ham radio websites have contest listings, tips, and other useful information (see www.arrl.org/contests, www.cq-amateur-radio.com/awards.html, http://en.wikipedia.org/wiki/Contesting, and www.contesting.com for starters). These are good places to look for up-to-date contest information. The *ARRL Operating Manual* has plenty of detailed information on the fine points of contesting. It's a popular subject.

The extreme level of competition has driven some hams to erect gigantic antenna arrays powered by rows of dedicated amplifiers and top-of-the-line transceivers. Fortunately, ham radio contesting is productive and fun even with modest stations. That big-gun station in the South Pacific can pull your weaker signal through with ease. In that case, the contester's top-notch station is working for you, too! Don't be afraid to enter the heat of the battle with only a transceiver and a simple antenna—the big-guns need you, and they have to listen for weak signals.

Listen In

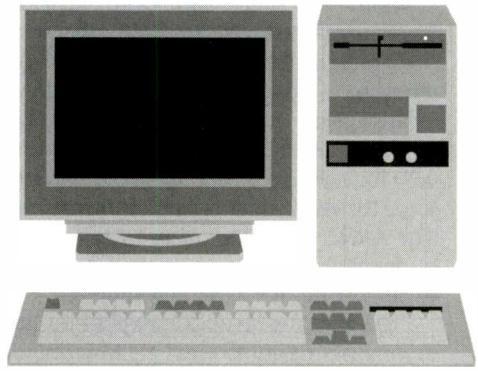
SWLs can have a lot of fun in ham radio contests, too. I can't think of any other time when there are so many signals emanating from exotic locations. In a big DX contest you can hear stations from every little nook and cranny on the globe; many you've probably never even heard of! Island countries that have no (or very few) international broadcast outlets often support furious ham radio contest activity.

Many of these stations will send you a QSL card if you write to them and provide the details of one or more of their contest contacts. During SSB DX contests, listen from 28.3 to 28.7 MHz, 21.15 to 21.35 MHz, and 14.1 to 14.3 MHz during daylight and early evening hours, and 7.05 to 7.25 MHz and 3.75 to 3.85 MHz during late-night hours for contest activity.

The best way to get comfortable with ham radio contesting is to simply get your feet wet. Be careful, though. Contesting can be extremely addicting. If you're like many hams, once you get started you won't want to stop! ■

by Joe Cooper, carm_popcomm@hotmail.com

Digital Signal Processing—Part IV Wrapping Up Our Exploration Of Digital Sampling Technology



Over the past series of columns we've learned that digital technology is not something new. The "digital revolution" has actually been in development for just over 300 years. More importantly, you now know that the "ancestor" of any digital technology that may you own—CD player, cell phone, digital signal processing (DSP)-based radio, or even a micro-computer—was a telegraph key. All of today's digital technology can be traced back to the first practical telegraphy system developed by Claude Chappe in France in 1792. And the first true application of DSP was when Baron Pavel Lvovitch Schilling began transmitting telegraph signals in 1832 using electrical wires.

Edwin Howard Armstrong (1890–1954), inventor of the regenerative, super-regenerative, super-heterodyne, and FM radio. His was a life of brilliant invention and achievement, but hounded by lawsuits from competitors. Few people on this planet have been untouched by his accomplishments, but other than in the circles of those interested in radio history and technology, his name is virtually unknown. (Photo courtesy NOAA)

Even those critical improvements made in telegraphic technology, such as American scientist Joseph Henry developing the mechanical striker, were simply further applications of DSP technology. One could even argue that when Samuel Morse developed his alphanumeric code to exploit the commercial potential of Henry's mechanical striker he developed the human equivalent of a computer software program to encode and decode a message.

Telegraphy, whether visual, over wires, or wireless, has always worked exceptionally well as a method of communication, so much so that the radio engineering community of the early 20th Century agreed that a method was needed to allow voice and data communications to be transmitted in digital form.

The Beginnings Of Analog Radio

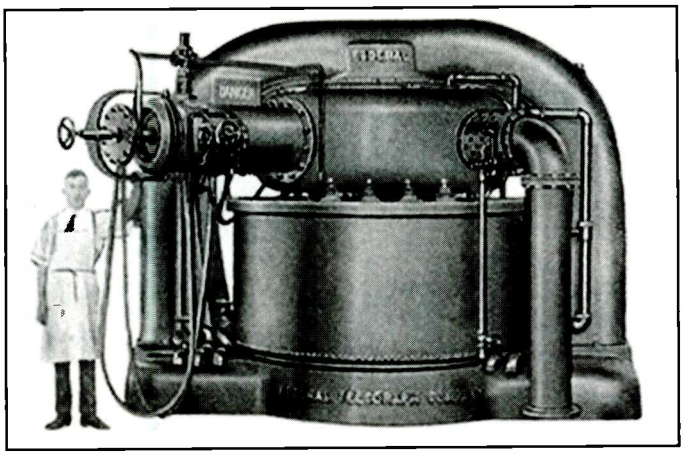
When early attempts were made at analog voice communication, the techniques first used were already obsolete. The carbon microphone used in the first successful voice broadcast by Reginald Fessenden in 1906 was already a relic of 18th Century technology. However, despite the limitations involved the exciting potential for the communication of voice and music motivated amateur radio experimenter to use whatever was on hand. What most hams used when attempting early voice communication was the carbon microphone, which was relatively cheap and easy to find. These early amateur-built radios and transmitters were crude, even by the standards of the day, but they worked.

More importantly, people of the day were willing to ignore the technical limitations of the early radios simply because they were so entranced by the novelty of the new medium. In fact they were *so* willing to put up with these limitations that a completely new hobby came into being almost overnight. People spent hours listening to noise-filled signals looking for new stations, and soon these early radio listeners began to log the stations they heard. And with skill and patience they began to hear new stations at greater and greater distances.

While there were many amateurs on the air, one of the more interesting stories concerns one Dr. Frank Conrad, assistant chief engineer of Pittsburgh's Westinghouse Electric Company. Conrad became interested in radio in 1912 and received a license (callsign 8KX) to transmit in 1916. He spent the next few years as an amateur broadcasting from a garage in his backyard.

Much to his amazement he was soon deluged with requests for more music and information, which Conrad soon turned into a regular broadcast schedule, using musical records supplied by a local music store to supplement news and talks. After several years of performing these broadcasts, Conrad's boss, Westinghouse vice president H.P. Davis, saw a newspaper ad stating that a Pittsburgh department store was selling a radio receiver that could pick up Frank's broadcasts. This advertisement convinced Davis that there were enough listeners for Westinghouse to invest in commercial broadcasting.

In 1920 the Westinghouse Corporation established KDKA in Pittsburgh using amplitude modulation (AM) as the method of transmission. At the time this choice made sense because analog signals could be received using simple radio circuits, including those in crystal radios



This is a 1000-kW Poulsen arch transmitter, manufactured by the Federal Telegraph Company after World War I and installed at the Lafayette radio station. It was the only arc transmitter of its time that could produce a continuous wave. This required a unique method of keying, which employed two shifting frequencies. Frequency shift keying (FSK) was the starting point for the development of FM radio technology by Armstrong in the 1930s.

which could be built by anyone with simple tools and relatively inexpensive parts. As a result, the original group of amateur radio monitors, who numbered in the hundreds, mushroomed into tens of thousands by 1922.

While still a fad, there were enough listeners to encourage a flock of advertisers to purchase on-air time for their announcements, putting surprising amounts of money into the coffers of broadcast station owners. This encouraged a huge boom in the manufacturing of mass-produced radios to expand the listening market command higher advertising rates. By the mid 1920s people who had no real interest in radio technology, but wanted to listen to what everyone else was talking about bought massed produced radios by the millions.

And as they say, the rest is history.

The Limitation Of Analog Radio

The large radio audience that emerged by the late 1920s was a great financial boon to the commercial interests who owned fledgling radio stations. However, the radio transmitters and receivers of the period were the bane of radio engineers who had to design them.

If you look at the research of the engineering community of that time, you'll find that most efforts focused on developing alternative methods of radio transmission and reception. AM signals and analog circuits may have been a relatively cheap and easy way to build a pioneering broadcast industry, but those who needed clean and dependable signals to do business found analog technology deplorable. That, of course, is because whenever you amplify an analog signal, you amplify noise and intelligence equally. Worse, not only was natural noise amplified, but all methods of amplification (vacuum tube and solid-state devices) actually added *additional* noise to radio circuits, and it was expensive to eliminate it once it was in there.

While there was indeed a "golden age" of AM radio research and development during the 1920s, it was over by the time the Great Depression came along in the 1930s. Even with the restraints on research during the Depression, by the end of it scientists knew that any further development of analog technology was a dead-end pursuit. The only reason why time, money, and effort was still being invested in analog technology was because commercial broadcasters were still getting rich off it and were in no hurry to kill the golden goose.

Dissenting voices among the engineering community were becoming louder, however. One of the loudest belonged to a great pioneer in the development of analog radio, Edwin H. Armstrong. Armstrong's discoveries, such as the regenerative and heterodyne radio circuit, completely transformed the way in which radios were built and used. His amplification circuits, particularly with the super-heterodyne radio, eliminated the multiple steps that were initially required just to tune a radio.

Early methods of tuning were complicated because a radio operator had to tune through a series of circuits to receive a signal on a single frequency. One reason logging a station was so important was to keep track of the multiple settings needed to find that station again. This tuning approach was fine for commercial operations, where one would monitor a single frequency (or more appropriately for those days, a particular wavelength) to listen to a small number of stations. It was unacceptable for broadcast reception, however, where one would be tuning over a wide range of frequencies to listen to multiple stations.

The beauty of Armstrong's super-heterodyne radio lay in its simplified design that reduced the multiple controls to two: the tuning dial and sound/volume control. Some visionaries, such as RCA's David Sarnoff, envisioned a time when super-heterodyne radios would have their tuning dials completely eliminated, replacing them with push buttons for selecting pre-tuned radio stations.

Even though Armstrong revolutionized radio receiver design, he also recognized the limits of analog methods of signal modulation. He knew that while his advancement was important, the circuits were still exceptionally vulnerable to noise, while digital methods would be vastly superior. There was no reason, he believed, to continue to further develop AM radio when a better alternative method could be developed.

His practical solution, which had the value of being able to use the vacuum tube technology of the day, was frequency modulation (FM), which he patented in 1933. But what many people don't know is that this mode of communication actually had its theoretical origins in the spark-gap based radiotelegraphy technology of the World War I era and earlier.

Frequency Shift Keying And FM Radio

Armstrong's inspiration for FM was the Poulsen arc transmitter, invented by Valdemar Poulsen of Denmark in 1902. Poulsen was a successful inventor with many accomplishments to his name, including the first magnetic voice recording device, developed in 1898 and incorporated into the first commercial telephone-answering machine the following year. Unlike the conventional spark gap transmitter of the time, which produced inefficient dampened waves of radio frequency, Poulsen's transmitter produced continuous waves. It was not only more efficient than the spark gap transmitter, but significantly smaller as well. Not surprisingly, the United States Navy adopted the Poulsen transmitter in 1912 and installed them at its major transmitting sites, as well as onboard many of its important battleships.

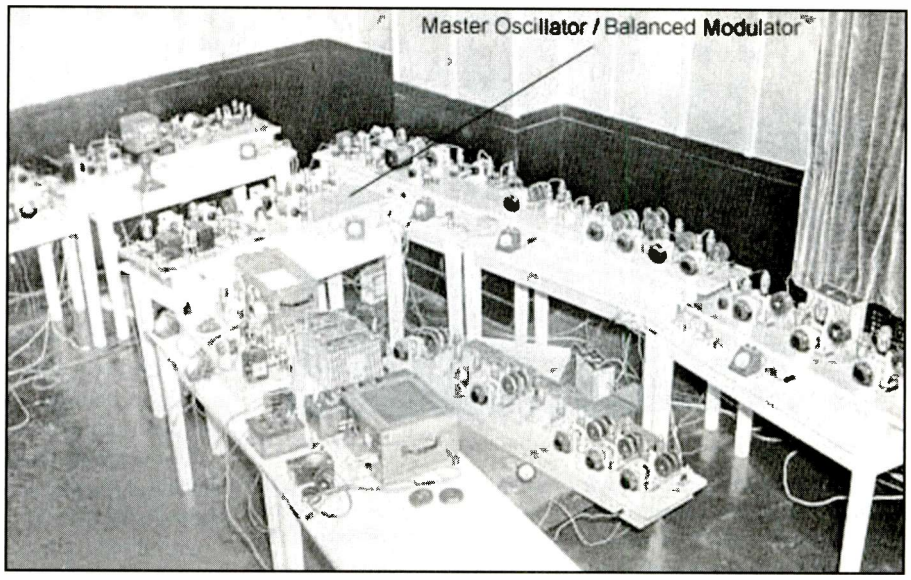
What caught Armstrong's imagination was the method of

keying the Poulsen transmitter employed, which was to shift the frequency between two points. Even a few years after the Poulsen transmitter was put into use, radio engineers were seriously asking if frequency shift keying (FSK) could sample an audio signal and convert it into digital form for transmission. It seemed possible if the simple "on" and "off" method of FSK was used in a Poulsen transmitter for radio telegraphy could be controlled by voice. Serious efforts were made to substitute a microphone for a telegraph key, resulting in the FSK-based signal being modulated by a voice or music. Likewise, it also seemed being possible to design a radio receiver that could convert the FSK signal back into analog form.

What's being described in this method of transmission is digital sampling, though at that time the concept was not fully understood. While exploring the theoretical concept of how FSK could be used for voice transmissions, the engineers of the period (early 1920s) could not believe what they discovered. When the mathematical calculations were performed, they confirmed that the bandwidth required to make audio sampling work would be double the highest sampled frequency. This is exactly the same conclusion Harry Nyquist would outline in his famous theorem on digital sampling in landline telegraphy, published in 1927.

The problem was that at the time most radio transmissions were being made on frequencies below 1.5 MHz, so the bandwidth requirements of FM were unthinkable. However, Armstrong's solution for the large amounts of radio frequency real estate required was to simply move FM transmission far above the 1.5 MHz into the VHF portion of the radio frequency spectrum. In this part of the spectrum, Armstrong argued, one would be able to operate FM transmitters at their optimal bandwidth for good quality sound. Indeed if you take a look at the current band-plan for commercial FM broadcasting in the United States, you find that each station is allocated 200 kHz.

Thanks to an important discovery Armstrong made during the 1940s, audio transmissions were not the only signal transmitted in that allocated bandwidth. He found that a single FM carrier wave could transmit two radio programs at once. He was even able to simultaneously transmit voice, a telegraph message, and a facsimile of the front page of *The New York Times*. This clearly showed the potential of digital signals carry multiple data streams over one signal—a clear improvement over AM technology.



This 1933 photo shows Armstrong's early "breadboard" FM transmitter, which was located in the RCA radio laboratory on the 85th floor of the Empire State Building in New York City. The room was originally used for early mechanical television experiments, which were put on hold during the Depression. Armstrong would later be ordered to remove the equipment so RCA engineers could begin testing a working electronic television system. (Courtesy the Harry W. Houck collection)

FM stereo broadcasting was introduced in 1960, and there have been a few other technical enhancements, but FM proved itself an extremely successful medium of broadcast almost from the very beginning.

Opposition To FM By Big Business

Given the obvious superiority of the digitally based FM over analog-based AM, why did AM broadcasting and its associated technology remain so firmly entrenched for so long? It took over 40 years for FM broadcasting listeners to surpass AM audience's numbers in the United States and Canada, while most of the world's other broadcasters and audiences embraced the new mode soon after its introduction in the 1940s.

The consensus among radio historians today is that this delay was caused by the deliberate resistance of David Sarnoff in his role as president of RCA during the 1930s and '40s. Armstrong had sought Sarnoff's assistance in developing FM, but Sarnoff was not particularly keen to support him. Sarnoff knew that AM radio had reached its limits of development, but rather than explore a new mode of audio transmission, he believed that video was the mode of the future. Sarnoff and RCA had been experimenting with mechanical television systems in the early 1930s, using a research facility located in New York's Empire State Building. RCA engineers had converted an abandoned mooring tower for dirigibles located on the top of the building into a mast for VHF antennas and installed a transmitter below it.

In 1933, during the height of the Depression, Armstrong approached RCA for help in developing FM radio, and Sarnoff did allow him to use the Empire State facilities for that purpose. Armstrong set up his equipment in the spring of 1934, operating experimental station W2XF on 41 MHz. But one year later, Sarnoff ordered Armstrong to vacate the facility without any explanation offered (it was actually for the resumption of television experiments).

Sarnoff could not have cared less about Armstrong's FM experiments, which he considered purely academic. Armstrong, though, was fully determined to make FM the new mode of broadcasting in the United States, if not the world. This was not out of an altruistic desire to see the state of radio improved for the listener, but with the purely commercial aim of receiving a patent royalty on every receiver and transmitter sold. Armstrong's shot across the bow of the AM broadcasting establishment came in 1936 when he pub-

The antenna for the United States' first commercial FM broadcaster was located on Mt. Asnebumskit near Paxton, Massachusetts, and was completed in 1938. The station operated as W1XOJ on 43 MHz at 50,000 watts until the FCC ordered all FM broadcasters to move to the current FM band in 1945. The tower remains in operation to this day. It's 400 feet high and sits at 1,400 feet above sea level, providing a very good signal to the Boston area. The transmitter was originally linked to the studio 42 miles away by a repeater transmitter operating at 133 MHz. After 1945 the station converted its transmitter and antenna to the higher frequencies and operated under the callsign WAAB, which it later changed to WAAF in 1967. (Photo courtesy www.tybush.com)

lished his now classic paper on FM broadcasting, titled "A method of reducing disturbances in radio signaling by a system of frequency modulation" (https://michael.katzmann.name/armstrong.html). With this, Armstrong claimed the future of FM radio as his own.

In that same year, Armstrong approached the FCC to consider laying the foundations for FM broadcasting, which was allowed through the establishment of a number of experimental stations. By 1937 the FCC was satisfied that the necessary technical research had been undertaken and opened up seventy-five 40-kHz channels between the frequencies of 41.02 to 43.98 MHz. During this period Armstrong found a champion for his new mode of broadcast in the person of John Sheppard, president of New England's Yankee Network of radio stations.

Sheppard, who formed his network during the late 1920s and early '30s as a regional broadcaster, originally had no interest in connecting it with an audience larger than a single city and its suburbs. In that regard, the limited range of FM broadcasting at 40 MHz was an ideal mode of transmission for reaching such a highly defined market. But, in 1937, Sheppard received the first FCC license to build and operate a 50,000-watt FM transmitter under the call letters W1XOJ. It still operates today as WAAF. On May 27, 1939, the station officially began broadcasting from Paxton, Massachusetts, a suburb of Boston, becoming the first in the United States to do so (though 11 *experimental* stations, including one owned and operated by Armstrong, were also on the air). As soon as the official broadcasts were underway, the FCC received over 500 applications for FM station licenses in the first year alone.

During this time, Sarnoff was completely embroiled in the official roll out of NBC's system of television. However, soon after the inaugural TV broadcast made from the 1939 World's Fair in New York City, Sarnoff quickly caught up on the news of broadcasts success. He was completely furious with the development, for he had completely misunderstood what Armstrong had been attempting to accomplish during his experiments in the Empire State building.

Rather than a radically new method of broadcasting, Sarnoff believed that Armstrong was simply building a new anti-static filter for AM radio, and so had allowed him to go ahead. Now Sarnoff found that not only had Armstrong been successful in creating a new technology, he was also building a highly competitive broadcasting empire in NBC's own backyard. Initially Sarnoff believed that World War II would put an end to Armstrong's ambitions, but instead Armstrong further entrenched FM when he convinced the U.S. military to adopt the new mode as a standard. More importantly, Armstrong also demonstrated the advantage of using FM in RADAR technology, making it more accurate and reliable.

Having committed the majority of RCA's financial resources to the development of television, Sarnoff could not fight Armstrong directly in the rapidly emerging FM marketplace. Instead Sarnoff launched a back-handed attack on the FM broadcast industry, first by having the FCC move the frequencies from 40 MHz to their current location, arguing that the lower frequencies were needed for television channels. This not only rendered all existing FM receivers obsolete, but also required the complete rebuilding of transmitters and antennas because of the jump to a higher set of frequencies.

At the same time the FM frequencies were changed, RCA embarked on a massive promotional campaign for its new television system. Not surprisingly then, the majority of people in the New England area who had a non-operating FM radio opted for a new TV set instead. Not satisfied with simply stopping FM radio in general, however, Sarnoff attacked Armstrong directly through patent interference. Despite having virtually ignored FM technology, RCA still won the patent fight, stripping Armstrong of any right to royalties in the United States.

Brought to financial and emotional ruin by the years of litigation with RCA, Armstrong jumped to his death in 1954. His widow continued the fight and finally won in 1967, though receiving only a

paltry $1 million for her efforts, while RCA made hundreds of millions thanks to Armstrong's patents.

The story of Edwin Armstrong unfortunately demonstrates a cold reality of the world of business: no matter how good an idea or invention is, it has no value in the "real world" unless it can make money.

The Implication For Digital Radio

As I've pointed out with Armstrong, the scientific world originally dismissed FM as impractical because of the amount of bandwidth involved in digital sampling. Given the limited number of radio frequencies available at that time, that assessment of the situation was true.

Also, when engineers like Harry Nyquist and Alec Reeves put forward their ideas on digital sampling and its application to advance communications techniques, their ideas were critically important, but not in a way that was financially practical. Reeves realized his ideas on pulse code modulation earlier than expected thanks to the extraordinary circumstances that the Allied forces found themselves in during World War II. And while contemporary scientists fully understood and appreciated Nyquist's theorem at a *theoretical* level, they could only use it in a limited way.

However, by the late 1940s the time was right for Nyquist's ideas to be re-discovered by Claud Shannon in his paper *A Mathematical Theory of Communication*. When Shannon re-articulated Nyquist's theorem, he did so at the right time and in the right economic climate. As a result, he was able to demonstrate clearly the potential application of digital sampling in voice, video, and data communications. Thanks to concurrent advances made in areas such as solid-state electronics and DSP technology, Shannon's ideas opened up an entirely new era of communication theory.

Today all of us directly benefit from the once radical ideas of Reeves, Nyquist, Shannon, and Armstrong about DSP. The ideas of geniuses such as these, however, will always be far ahead of the times that produce them. What is important then is to make proper use of these ideas when the proper time comes along. Today is similar in the multitude of technological advances that surround us. We have common access to tools such as computers, the Internet, and integrated electronic components that would have been pure science fiction when their original theories were first articulated.

So remember, while these engineers worked separately from one another, each had a single goal in mind as they did their research. Claude Shannon best summarized this goal in his previously mentioned paper, where he began with this statement: "The fundamental problem of communication is that of reproducing at one point either exactly or approximately a message selected at another point." Over 50 years later, we are closer to reaching that ideal than at any time in history—and we are the inheritors of this amazing legacy of 20th Century engineering. It is up to us to see that the potential of this gift is fully utilized.

The reality of radio and electronics in the 21st Century is that analog technology has been obsolete for over 60 years already. It is time to put it aside and, in doing so, fully reap the benefits of living in our "new" digital age.

Next Month

Next month I'll look at the current technology used in capturing large amounts of analog information, converting it into digital form, processing it, and then successfully converting information back into analog form. There's a wide range of such converters available today and they're becoming increasingly inexpensive.

You can 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.

As I write this column, it's predicted that this summer will be one of the worst on record for storms. I hope by the time you read this, prediction has not come true, but if it has, please 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. However, there are also many good (and ethical) organizations that you can contribute to, so please use them if you wish but do not give into "charity fatigue." Again, if you do have a job, a family around you and are living in a stable neighborhood, then show your thanks for that wonderful good luck by sharing of that with someone less fortunate, and do so regularly.

Let us also not forget our troops overseas who continue to need our visible support, particularly as fighting in the Middle East and Afghanistan remains unabated. Please refer to the U.S. Department of Defense's official webpage, "Defend America." The section found at www.defendamerica.mil/support_troops.html has 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, please remember to give thanks for your personal blessings by remembering to pass on that blessing to others through regular acts of selfless sharing. See you again next month! ■

by John Kasupski, KC2HMZ, kc2hmz@wzrd.com

We're Back! MARS Changes, The Death Of WUN, And Coming Attractions

Editor's Note: This month we turn over the reins of the "Utility Communications Digest" column to John Kasupski, a self-described radio jack-of-all-trades from Tonawanda, New York, a suburb of Buffalo. Radio has been John's primary hobby for the past 40 years. In addition to utility listening, John also lists AM and shortwave broadcast band DXing and scanner monitoring among the various facets of the radio hobby that he has enjoyed over the years. A long time member of the WUN club (now the Utility DXers Federation), John is also active in ARES/RACES and is a past president of the Amateur Radio Association of the Tonawandas (ARATS). He's also active in Internet Relay Chat (IRC) as a channel operator in the #monitor channel on the zIRC network and several other radio-related chat channels there, which are cross-linked to four other IRC networks (IRCNet, StarChat, IRC-Global, DalNet) as well. He also plans to create a #popcomm channel on one or more of those networks for readers to have an IRC gathering place. John is registered monitor KNY2VS, and has been a licensed ham since 1999, currently holding a General class amateur radio ticket, callsign KC2HMZ (ex-KC2FNG). A hearty welcome to John!

As followers of this column undoubtedly noticed, "Utility Communications Digest" has been on a "summer vacation" for the past two months. I won't bore you with all the specifics about why this occurred, but I'm happy to say that the column is now open again under new management, beginning with the issue that you're now holding.

As I begin my stewardship of this long-running *Pop'Comm* column, I'd like to take the opportunity to encourage you to begin or continue, as appropriate, to send in your contributions in the form of loggings, shack photos, and stories about your own utility communications listening experiences.

Although I've been a contributor to a couple of the monthly columns, including this one, on various occasions in the past, this will be my first experience at writing a monthly column for this magazine. I've always felt that it's best to just jump right in and get started, so let's begin with a look at a some news items that have accumulated while we've all been trying to figure out new ways to get rid of the static in our radios caused by the neighbor's old, inefficient, but unfortunately still working air conditioner!

U.S. Navy Lends A Hand In Caribbean Drug Interdiction Operations

As this month's column was being written, word was received that several units from the U.S. Navy's *USS George Washington* (CVN 73) Strike Group were operating with the U.S. Coast Guard and various other forces from the Caribbean and Latin America area as part of the Partnership of the Americas. Among them was the guided missile frigate *USS Underwood* (FFG 36), which also participated in ongoing operations in the western Caribbean aimed at stopping illegal drugs from reaching the United States.

The *USS Underwood*, along with the *Washington*, *USS Monterey* (CG 61) and *USS Stout* (DDG 55), also took the oppor-

The guided missile frigate USS Underwood *(FFG36) receives fuel and cargo from fast combat support ship* USS Seattle *during replenishment at sea. (U.S. Navy photo)*

USS Underwood *(FFG36) leading the way in a "Ships Parade" formation during a recent Joint Task Force exercise (JTFEX). The other ships are* USS Ticonderoga *(CG 47),* USS Carney *(DDG 64),* USS Sir Winston Churchill *(DDG 81), and* USS Taylor *(FFG 50).*

tunity to improve the training levels of their respective crews in a variety of mission areas. Naturally, this provided utility monitors with some interesting communications related to the counter-narcotic operations in conjunction with the Coast Guard, U.S. Customs, and DEA. Such operations are well known and frequently targeted for listening by experienced utility listeners, since a considerable amount of traffic results on HF frequencies. We'll be taking a more in-depth look at these operations in a future issue of *Pop'Comm.*

Army, Air Force MARS Leadership Changes

Air Force Military Affiliate Radio System (MARS) Chief Ray Collins, AGA3C, recently announced his retirement from federal service and will be stepping down as chief of Air Force MARS. According to his announcement, the chief's position will remain vacant for a while and, in the interim, issuing and signing MARS licenses for new and renewing members, as well as many other duties formerly handled by Collins, will be taken over by regional MARS directors.

Meanwhile, former Army MARS Eastern Area Director Kathy Harrison has been named the new chief of Army MARS. Harrison succeeds Bob Sutton, N7UZY, who is recuperating from an illness. Sutton was the chief of Army MARS for 16 years, and while Lt. Col. Gregory Harris had been filling in for Sutton during what was originally thought to be a temporary absence, Sutton has now announced his retirement. His long career as an Air Force communicator and civilian employee of the Army add up to 46 years spent in the service of the country. As for Harrison, she will of course receive the coveted AAA9A MARS callsign along with her new job.

When Is A WUN Not A WUN? When It Becomes a UDXF

It would not be fitting for me to fail to say a proper goodbye to the Worldwide Utility News (WUN) club, which was dissolved earlier this year for a variety of reasons. In addition to the workload on club officers in running WUN as a not-for-profit entity, the club also had an excellent website and monthly newsletter that were maintained by volunteers, and an e-mail listserver for posting of logs and discussions related to utility monitoring. But, alas, the workload got to the point where too few were trying to do too much for too many, and something had to be done to change the situation. Thus, WUN has officially been disbanded, its website closed, and its listserver discontinued.

In its place, a new Yahoo group has been created, the Utility DXers Forum (UDXF). This group is currently featuring an e-mail listserver similar to the one that WUN had. I was a member of WUN and a regular (daily) reader of postings to its listserver for years, and when UDXF formed from the ashes of WUN, I was quick to subscribe to the new listserver. Since most of the hundreds of worldwide former members of WUN have now migrated to UDXF, the new group is likely to be a very valuable resource for utility communications enthusiasts, so those of you with Internet access might wish to subscribe to the UDXF listserv if you haven't already done so.

The easiest way to do this is to simply send an e-mail to udxf-subscribe@ yahoogroups.com with a subject line consisting

only of the word "subscribe." Yahoo sends you back an e-mail with a link. This is done to prevent someone else from maliciously subscribing you to dozens of unwanted listservers in an effort to flood you with equally unwanted e-mail. To confirm your subscription to the UDXF listserv, once Yahoo sends you the e-mail with the confirmation link you can either click on the link or paste it into a browser. Once you've done that, you receive the postings in your e-mail as with any other listserver.

Ary Boender, a gentleman whose name will be familiar to longtime readers as a frequent contributor of loggings to this column in the past, was the president of WUN and now is the moderator of the new UDXF listserv. He has a couple of assistants from the group to help him keep things running smoothly.

Coming Attractions

Now that my first column is already in print, it's time to look ahead to the coming months and what you can expect to see in this column in upcoming issues of *Pop'Comm*.

Next month is September and the beginning of the hurricane season will be upon us. With the memory of Katrina's devastation still fresh in everyone's minds nearly a year later, I'm sure that hurricane-related comms will be a primary listening target for utility enthusiasts, so I plan to devote most of the September column to this subject. A lot of good information was learned by the monitoring community during last year's battles with Mother Nature, and it will be covered in depth next month.

On tap for a future column is a look at the HF activities of the Homeland Security department, which has numerous federal agencies under its umbrella that make frequent use of the HF spectrum. In particular, FEMA, the Coast Guard, and U.S. Customs are "frequent fliers" on HF, literally as well as figuratively. This topic ties in with the counter-narcotic operations in the Caribbean, including the activities discussed earlier in this column, as well as the hurricane-related activities we will address in September.

This, of course, assumes that our plans aren't preempted by current events. If, for example, the scenario in the Middle East that was reported on in the April 2006 issue becomes reality and there should happen to be a confrontation with Iran and the United States and/or Israel, we will cover that and put our other plans on the back burner for the time being, but let us hope that doesn't happen! Certainly, the opportunity to log military UTE stations involved in active operations is always an exciting catch to put into one's log. However, we should bear in mind that many of us have friends and family members in the military, and their lives are a lot safer when we're not having a nuclear confrontation with another country!

Again, your contributions to the column are welcomed, encouraged, and appreciated. Send in your logs, suggestions for future columns, perhaps even a nice shack photo or two, and I'll see to it that your contributions are immortalized on the pages of *Pop'Comm* for you and posterity!

Reader Logs

This month's logs come to us from Mark Cleary (Charleston, SC) and Steve Jones (Lexington, KY). We also have some logs that were forwarded to me from Chris Gay (CG) after being submitted to my predecessor.

490.0: VAR-3, Canadian CG Fundy Bay, Saint John, NB w/AVNAV bulletin in FF headed VA60 re relocated buoy, plus contact phone numbers for ice conditions at 0340Z, also wx bulletin headed VE89 at 0735Z. VCK, Canadian CG, Riviere-au-Renard, Quebec

w/ice and snow forecast in FF headed DE49 at 0835Z. (SJ)

518.0: NMF, USCG, Boston, MA w/NAVTEX navigation bulletin headed FA36 at 0045Z re Hoover Beak Whale sighting off VA coast. NMB, USCG Savannah, GA w/bulletin at 0502Z on "Moving Safety Zone" for LPG tanker M/V *CUMBRIA* inbound to San Juan, also more Right Whale sightings off FL and GA coast. XMJ, Canadian CG, Prescott, ON in the clear after NMB signoff w/Great Lakes wx forecasts and MAFOR data at 0520Z. NMG, USCG New Orleans, LA w/bulletins at 0730Z incl seismic survey operations by M/V *WESTERN NEPTUNE* in Gulf of MX 200 mi S of New Orleans. VCK, Canadian CG, Riviere-au-Renard, Quebec w/off-schedule bulletin at 0742Z headed CB78 re Gale Warning for the Maritimes, also regularly scheduled wx bulletins headed CE88 and CE89 at 0817-0825Z when NMA, USCG Miami not transmitting. NMF, USCG, Boston, MA w/brief bulletin headed FJ55 at 0920 after NMB signoff, also VAR-3, Canadian CG Fundy Bay, Saint John, NB w/bulletins headed UE61 and UE62 at 0923Z, then NMN, USCG, Portsmouth, VA at 0930Z. NMR, USCG San Juan, PR at 1000Z w/wx forecast and navigation warnings re "partially submerged wooden *yola* adrift" (a "yola" is an open Jamaican canoe w/twin motors, often used in smuggling) and USN unexploded ordnance disposal operations off Isla de Vieques. XLJ 895, Canadian CG, Thunder Bay, ON w/wx forecast for Great Lakes mixing w/NMR after 1030Z. All stations SITOR-B. (SJ)

4018.7: US Army MARS Net, AAR7MJ, AAR7PF, AAA7IA, AAR7FI and AAT7CN exchanging casual tfc at 0205Z, all seem to be in Iowa, SITOR-B. (SJ)

4028.0: Cuban ENIGMA V2, YL w/Atencion in SS in AM, pause, then into 1-kHz modulated machine-sent CW monitored at 0300Z w/header WINRD DDIRA TUMMN using TANDUWRIGM for 0123456789. (SJ)

4146.0: Gold Medal Base, unid. coast station in QSO w/multiple MS River vessels, USB at 1236Z. (SJ)

4146.0: INDIA CHARLIE wkg DELTA in USN carrier strike group air defense net at 2223 (MC)

4149.0: WBN3019, *SEA BREEZE*, U.S.-registered tug w/check-in, position, activities, wx obs, USB at 0720Z. (SJ)

4209.5: TAH, Istanbul R., Turkey w/CW+SITOR-A marker at 0150Z, then into SITOR-B 0158-0215Z w/NAVTEX navigation bulletins ("NAVTEX Denizcilere") in Turkish headed MA13 and MA64, including ship laying "Fiberoptik Kablo," ID as ISTANBUL TURK RADIO. (SJ)

4210.5: A9M, Hamala R., Bahrain w/CW+SITOR-A marker, "DE A9M" at 0155Z. (SJ)

4331.0: 4XZ, Israeli Navy, Haifa, Israel w/rapid machine-sent CW 5 letter groups at 0230Z. (SJ)

4372.0: 9TG, E2U, 1NV, G6B USN vessels in Link-11 coordination net at 2307 (MC)

4372.0: F9J and N5Q USN vessels in comms at 1327. (MC)

4414.0: ECHO FOXTROT with Link-11/16 Sitrep for GOLF, HOTEL, B5J, and KILO at 2051. (MC)

4426.0: NMN, USCG, Portsmouth R., Chesapeake, VA w/wx obs at 0401Z in computer-generated male voice, USB. (SJ)

4479.05: Cuban ENIGMA V2, YL w/standard Atencion callup, into 5N groups in SS. Fidel must be having tx problems...this freq. has wandered around from 4478.972 to 4479.05 kHz, audio a bit mushy but only weak hum, AM at 0400 s/on. (SJ)

4645.0: Tallinn, Estonia, airport with wx. Severe QRM from some type of digital signal. USB at 1755Z. (CG)

4703.0: Link-11 data transmission monitored at 0102. (MC)

4706.0: M8J with blue force contact report to SILENT WARRIOR at 2244. (MC)

4724.0: Andrews HF-GCS with all frequency call for REACH 121T at 2245. (MC)

4739.0: FIGHTING TIGER 67 (P-3C) wkg FIDDLE at 0245. (MC)

4739.0: RED TALON 711 (P-3C) with on station report to FIDDLE at 1145. (MC)

5171.0: Link-11 data transmission heard at 2059. (MC)

5335.0: ALPHA, DELTA, GOLF, MIKE, ROMEO USN vessels in Link-11/16 coordination net at 1137. (MC)

5680.0: Kinloss Rescue, Scotland, in QSO with Rescue 131. Advised him of a "change of rendezvous," gave him a new grid and channel number. USB at 2123Z. (CG)

5732.0: 61A position report to PANTHER at 1310. (MC)

6314.0: NMF, USCG, Boston, MA w/Maritime Safety Information BC at 0210Z, SITOR-B. (SJ)

6393.5: UDK, Murmansk R., Russia w/navigational warnings at 0407Z, ITA-2 at 50 baud & 170 Hz. (SJ)

6507.0: SVO, Olympia R., Athens, Greece w/standard USB female voice marker in GG and EE at 0100Z. (SJ)

6628.0: New York R. ATC working AERO MEXICO 001, SKYWAY 021 and AIR FRANCE 657 at 0615Z, USB. (SJ)

6694.0: P4K, X8X, K5S USN vessels in Link-11 coordination net at 2226. (MC)

6694.0: O5A, 3LX, M4U USN vessels in Link-11 coordination at 1215. (MC)

6694.0: RESCUE 323 (CC-130) p/p via HALIFAX MILITARY to RCC Halifax for doctor instructions for RESCUE 903 monitored at 0009. (MC)

6761.0: ETHYL 63 (KC-135) wkg REACH 9061. Reports departure from Pease ANGB at 0523. (MC)

6761.0: GRITS 20 (C-17A, 315 AW) clg TOPCAT 03 (KC-135, 108 ARW) monitored at 2225. (MC)

6959.0: UNID YL/EE with 5-fig grps each twice in USB at 2221Z. (CG)

6960.0: UNID OM/RR with 5-fig grps each twice in USB at 1740Z. (CG)

8381.0: C6UN7, *DISCOVERER 2*, 2,400-ton Bahamas-registered research vessel w/TEST+ command to WLO, Mobile R., AL at 0012Z, SITOR-A. (SJ)

8383.5: 9MCO2, *BUNGA KELANA SATU*, 105,575-ton Malaysia-registered crude oil tanker w/AMVER/PR at 1926Z, sailing NW between Yucatan and Cuba, due in Corpus Christi in 2 days. 3FXF6, *CROWN JADE*, 10,332-ton Panama-registered refrigerated cargo ship w/AMVER/PR at 0245Z, in mid-Atlantic en-route at 19 knots on course 069 to Puerto de Sagunto on Spain's Mediterranean coast, to arrive in four days, SITOR-A. (SJ)

8384.0: Unid. vessel w/SELCAL XYFV (1780) for SVO, Olympia R., Athens, Greece at 2055Z, no contact. H3BU, *MONA CENTURY*, 172,036-ton Panama-registered bulk carrier in QSO w/NMC, USCG San Francisco w/telex to Hong Kong at 2300Z. SITOR-A. (SJ)

8386.0: 9V6487, *TALABOT*, 31,591-ton Singapore-registered Ro-Ro vehicle carrier w/AMVER/PR at 2237Z, en-route to Balboa, Panama to arrive in 7 days, SITOR-A. (SJ)

8388.0: V7HP7, *OVERSEAS ATALMAR*, 46,177-ton Marshall Islands-registered oil/chemical tanker w/AMVER/PR at 1705Z, 100 mi E of Melbourne, FL en-route to Port Everglades. 3ECJ9, *SANKO BLOSSOM*, 105,699-ton Panama-registered crude oil tanker w/AMVER/PR at 1833Z, 300 mi SE of Brownsville, TX. A8HJ8, *SAFMARINE ILLOVO*, 30,554-ton Liberia-registered container ship w/AMVER/SP at 1932Z for departure from Freeport, Bahamas en-route to Cape Town, SA. All stations SITOR-A. (SJ)

8389.5: WFLG, *HORIZON SPIRIT*, 46,154-ton U.S.-registered container ship w/AMVER/PR at 0213Z, 40 mi off OR coast headed S to Oakland, SITOR-A. (SJ)

8392.0: XCPW, B/T *NUEVO PEMEX IV*, 45,705-ton Mexico-registered oil product tanker w/telex to base at 2320Z re crew contract info for current voyage, SITOR-A. (SJ)

8393.0: Unid. vessel w/SELCAL QVXV (2010) for XSG, Shanghai R., China at 2316Z, no contact, SITOR-A. (SJ)

8416.5: NMC, USCG, San Francisco R., Point Reyes, CA w/Maritime Safety Information BC and contact info at 0020Z. NMO, USCG Honolulu, HI w/same at 0800Z. SITOR-B. (SJ)

8420.5: CBV, Valparaiso R., Playa Ancha, Chile w/info in SS on radiotelephone rates at 0402Z, SITOR-B. (SJ)

8424.0: SVO, Olympia R., Athens, Greece w/wx obs in EE at 2215-2229Z, s/off w/DE SVO SVO SVO TELOS METEO, SITOR-B, also in QSO at 0046Z w/unid vessel on 8384.0 requesting info on placing collect call, SITOR-A. (SJ)

8429.5: NMO, USCG, Honolulu, HI w/CW+SITOR marker at 0325Z. (SJ)

8431.0: Unid sta. transmitting SITOR-B RRRR signal on top of TAH, Istanbul Radio's standard CW+SITOR-A marker, 0050 to past 0330Z. (SJ)

8971.0: FIGHTING TIGER 27 (P-3C, VP-8) and RED TALON 71C (P-3C) wkg FIDDLE at 2012. (MC)

8971.0: FIGHTING TIGER 21 (P-3C) SPARE GROUP 6 report to GOLDENHAWK at 1806. (MC)

8971.0: FIGHTING TIGER 21 (P-3C, VP-8) wkg GOLDENHAWK to report # 3 engine shutdown at 1615. (MC)

8983.0: CAMSLANT wkg CG 2114 (HU-25) to pass report from Sector San Juan of a vessel sighted by OMAHA 69A at 2143. (MC)

9001.6: Sector Miami clg SHARK 13 at 2350. (MC)

9007.0: TRENTON MILITARY clg SENTRY 50 (E-3 AWACS) at 1631. (MC)

9025.0: SENTRY 50 (E-3 AWACS) p/p via Andrews HF-GCS to RAYMOND 24 at Tinker AFB at 2053. (MC)

11175.0: RANGER 33 (KC-130T) p/p via Puerto Rico HF-GCS to NAS Fort Worth at 2031. (MC)

11175.0: MADFOX 04 (P-3C, VP-5) p/p via Offutt HF-GCS to NAS JAX at 1524. (MC)

11175.0: Diego Garcia HF-GCS wkg WB 774 (P-3C) at 2043. (MC)

11232.0: NATO 07 p/p via TRENTON MILITARY to Shaw AFB Meteo monitored at 2042. (MC)

11232.0: JSTARS 66 (E-8 JSTARS) p/p via TRENTON MILITARY to PEACHTREE at 2147. (MC)

11232.0: CANFORCE 2642 (CC-130) p/p via TRENTON MILITARY to 436 Squadron Ops at 1429. (MC)

12486.5: DSDU5, *HANJIN BOMBAY*, 27,209-ton South Korea-registered bulk carrier w/partial AMVER at 2008Z, SITOR-A. (SJ)

12490.0: ZCDJ6, *TMM SINOLOA*, 40,744-ton Bermuda-registered container ship /AMVER/PR at 1815Z, 300 mi ENE of Nassau sailing W. (SJ)

12501.0: Unid. vessel w/SELCAL XYFV (1780) for SVO, Olympia R., Athens, Greece at 2215Z, no contact, SITOR-A. (SJ)

12603.0: Lincolnshire Poacher numbers station. YL/EE with callup of "14147." Then tones, and into 5-fig grps, each twice. USB at 1804Z. (CG)

12603.8: SVO, Olympia Radio, Greece with beacon in CW at 1805Z. (CG)

13200.0: Puerto Rico HF-GCS wkg REACH 366 at 2038. (MC)

13927.1: KING 84 (HC-130) p/p via AFA3HS, Kansas to TACC Meteo monitored at 1848. (MC)

14405.0: AFA6TP, MARS stn in informal QSO with another stn. USB at 1645Z. (CG)

15043.0: CONDOR 01 (E-3 AWACS) ALE initiated call to Tinker AFB Meteo at 1900. (MC)

16699.0: XCPI, B.T. *NUEVO PEMEX III*, 44,575-ton Mexico-registered crude oil tanker w/lengthy telex at 1607Z in SS detailing vessel's activities since arrival at Topolobampo. (SJ)

16811.0: CBV, Valparaiso R., Chile w/CW+SITOR marker at 0001Z. (SJ)

16814.5: CBV, Valparaiso R., Chile w/CW+SITOR marker at 0006Z. (SJ) ■

by Gerry L. Dexter, gdex@genevaonline.com

HCJB Ends English Shortwave

By the time you read this HCJB will have ended all of its English language programming, including the fabled "DX Party Line," which lingered for a while in other services and on other stations after the North American service was killed off a couple of years ago. DXPL had been on the air continuously since 1961, and its loss has to be counted as another large step downward in the slow decline of what was once one of the world's mightiest and most appreciated shortwave broadcasters. Just so you really get the point, late word from HCJB is that deconstruction has begun on the towers at their Pifo, Ecuador, transmitter site, so the loss of some HCJB frequencies has already begun.

That special Radio Japan "Shiokaze" service aimed at Japanese individuals kidnapped by North Koreans has been extended. It now airs from 1400 to 1500, repeated at 1900, both on 5890. In addition to programming in Japanese, the expansion includes some English and Korean, as well. So far, the service has received reports from a number of different countries, but has had no reaction from the people they are trying to reach. That's hardly surprising since those people are probably in no position to mail letters. Once the winter months return again we should have a better chance to hear this one.

If your listening travels have ever taken you into the 60-meter band, you've likely run into the "blip, blip, blip" sounds that appear from around 4750 up to 5 MHz. Known as "CODAR" (coastal ocean radar), the signals are used to measure the height of ocean waves. The interference they create makes them almost as annoying as that guy in the Ditech TV commercials! We need to warn you that there are more of these things on the way. Our friendly, all-knowing, ever helpful FCC has authorized additional such transmitters based at various universities and oceanographic institutions along the Florida and California coasts. They'll be using 4470, 4550, 4800, 4900, 12060, 12140, 12200, 13460, 13630, and 13700. Yikes!

Every now and then significant shortwave news seems to appear from out of nowhere. "John Madden!" (i.e., "boom!")—a new signal appears that no one had any idea was coming. That occurred recently when DXers began encountering Radio Internacional de Chile in the 31-meter band. Several years ago then-Radio *Nacional* de Chile closed and later sold its transmitters to Florida-based Christian Voice, which uses them for its Voz Cristiana broadcasts. It turns out that the new Chilean broadcaster is, in fact, simply a relay through the facilities of Radio Nacional Amazonia in Brazil. It's being reported on 9665 around 0300 and later. It could be that, early on, these are just experimental, as our checks haven't found anything.

Christian Voice has also added "The Voice-Africa," which broadcasts from Zambia, as well as Voice International from Australia. Now comes word that they have purchased the transmitter site at Julich, Germany, which so many broadcasters use to get their programs out to particular target areas. All of these "via Julich" relays are expected to end at the close of 2007, and all those broadcasters will then need to find new "delivery methods." Probably some will switch to Web-based delivery and some others will relocate. Not to worry, though, because by then some other European government broadcaster will have tossed in the towel and one or more silent transmitters will become available.

Dear Robert Brossell:

This is Chen Wei as the representative of "Voce of PuJiang" writing this letter to you. It was very nice of you writing us a letter to confirm our broadcasting in USA. We appreciated very much that you share this message with us.

According to your letter, we are sure that the program which you listened on February 5,2006,1313 GMT-1331 GMT, band SW5075KHZ was the "Voice of PuJiang". The other bands are:AM 1422 ,SW3280, SW4950 and FM97.7. For your future listening reference, I have made a table as the following which lists our program in details:

Pu Jiang Zhi Sheng (Voice of Pujiang)

AM1422 SW3280、4950、5075 FM97.7 (From 2006/03)

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
19：55~24：00	Voice of Pujiang						
20：00~21：30	Family of Taiwanese in Shanghai						Entertainment
20：00~21：00	Famous People Talks、New Shanghai People、Fighting Till Win、Special Feature、The talk in hearts、Walk in Shanghai、Jack-of-all-trades of Life、Listen&Talk in Shanghai Language						The way between Shanghai and Taiwan
21:30~23：00							
23：00~24：00							
23：00~24：00	Charming of Pujiang Cultural People、Finding Ancestor' Track、Cultural Fax、Shanghai Night						Culture of China

Thanks again for your letter, and we look forward to meeting you up someday in Shanghai.

Best wishes.

Chen Wei
Voice of PuJiang
Tel: 86-21-62788177-3069
Fax: 86-21-62082847
Email: chenwei@eastradio.com

Robert Brossell got this letter QSL for his reception of the Voice of Pujiang, based in Shanghai.

Chinese opposition station The Sound of Hope has increased its schedule to 60 hours each week and has plans for even more extensive programming. The new schedule has it active from 2200 to 2300 on 9635; from 2200 to 0000 on Saturdays and Sundays on 6280; from 2300 to 0000 on 7310; from 1100 to 1300 on 7280; from 1300 to 1400 on 7310; from 1400 to 1600 on 9450; and 1600 to 1700 on 11765.

Zimbabwe Fights Back

It appears that the Zimbabwean government is about to fight back in the war of words raging over the political situation there. The Zimbabwe Broadcasting Corporation is to be revitalized and targeted to Zimbabweans living abroad, an obvious move to counter the efforts of opposition broadcaster, Voice of the People. The frequencies used by Radio Zimbabwe are 3306 (sometimes also appearing as a harmonic on 6612) and 6045, both running 50 or 100 kW from a site at Gweru. Let's keep our ears peeled and see if we note any significant changes in the near future.

Help Wanted

The "Global Information Guide" consistently presents more shortwave broadcast loggings than any other monthly SW publication! (This month we processed **482** loggings!)* Why not join the fun and add your name to the list of "GIG" reporters? Send your logs to "Global Information Guide," 213 Forest St., Lake Geneva, WI 53147. Or e-mail them to your "GIG" editor at gdex@genevaonline.com, or if you have problems getting through there, directly to Editor Harold Ort at popularcom@aol.com (see the column for formatting tips). Our deadline is the 25th of each month.

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

Component failures put the Ghana Broadcasting Corporation's Radio Ghana off the air for a time last spring, but repairs have now been made and 4915 is active again from its usual 0530 sign on. There's even been talk of replacing the present unit, which is showing its age.

Help For Darfur And Other SW News

The BBC has begun a new program called "Dafur Salaam" aimed at the troubled Dafur area of the Sudan. It's only on for 15 minutes twice a day, in Arabic at

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

1700 on 15515 and 17585 and at 0500 on 9735 and 11820 via the BBC's Cyprus Relay.

Another new one is Radio Especial in La Libertad, Peru, now active on 4620, which seems to sign on slightly before 1000.

Charles Maxant in West Virginia reports that WEWN took a serious lightening hit back in April and all of its English transmissions went down. He estimated it would be several weeks before the facility could be repaired. Broadcasts in Spanish were not affected.

Reader Logs

Remember, your shortwave broadcast station logs are always welcome. But please be sure to double or even triple space the items, list them country name first, and include your last name and state abbreviation after each log. Also very welcome are spare QSLs you don't need returned, station schedules, brochures, pennants, station photos, and anything else you think would be of interest. And the postman disappoints again—where's that pic of you at your listening post?

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).

ALBANIA—Radio Tirana, 6115 at 0143 with sign on f/by news and a pgm about developments there. Off at 0158. (D'Angelo, PA) 9520 in FF to Europe at 2024. (DeGennaro, NY) 9920 (*nf?—gld*) at 1845 sign on with ID, frequency info and into news. (Yohnicki, ON)

ANGOLA—Radio Nacional, 7245 in PP at 0048 with pop vocals, ID, and news. (Paszkiewicz, WI)

ANGUILLA—Caribbean Beacon, 11775 with Dr. Scott's widow heard at 2330. (Maxant, WV)

ARGENTINA—Radio Nacional, 6060 fair in SS at 1016. (Barton, AZ) 15345 in SS to Europe at 2214. (DeGennaro, NY)

Radiodfusion Argentina al Exterior (RAE) 11710.7 with EE at 0211 and DX'ers Special at 0240. (D'Angelo, PA) 15345 in SS or PP at 1815. (Maxant, WV) 15345 (varying to 15347) in SS at 2230. (Linonis, PA)

ARMENIA—Voice of Armenia, 9965 in unid lang. at 1925 opening with domestic service simulcast, IS, anthem, ID and into schedule and presumed news. (Burrow, WA)

ASCENSION ISLAND—BBC Relay, 6005 at 0303 to S. Africa. (DeGennaro, NY) 6005 at 0420. //7120 and 7160. (MacKenzie, CA) 6155 in FF at 0430. (Brossell, WI) 15400 with "Focus on Africa" at 1906. (Jeffery, NY) Same pgm on 17830 at 1930. (Gay, KY)

AUSTRALIA—Radio Australia, 6020 in Pidgin at 1036. (Barton, AZ) 6020 at 1120 in Pidgin to the Pacific and 9580/9590 at 0855. (DeGennaro, NY) 7240 at 1645, 9580 at 1315, 9590 at 1325, 15230 at 2245, 15515 at 0345 and 17785 at 2315. Also 21740 at 2315. (Maxant, WV) 9580//9710//11880 at 1901. (Burrow, WA) 15515//17785 with domestic and regional news at 2230. (Linonis, PA)

ABC No. Territories Service, Alice Springs, 4835 with two women in discussion at 0811. (DeGennaro, NY)

CVC International (t), 11770 at 1638 with man and woman with dramatic reading in Mandarin. Heard to 1700 close on another occasion. (Taylor, WI) 15715 at 1650. (Yohnicki, ON)

AUSTRIA—Radio Austria Int., 13675 with "Austria Today" at 1645. Also 13775 at 1540. (Maxant, WV)

BELARUS—Radio Belarus, 5970 at 0200 with IS and multi-lingual ID, opening in EE and into news. Lots of adjacent channel splatter and barely audible on parallel 7210. (Alexander, PA)

BELGIUM—RTBF, 9970 in FF to Southern Europe at 1053. (DeGennaro, NY)

BENIN—ORTN Benin, 5025 at 2230 in FF but poor under Rebelde. Off with NA at 2301. (Alexander, PA)

BOLIVIA—Radio Santa Cruz, Santa Cruz, 6134.8 in Aymara heard at 0912 with ID and talks in SS and Aymara. (D'Angelo, PA) 0950 with flutes, drums and talking. (DeGennaro, NY)

Radio Mosoj Chaski, 3310 in QQ at 0051 and 0932. (D'Angelo, PA)

Radio San Miguel, Riberalta (t) 4900.7 with CP music, SS anmts and abrupt close at 0255. (Alexander, PA)

Radio Pio Doce, Llallagua Siglo XX, 5952.5 at 0130 with CP music, SS talks but splatter from Okeechobee on 5950. (Alexander, PA)

BOTSWANA—VOA Relay, 4930 monitored at 0346, //6035 with "Today's World of Music" and B.B. King doing an ID. (Brossell, WI) 15445 with "Nightline Africa" at 1600. (Foss, Philippines) 15580 at 1750 with TC on the hour and into "African News Now." (Wood, TN)

BRAZIL—(All in PP) Radio Anhanguera, Goiania, 4915 at 0100 with talk and brief music breaks. Also noted on 6080 and 11830. (Alexander, PA) 0115 with futbol. (DeGennaro, NY)

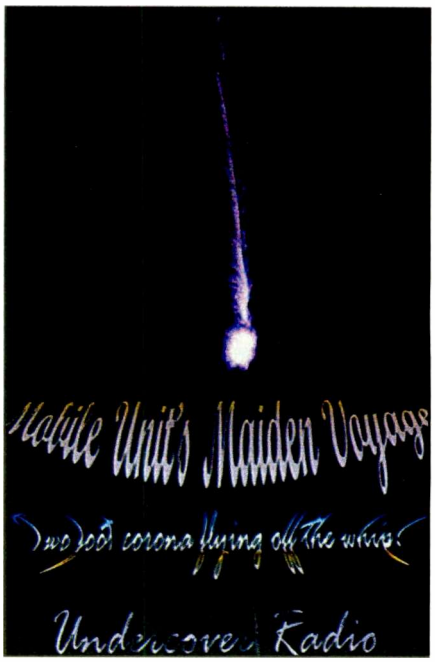
Radio Difusora Roraima, Boa Vista, 4875 with political talks heard at 0813. (DeGennaro, NY)

Radio Brasil Central, Goiania, 4985 with music and talk at 0819. (DeGennaro, NY)

Radio Clube do Para, Belem, 4885 with hymns and PP talks at 1025. (DeGennaro, NY)

Radio Difusora do Amazonas, Manaus, 4805 with music and commercials at 0952. (DeGennaro, NY)

Radio Integracao, Cruziero do Sul, 4765 with religious talk at 0957. (DeGennaro, NY)



Rich D'Angelo got this color QSL card from pirate Undercover Radio.

Radio Educacao Rural, Tefe, 4925 with talks and music at 0111. (Brossell, WI) 1035 with news. (DeGennaro, NY)

Radio Cultura, Sao Paulo, 9615 at 0210 with easy listening PP ballads and light jazz. Off at 0305. (Alexander, PA)

Radio Marumby, Florinapolis, 9665 with church service at 0100. Parallel 11750 was very weak. (Alexander, PA)

Radio Bandeirantes, Sao Paulo, 9645.1 at 0130 with PP pops, ad string and ID. Parallel 11925 was very weak. (Alexander, PA)

Radio Nacional Amazonas, 11745, //11780 at 0300 with talk of some sort of special event in Brasilia. (Linonis, PA) 11780 at 0018. (MacKenzie, CA) 1033 with religious service. (DeGennaro, NY)

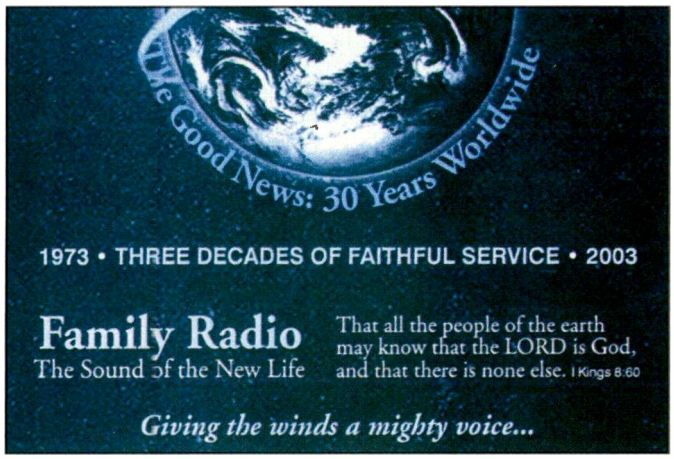
Radio Nacional, Macapa, 4915 at 0017 with talk before a live audience and music breaks. (Taylor, WI) 0200 with good signal after Anhanguera signs off at 0200. (Alexander, PA) 0222. (Wood, TN) 0345 with "Radio Difusora" ID. (Brossell, WI)

Radio Difusora Acreana, Rio Branco, 4885 heard at 0342 with salsa and talk. (Brossell, WI)

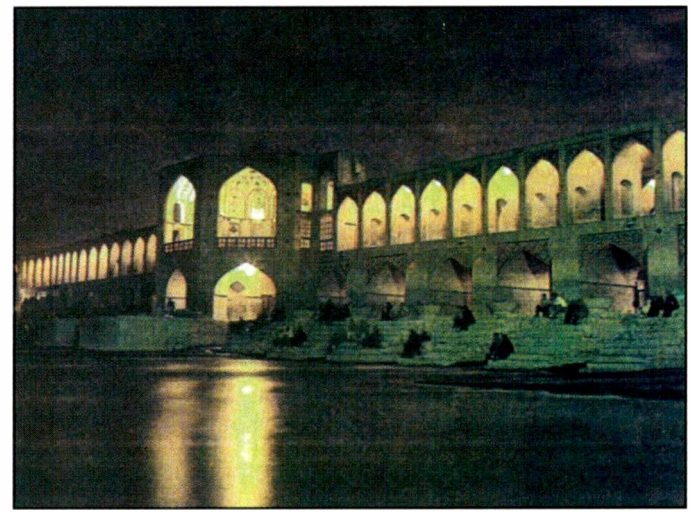
Radio Cancao Nova, Cachoeira Paulista, 9675 heard at 0743 with religious talks. (D'Angelo, PA)

Radio Novas de Pas, Curitiba, 9515 at 2335 with talks, commls, jingles, ballads. Poor to weak on //6080. (Alexander, PA)

BULGARIA—Radio Bulgaria, 7400//9700 with Bulgarian news at 0322. (Burrow, WA) 7500 to W. Europe at 2158, 9400 in BB to Asia at 2008 and 9500 in SS to S. America at 0105. (DeGennaro, NY) 11700 at 0159 sign on with IS and into EE with news and day's events. (D'Angelo, PA) 0205 with ID and local weather. //9510. (Wood, TN)



Family Radio is so pervasive it actually leaks out of your speaker and all over your radio desk! This QSL was for Rich D'Angelo's reception via the RN Madagascar relay.



Rich D'Angelo received this QSL card for reception of VOIRI on 3945.

BURKINA FASO—Radio Burkina, 5030 at 0558 sign on with anthem, FF anmts at 0600 and Afro-pops. Mixing with co-channel University Network.

CANADA—Radio Canada Int., 9635 in AA at 0244 and 15180 in FF at 2200. (DeGennaro, NY) 13655 at 1410 with news, "Vinyl Café. (Maxant, WV) 15180 with "Maple Leaf Mailbag" monitored at 2245. (Linonis, PA)

CBC 9625 with music at 0335. (Maxant, WV)

CFRX, 6070, Toronto, on school problems at 1115. (Maxant, WV)

CKZN, St. John's (Newfoundland), 6160 monitored at 0953. (DeGennaro, NY)

CHILE—Voz Cristiana, 5960 in SS at 0939, 6070 in SS at 0944 and 6110 in PP at 0836. (DeGennaro, NY) 11745 in SS at 0020 and 17680 in SS heard at 2325. (Maxant, WV)

CHINA—China Radio Int., 5965 (Beijing) in RR at 1515. (Barton, AZ) 6020 via Albania at 0427, //6080. (MacKenzie, CA) 7190-Beijing in JJ at 1017, 7335-Jinhua in SS at 2232, 9440-Kunming at 2018, 9570 via Albania in CC at 0236, 9580 via Cuba at 0102, 9640-Kashi in SS at 2148, 9690 via Spain in CC at 0258, 9745 via Bonaire in SS at 0037, 11875-Kunming at 1100 sign on, 11935-Shijiazhuang in RR at 1055 and 11975 via Mali in FF at 2136. (DeGennaro, NY) 9440 at 1931. (Gay, KY) 9570 at 1355 and 9775 in CC at 1350. (Maxant, WV) 13740 via Cuba at 1416. (Yohnicki, ON)

CPBS, 7360-Xi'an in CC at 2224 and 9810-Xi'an in CC heard at 1110. (DeGennaro, NY)

Nei Menggu PBS, Hohhot, (Mongolia) 4785 in Mongolian at 1523. (Foss, Philippines)

Voice of Pujiang, Shanghai, 5075 in CC at 1313. (Brossell, WI)

Voice of the Strait, Fuzhou, 7280 in CC monitored at 1023 with talk and laughter. (DeGennaro, NY) 1200 in CC. (Taylor, WI)

Xizang PBS, Lhasa (Tibet) 6050 in CC at 1403. (Brossell, WI) 7385 in Tibetan at 2220. (DeGennaro, NY)

China Music Jammer, 9780 at 1406. (Brossell, WI)

COLOMBIA—La Voz de su Concencia, Puerto Lleras, 6010 in SS at 0831. (DeGennaro, NY)

Marfil Estereo, 5090.9 at 0510 with SS anmts, ads, ID, variety of music. (Alexander, PA)

COSTA RICA—University Network, Cahuita, 6150 with Dr. Gene Scott at 1123. (Jeffery, NY) 7375 at 0515 with Dr. Scott. (Wood, TN) 11869 with Dr. Scott at 1807. (Wood, TN)

Faro del Caribe, San Jose, 5054.6 in SS at 1040. (DeGennaro, NY)

Radio Exterior de Espana Relay, 17850 with futbol match in SS at 1715. (Barton, AZ)

CROATIA—Voice of Croatia, 7285 via Germany at 0313 with political comment, headlines, IDs, schedule. (Burrow, WA) 0202 in Croatian. Also 9925 via Germany in Croatian heard at 0049. (DeGennaro, NY)

CUBA—Radio Havana Cuba, 6140 in SS at 0240, 9550 in FF at 0107 and 11805 in SS at 1109. (DeGennaro, NY) 9550 at 1330 with SS sign on. (Maxant, WV) 11760 in EE at 2105. (Gay, KY)

Radio Rebelde, 5025 in SS at 1113. (DeGennaro, NY)

CYPURS—BBC Relay, 7165 in Dari at 0035. (DeGennaro, NY)

CZECH REPUBLIC—Radio Prague, 6200 at 0414 on alcoholic beverages made there (Brossell, WI) 6200 in SS at 0325, 7345 in EE at 2227, 9430 in SS at 2015 and 9880 in GG at 1026. (DeGennaro, NY) 7345 at 2335 (Maxant, WV) 11600 at 2136. (Gay, KY) 11665 in SS at 0013. (MacKenzie, CA)

DJIBOUTI—Radio Djibouti, 4780 with Koran heard at 0410. (Brossell, WI)

DOMINICAN REPUBLIC—Radio Cristal Int., 5009.8 at 2315 with SS phone talk, local music. Off with NA at 0007. (Alexander, PA)

ECUADOR—Radio Quito, 4919 in SS heard at 0323. (Taylor, WI) 0413. (Brossell, WI)

La Voz de Saquisili, Saquisili, 4900 in SS with ID and music at 1007. (DeGennaro, NY)

La Voz del Napo/R. Maria, Tena, 3279 in SS heard at 0235 with talks, bridge music, mentions of Tena. (Taylor, WI) 0418. (Brossell, WI) 0935 in QQ. (DeGennaro, NY)

HCJB, 6125 in QQ at 0839 and 9745 in QQ at 2156. (DeGennaro, NY) 9780 with religious pgm in possible Dutch at 0315. (Linonis, PA) 11700 in SS at 0023. (MacKenzie, CA) 12005 in EE at 1120, 12020 in EE at 0215 and 21455 at 1320. All in EE. (Maxant, WV)

EGYPT—Radio Cairo/Egyptian Radio, 7270 at 0316 with news and goodbye, then into music. (Burrow,) 7270 to North America at 0201, 9415 in SS at 0051, 9735 in AA at 0034 and 12050 in AA at 2148. (DeGennaro, NY) 9990 with news and ID at 2142. (Gay, KY) 2330 with EE DJ. (Maxant, WV)

ENGLAND—BBC, 3255 via So. Africa at 0335, 11865 via French Guiana at 1105 and 17585 in AA at 1230. (DeGennaro, NY) 11705 at 1810 and 12095 at 1805. (Maxant, WV) 11720 with the last "Calling the Falklands" broadcast at 2130. (Strawman, IA)

ETHIOPIA—Radio Ethiopia, 9704.2 at 0332 with man in Amharic, ID at 0341, music and talk by woman. Deep fades. //7110 was blocked by Radio Republica. (D'Angelo, PA)

Radio Fana, 6210 in Amharic at 0416. (Brossell, WI)

FRANCE—Radio France Int., 11615 in FF to West Africa at 1730. (Maxant, WV) 2021. (DeGennaro, NY)

GABON—Africa Number One, 9580 in FF at 2230. Lively African pops. (Linonis, PA) 9580 in FF at 2141 and 17630 in FF at 1237. (DeGennaro, NY) 15475 with FF phone interview heard at 1818. (Burrow, CA)

RTV Gabonaise, 4777 at 0459 sign on in FF with news at 0500. (Alexander, PA) 0530 in FF. (Barton, AZ)

GERMANY—Deutsche Welle, 7130 Sri Lanka Relay in EE to So.

Asia at 0043, 9430-Wertachtal in GG to Europe at 0057, 9545-Nauen in GG to Atlantic and S. America at 2136, 9620 Sines Relay in AA at 2145, 9735 in GG to Africa at 2153, 9855 at 0900 with sign on in GG, 9900 via Irkutsk, Russia, in GG to Asia at 1056 and 13780-Wertachtal in GG to ME at 1542. (DeGennaro, NY) 11795 (Wertachtal) in EE at 2056 and 15205 (Wertachtal) with "African News" at 2027. (Gay, KY) 11860 in EE at 1915 and 15275 (Rwanda) in GG heard at 1930. (Maxant, WV)

GHANA—GBC/Radio Ghana, 4915 with woman in EE talks at 1014. (DeGennaro, NY)

GREECE—Voice of Greece, 5865 in Greek to Europe at 0313, 7475 to Europe in Greek at 2202, 9420 in Greek to Europe at 2013, 9775 via Delano in Greek to NA at 1302 and 15630 in Greek to Europe at 1525. (DeGennaro, NY; Maxant, WV) 9420 in Greek at 2310. (Linonis, PA) 9775 via Delano in Greek at 1345. (Maxant,WV)

RS Makedonias, 7450 in Greek with domestic service at 2206. (DeGennaro, NY)

GUAM—Adventist World Radio, 9725 in EE at 11850 and 15590 with preacher at 1835. (Maxant, WV)

GUATEMALA—Radio Cultural Coatan, San Sebastian, 4780 with SS religious message and vocals at 0205. (Taylor, WI) 1110. (DeGennaro, NY)

Radio Verdad, Chiquimula, 4052.5 heard at 0406 alternating with talks in SS, ID and mentions of "areoprograma internacional." (D'Angelo, PA) 0419. (Brossell, WI)

Radio Buenas Nuevas, San Sebastian, 4800v at 0226 in SS with traditional LA music, lots of accordions. CODAR QRM. (Wood, TN)

GUYANA—Voice of Guyana, 3291, 0326 with rap, Michael Jackson. ID at 0400 and BBC news. (D'Angelo, PA) 0410 with BBC news. (Maxant, WV) 0958 with domestic service in EE. (DeGennaro, NY)

HAWAII—AFN/AFRTS Pearl Harbor, 6350u at 1332 on Native American linguistics. (Brossell, WI)

HONDURAS—La Voz Evangelica, 4819 in SS at 1017 with ID a minute later. (DeGennaro, NY)

Radio Misiones Int., Tegucigalpa, 3340 with domestic programs in SS at 0322. (DeGennaro, NY)

HUNGARY—Radio Budapest, 9590 in EE to ECNA at 0100 and 0770 in HH to NA at 0044. (DeGennaro, NY) 9795 from 0229 sign on, news in EE and "Inside Central Europe." (D'Angelo, PA)

INDIA—All India Radio, 4970-Shilong at 1508. (Foss, Philippines) 5010-Thiruvananthapuram with talks in Hindi at 1309, 6165-Delhi in Hindi at 1353 and 11620-Bangaluru (Bangalore) in EE at 2050. (Brossell, WI) 7410-Delhi in EE to Europe at 2209 and 10330-Bangaluru in Hindi at 1522. (DeGennaro, NY) 10330-Bangluru in Hindi at 0235 and 11620-Bangaluru in Hindi at 2320. (Maxant, WV) 10330/11620 in presumed Hindi at 2245. (Linonis, PA) 9705-Panaji (Goa) in EE at 0039 to 0045 close. Also on 11715 at 2218 to 2230 close. (D'Angelo, PA) 11715 at 2128 on Indian culture in Trinidad. (Gay, KY)

AIR sent this card for reception of its station at Itanagar on 4990. (Thanks Rich D'Angelo)

INDONESIA—Radio Republik Indonesia, 4605-Serui at 2056 with reggae, ID and news at 2100. Listed for just 500 watts! (Foss, Philippines) 1242 with pops. (Strawman, IA) 4790-Fak Fak in II at 1341. (Brossell, WI) 15150-Cimanggis with piano music and ID heard at 1950. (Gay, KY)

IRAN—VOIRI, 7330//9940 at 1604 with EE interview. (Burrow, WA) 9495 at 0225 with talk, music and sudden sign off. (Maxant, WV) 9495 with "Voice of Justice" program in EE to NA at 0226. Also 15150 in AA heard at 1533. (DeGennaro, NY)

ISRAEL—Kol Israel, 9345 in HH at 0305. (MacKenzie, CA) 0216 to W. Europe. (DeGennaro, NY) 9345//11590 at 1833 with EE phone interview, regional news, financial and weather bulletins and "Voice of Israel" ID at 1844. (Burrow, WA) 11590 in HH at 1845. (Maxant, WV) 17535 in HH at 1709. (Yohnicki, ON)

Galei Zahal, 6973u in HH at 0228. (Wood, TN) 0331 (DeGennaro, NY)

ITALY—RAI Int., 9760 with IS, ID and news from 1935. (Burrow, WA) 11800 in II/EE at 0047. (MacKenzie, CA) 11875 with music, ID, bird IS at 2045. (Gay, KY) 11920 via Singapore in II at 1043. (DeGennaro, NY)

JAPAN—Radio Japan/NHK, 5960 via Canada in JJ at 0415. 6120 (*via Canada—gld*) at 1130 with EE/JJ lesson. Also 9665 via French Guiana in JJ at 0345 and 15355 on arithmetic and grammar in schools. (Maxant, WV) 6120 via Sackville in EE at 1018, 9540 in JJ to WCNA at 0850 and 15220 via Ascension in JJ to S. America at 2204. (DeGennaro, NY) 6120 via Canada with "Japan Unplugged" at 1030 and 12045 in JJ at 1700. (Barton, AZ) 7200 at 1531. (Foss, Philippines)

Radio Nekkei, 3925 with symphonic music and woman in JJ at 1145. (Barton, AZ)

JORDAN—Radio Jordan, 11690 at 1340. RTTY QRM. (Maxant, WV) 1546 with pop vocals in various languages. ID at 1600 and into news. (D'Angelo, PA)

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 **Jerry Strawman** of Des Moines, Iowa, who receives a copy of *Joe Carr's Receiving Antenna Handbook* from Universal Radio. Don't forget Universal's great catalog of shortwave receivers, antennas, and numerous gadgets and other aids, plus books, and much more—even replicas of classic radios! Get your free copy by calling (614) 866-4267 or send an e-mail to dx@universal-radio.com or drop a note to them at 6830 Americana Parkway, Reynoldsburg, OH 43068.

KUWAIT—Radio Kuwait, 11675 with sign on in AA at 0300. (Linonis, PA)

LIBERIA—Radio Veritas, 5470 with EE religious programming at 2230. (Linonis, PA)

LIBYA—Radio Jamahiriya/V of Africa, 7320 via France in AA at 2240. (DeGennaro, NY) 17850 via France at 1400 to 1557 close with IDs, sked and various EE features. (Alexander, PA)

LITHUANIA—Radio Vilnius, 7325 monitored at 2253 with IS, ID. (Brossell, WI)

MALAYSIA—Radio Malaysia, 7295 with Traxx FM simulcast at 1626 with rock/rap, IDs and dedications. (Burrow, WA)

MAURITANIA—Radio Mauritanie, 4845 at 0030 with AA talks and music. (Taylor, WI)

MEXICO—Radio Educacion, 6185 with EE ID at 0303 and request for letters to P.O. Box 465, Mexico City. (Brossell, WI) 0443 with woman in SS and music. (MacKenzie, CA) 0449 with classical music. (Wood, TN) 0843 in SS with talk on copyright laws. (DeGennaro, NY)

MOROCCO—Radio Medi-Un, 9575 with US pops and AA anncr at 0245. (Maxant, WV)

RTV Marocaine, 15345 at 2130 with flute music and woman with comments in AA. (MacKenzie, CA)

VOA Relay, 15220 in AA at 1838. (Brossell, WI)

MOLDOVA—Voice of Russia, 9665 via Moldova at 0214 with EE features including Japanese claims on islands also claimed by Russia. //9860. (Wood, TN) 0400. (Maxant, WV)

MONACO—Radio Monte Carlo, 6080 via Canada with talks in AA at 0410. (Brossell, WI)

NETHERLANDS—Radio Nederland, 9795 via Singapore, at 1113 in II to SEA. (DeGennaro, NY) 11655 in EE discussing Russian music and composers at 1905. (Maxant, WV)

NETHERLANDS ANTILLES—Radio Netherlands Bonaire Relay, 6110 in SS at 1118. (Jeffery, NY) 9845 with "Newsline" at 0005. (Wood, TN) 0030. Also 11970 in 2345. (MacKenzie, CA) 17810 in EE at 1934. (Gay, KY)

NEW ZEALAND—Radio New Zealand Int., 9870 at 1330 and 15720 at 0205. (Maxant, WV) 9870 with Pacific Island news at 1103 and 9885 at 0909. (DeGennaro, NY) 15720 with news magazine pgm at 0310. (Jeffery, NY) 2318. (MacKenzie, CA)

NIGERIA—Voice of Nigeria, 15120 with African and world news at 1704. (Burrow, WA) 1750 on job opportunities for young people. (Maxant, WV) 1810 with drums and ID. (Yohnicki, ON) 1815 with ID and into Afro-pops. (Brossell, WI) 2033 with news. (Gay, KY)

Radio Nigeria, Kaduna, 4770 at 2240 with vocals pgm hosted by man in EE. Sign off at 2302. (D'Angelo, PA)

NORTH KOREA—Voice of Korea, 3560 in CC at 2115. (Foss, Philippines) 6285 at 1045. (Barton, AZ) 7570 with narrative, ID, music at 1552. (Burrow, WA) 2152 with EE to Europe. (DeGennaro, NY) 9335 with woman talk at 1327, ID, Asian opera. (Taylor, WI) 1325. (Maxant, WV)

NORTHERN MARIANAS—VOA Relay, 13640 at 2208 in JJ/VV. Mentions of Taiwan. (MacKenzie, CA)

OMAN—Radio Sultanate of Oman, 6085 in AA at 0315, 9760 in AA at 0040 and 15140 in AA at 1538. (DeGennaro, NY) 1405 with EE news. (Maxant, WV) 2158 in AA with chimes, ID, flute and radio drama. (Paszkiewicz, WI)

OPPOSITION—SW Radio Africa (to Zimbabwe) 3230 at 0300 sign on with jingles, anmts, ID, talk about Zimbabwe politics, local music. To past 0330. (Alexander, PA)

Radio Free Southern Cameroon, 15695 via Russia from 1800 sign on with EE ID, choral anthem, talk about Southern Cameroons, local music. On Sundays only. (Alexander, PA)

Voice of the Tigray Revolution, 5500 at 0355 sign on with IS, vernacular talk at 0400 and HOA music, //6350 which was very poor and under an RTTY station. (Alexander, PA)

Radio Republica (to Cuba) 5910 via Germany at 0200 in SS with piano ID, address and alternating man and woman speaking. Audible under Cuban bubble jamming. Also 6135 via the UK in SS at 2327, 7110 via UK at 0203 and 7205 via UK in SS at 0130. (Taylor, WI) 7205 in SS at 0031. (DeGennaro, NY)

Radio Free Asia, 9455 via Northern Marianas in unid Asian language at 1430 under Voice of Russia splash. (Barton, AZ) 11605 via Taiwan in unid language at 0032. (MacKenzie, CA) 15585 via Northern Marianas in CC at 2333, //15430 via Guam. (MacKenzie, CA)

PAKISTAN—Radio Pakistan, 9375//11570 at 1557 in EE with IS, ID and into possible news. (Burrow, WA)

PAPUA NEW GUINEA—Radio Sanduan, Vanimo, 3205 with native pop/rock at 1219. (Foss, Philippines)

NBC, Port Moresby, 4890 in EE and Tok Pisin at 1002. (DeGennaro, NY)

PERU—(All in SS or QQ) Radio Tarma, Tarma, 4775 at 1013. (DeGennaro, NY)

Radio Sicuani, Sicuani, 4826 at 1020 in QQ. (DeGennaro, NY)

Radio Macedonia, Arequipa, 4890 at 1029. (DeGennaro, NY)

Radio Maranon, Jaen, 4835.5 with music and occasional anmts at 1017. (DeGennaro, NY)

Radio Cultural Amuata, Huanta, 4955 at 1100. (DeGennaro, NY)

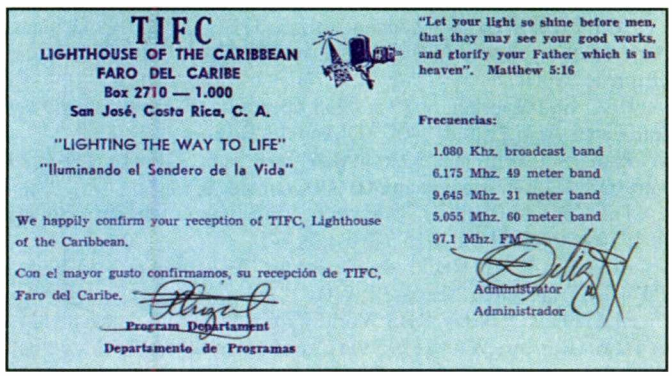
Radio Altura, Cerro de Pasco, 5014 with music, local items at 1002. (DeGennaro, NY)

Radio Luz y Sonido, Huanuco, 3234.8 with music and commls at 1010. (DeGennaro, NY)

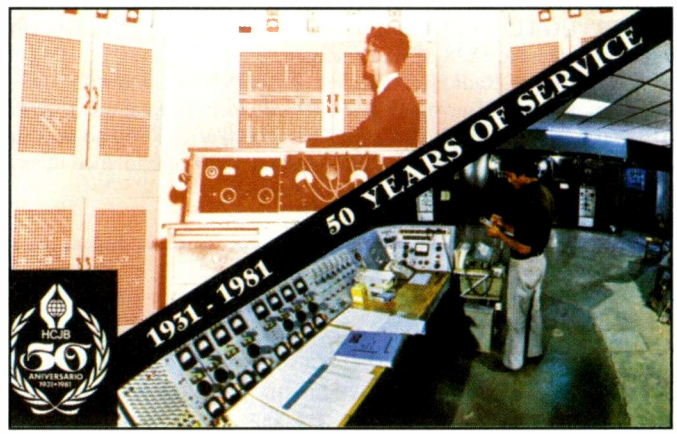
PHILIPPINES—FEBC, 9435 in presumed CC at 2230 with co-channel QRM from Israel. (Linonis, PA)

VOA relay, 7215 with news and sports. Off at 0030. (Foss, Philippines)

PIRATES—Undercover Radio, 6925u heard at 0102 with 20th

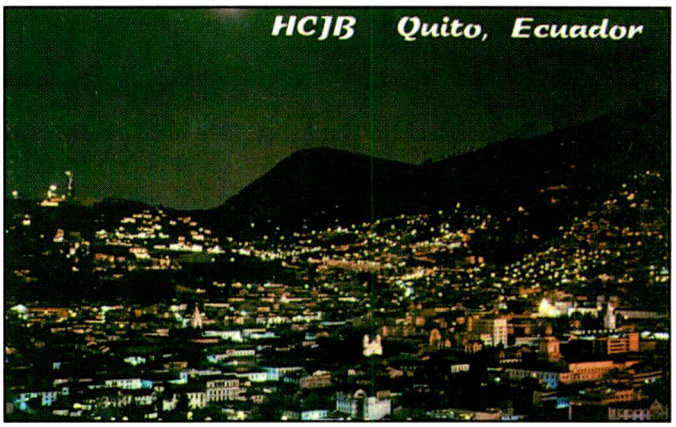


Recently returned TIFC, the Lighthouse of the Caribbean, sent this card to Rich D'Angelo. It's a different design than the old one, which featured the Quetzal bird.



HCJB celebrated its 50th anniversary—25 years ago!

This HCJB QSL dates back to 1946!



HCJB was the first entry in many a DXers logbook.

anniversary show and IDs as both Undercover Radio and Progressive Music Radio. (Wood, TN)

Progressive Music Radio, 6925u at 1453 "25 watts from the middle of nowhere." (Gay, KY)

Grasscutter Radio, 6925u with rock at 2258. (Gay, KY)

The Crystal Ship, 6854 at 0019 with mentions of blue states, IDs and music parodies. (Wood, TN) 1515 with rock. (Gay, KY)

MAC Shortwave, 6950 at 2309 with several IDs, 50s and 60s tunes, mentions of FRN. (Wood, TN)

WTPR, 6950 AT 2256. Unsure if this was a separate broadcast; it may have been part of MAC Shortwave but several IDs for WPTR and mentions of checking tire pressure. (Wood, TN)

Pirate Radio Boston, 6925 at 0050 with Stoneham, MA, mail drop, rock and largely unintelligible remarks by male. (Wood, TN)

Take It Easy Radio, 6925u at 0230 with comedy bit about drunks, C&W, donkey sound effects, hellos to various pirates and some listeners. (Hassig, IL)

Voice of the Runaway Mahirishi, 6925u heard at 2345 with anmts, parody music, mentions of broadcasting from a magic carpet, mentions of a replay of program #18 and QSLs via Radio Free Euphoria from the Belfast, NY, address. (Wood, TN)

WBNY, 6925u at 2323 with yodeling, Peter Cottontail song, promo for rodent freedom fighters. Belfast address. Off at 2338. Also at 0109 repeating 2323 program to close at 0132. (Zeller, OH) 0218 with Commander Bunny, bunny music and comedy bits. (Hassig, IL)

Voice of Captain Ron, 6925u at 2343 with rock and IDs. Lost around 0017. (Zeller, OH) 2352 with music and IDs. (Wood, TN) 0000 with hardcore heavy metal. (Hassig, IL)

Mystery Radio (Euro) 6220 at 0330 with station jingle heard at 0345. (Alexander, PA)

POLAND—Radio Polonia, 9525 at 1325 with a pgm on wine making. (Brossell, WI)

PORTUGAL—RDP Int., 15295 in PP at 2333. 15560 in PP with futbol broadcast at 1528. (DeGennaro)

ROMANIA—Radio Romania Int., 9515//9690 at 0406 with news, ID and more news. (Burrow, WA) 9640 with Romanian news at 1818. Also 9765 in SS at 0322. (Brossell, WI) 11940 at 2330 on politics in Albania and Bulgaria. Also 15105 heard at 1320 on violence there. (Maxant, WV)

In Times Past...

And now for some nostalgia. We 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:

SAO TOME—Radio Clube do Sao Tome, 4807.5 with domestic service in PP at 2127 on November 6, 1965. 1 kilowatt. (Dexter-WI)

RUSSIA—Voice of Russia, 6115-Armavir, RR to ECNA at 0249, 7180 via Moldova in SS at 0158, 7250 via Armenia in RR at 0210 and 9665 via Moldova to ECNA at 0250. (DeGennaro, NY) 6185-Samara in RR at 1313 and 9900-Samara in Asian language at 1407. Also 12055-Chita at 1358 with website mention, IS and talk in RR. (Brossell, WI) 12070 (Moscow) at 2030. (Gay, KY) 15455-Armavir in FF at 1933. (Jeffery, NY)

Russian International Radio, 7125 via Moldova in RR monitored at 0153. (DeGennaro, NY)

Radio Rossii, 6075 at 1059 with ID after long talk by man in RR. (Barton, AZ)

Radio Kyzyl, 6100 at 1200 sign on with "Goverit Radio Kyzyl" ID and into more RR. (Brossell, WI)

Deutsche Welle, 15460 via Petropavlovsk in GG monitored at 2325. (Zeck, NY)

RWANDA—Deutsche Welle Relay, 9640 in GG at 0037, 13650 in AA at 2150 and 15205 in EE at 2143. (MacKenzie, CA) 15205 in EE at 2035. (Jeffery, NY)

SAUDI ARABIA—BSKSA, 9675 in AA at 0254. (DeGennaro, NY) 11920 with news in AA at 1700 and into prayers. (Barton, AZ)

SEYCHELLES—BBC Relay, 9605 with "Caribbean Report" at 2240. (Linonis, PA) 9630 at 1843 on the African press. (Brossell, WI) 15420 in unid language at 1546. (Foss, Philippines) 1650 with call-in show. (Gay, KY)

SINGAPORE—Radio Singapore Int., 6080//6150 with news items at 1350. (Barton, AZ) 6150 at 1545 as Mediacorp Radio with discussion. Off at 1555. (Burrow, WA)

BBC Relay, 7205 in Bengali at 1640. (MacKenzie, CA)

SLOVAKIA—Radio Slovakia Int., 7230 with news items at 0102. (Brossell, WI) 9440 in FF heard at 0221. (DeGennaro, NY)

SOLOMON ISLANDS—SIBC, 5020 with BBC news heard at 1325. (Brossell, WI)

SOUTH AFRICA—Channel Africa, 3345 at 0326. (DeGennaro, NY) 7390 at 0326 with interview, music, news. Into FF at 0336. (Burrow, WA)

BBC via Meyerton, 6035 at 0255 open with IS, time pips, ID and into news. Also 7120 at 0402. (D'Angelo, PA)

Radio Sondergrense, 3320 at 0241 with jazz and pops. (Brossell, WI) 0331 with music and anmts. (DeGennaro, NY)

Trans World Radio via Meyerton, 9745 in unid African language at 1910 with EE ID at 1915. (Brossell, WI)

Adventist World Radio via Meyerton, 15140 with a multi-lingual ID at 1928 and close. (Brossell, WI)

SOUTH KOREA—KBS World Radio, 5970 with domestic news at 1606. (Burrow, WA) 11795 via Canada at in SS 1112 with domestic news items. (DeGennaro, NY)

SPAIN—Radio Exterior de Espana, 5965 in SS at 0700. (Barton, AZ) 6055 in SS at 0430l. Also 15385 in FF at 2337. (MacKenzie, CA) 6055 in SS at 0254, 7275 in SS at 2248, 9535 in SS at 0229, 9620 in

SS at 0057, 15385 in FF at 2309 and 17595 in SS at 1233. (DeGennaro, NY) 15110 with sporting event in SS at 1920. (Maxant, WV)

SRI LANKA—VOA relay, 9325 in Asian language at 1352. (Brossell, WI)

SWAZILAND—Trans World Radio, 3200 with pgm in GG at 0415. (D'Angelo, PA) 4775 in GG at 0408. (Brossell, WI)

SWEDEN—Radio Sweden Int., 11550 via Madagascar in Swedish at 0125. (Brossell, WI) 15240 at 1355 and into Swedish at 1400. (Maxant, WV) 15735 in SS with news at 1600. //13580. (Yohnicki, ON)

TAIWAN—Radio Taiwan Int., 11640 in CC at 0034. (MacKenzie, CA) 11665 (*via Florida—gld*) in GG at 2107. (Barton, AZ)

Voice of Han, 9745 in CC with pop/rock at 2120. (Foss, Philippines)

TANZANIA—Radio Tanzania, 5050 with pops and talks in Swahili at 0325. (Brossell, WI)

THAILAND—Radio Thailand, 5890 via Delano in EE to WCNA with news at 0309, 9535 in FF to Europe at 2028 and into EE at 2030. Also 11870 at 1038 in TT to SEA. (DeGennaro, NY) 9805 in EE at 1900. (Burrow, WA)

VOA Relay, 11690 in CC at 0042. (MacKenzie, CA)

TUNISIA—RTV Tunisienne, 7275 in AA at 0448. (MacKenzie, CA) 12005 in AA at 1928. (Brossell, WI)

TURKEY—Voice of Turkey, 5960 in EE at 2315. (Linonis, PA) 6020//7240 with "From the Dailies" at 0413. (Burrow, WA) 6020 at 0425. (Maxant, WV) 7300 in TT at 0019, and 17700 in GG to Europe heard at 1250. (DeGennaro, NY)

UGANDA—Radio Uganda, 4976 at 0311 with Ray Charles vocals f/by a church service. (Brossell, WI)

UNITED STATES—Family Radio, 9310 via Uzbekistan at 1355 to close at 1400. (Brossell, WI) 15195 via Ascension at 2030. (Jeffery, NY)

AFN/AFRTS, 12133.5u Key West with stock market at 1350. (Brossell, WI)

VATICAN—Vatican Radio, 7305 in SS at 0205, 9605 in FF at 0240 and 9660 in FF at 0247. (DeGennaro, NY) 13675 at 1535. (Maxant, WV) 13765 with news at 2000. (Gay, KY)

VIETNAM—Voice of Vietnam 6175 via Canada in VV at 0440. (MacKenzie, CA) 9730 reading listener mail f/by music heard at 1920. (Gay, KY)

VENEZUELA—Radio Nacional, 11760 via Cuba in SS heard at 2330. (Barton, AZ)

Observatorio Naval Cagical, 5000 with SS time signals at 0822. (DeGennaro, NY)

YEMEN—Republic of Yemen Radio, 9779.5 at 0251 with ME vocals, news in AA. (D'Angelo, PA) 9780 in AA at 1912. (Brossell, WI)

ZAMBIA—Radio Zambia, (p) 4910 in presumed Swahili at 0315. (Linonis, PA; Barton, AZ) 0409 with talks in an African language. (Brossell, WI)

ZANZIBAR—Radio Tanzania-Zanzibar, 6015 monitored at 0400 with news in presumed Swahili. Several mentions of Zanzibar and Dar es Salaam. (Brossell, WI)

And, once again, order is restored! An Everest of thanks to all who did the good thing this time, namely: Joe Wood, Greenback, TN; Robert Charlton, Windsor, ON; William Hassig, Mt. Prospect, IL; Michael Yohnicki, London, ON; Jack Linonis, Hermitage, PA; Jerry Strawman, Des Moines, IA; Stewart MacKenzie, Huntington Beach, CA; Charles Maxant, Hinton, WV; Robert Brossell, Pewaukee, WI; Chris Gay, Lexington, KY; Rich D'Angelo, Wyomissing, PA; Marty Foss Guinayangan, Philippines; George Zeller, Cleveland, OH; Rick Barton, Phoenix, AZ; Ciro DeGennaro, Fuera Bush, NY; Arnold Zeck; Bayberry, NY; Brian Alexander, Mechanicsburg, PA; Mark Taylor, Madison, WI; Dave Jeffery, Niagara Falls, NY and Sheryl Paszkiewicz, Manitowoc, WI. Thanks to each one of you and, until next month, good listening! ■

by Shannon Huniwell, melodyfm@dreamscape.com with Guest Columnist, Carl Tyrie

A Girl And Her T-Bird Radios, Plus A Guest Drops By

Mom noticed it on the little table next to my bed and went straight to my father. Eavesdropping through the tightly closed door of their room, I overheard Dad gently assure her that I was old enough to know how to safely use such a thing.

"But Sid," she firmly protested, "it looks positively naked and could do Shannon harm. I just don't think it appropriate for a proper young lady."

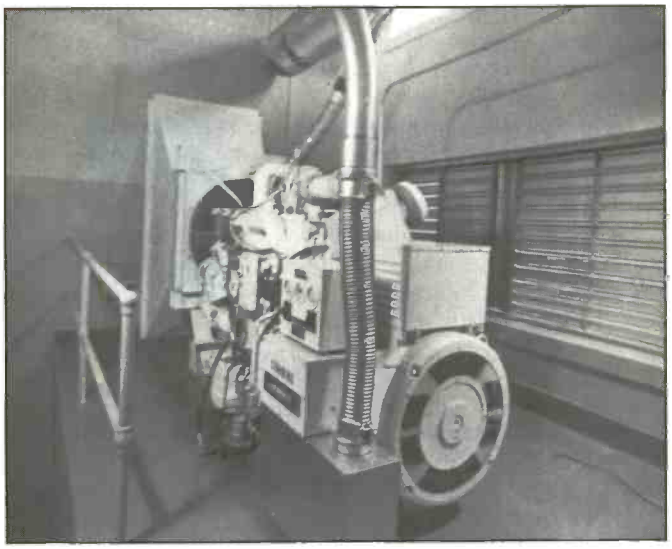
Before anyone jumps to conclusions, I should note that "it" was a bare chassis tube radio from an old Ford Thunderbird. Dad had pulled the darn thing out of an early '60s T-bird that was rusting away in a local junkyard. He enlivened the unit's small tubes with a $19.99 Micronta-Radio Shack 12-volt regulated power supply that, as Dad liked to point out, cost nearly 20 times what he'd paid the junkman for the hefty AM car radio.

My folks compromised on the "danger of electrical shock" issue, which meant that Dad offered to build a cabinet for the radio and mom gave him an approving kiss. This détente resulted in a nicely sanded pine cube in which the receiver, power supply, and five-inch oval speaker were regally garaged. Groupings of quarter-inch holes allowed tube heat and sound to escape in sufficient quantities. For fun, my father sopped up a bit of Minwax Fruitwood stain for a finish, and topped off the project with a Powered by Thunderbird emblem scrounged from the aforementioned auto graveyard. A "T" long-wire strung between poplar trees served as the radio's antenna, and gave it amazing "DX-ability." But what I remember best is the slide rule dial's glow in the middle of the night. Adventures in music, talk, and geography existed between the tiny civil defense triangles near the beginning and end of that fascinating numerical row. With eyes closed, I can vividly recall the heterodyne whistles, cross-talk, and fading of the 1970's AM band; to me, all mysterious and possessing the possibility that some never-before heard signal would suddenly connect my little world to somebody broadcasting in an equally small room maybe several thousand miles away.

Fun, Fun, Fun

In a tangential fashion, I'm getting a chance to rediscover the T-Bird radio this summer. Not the one my father found, as it was eventually the victim of dried-out capacitors, weak tubes, and a lawn sale. This time, I'm having fun listening to AM/FM in an "inspiration yellow," 2002 Thunderbird convertible.

Lest you think Harold Ort and his *Pop'Comm* compatriots who control the combination to the magazine's vault have been paying me in gold bullion, I'll admit my "new" sports car is hardly mint. A relative who owns a Toyota dealership knew I



Here's a photo of an old 1960s Cold War-era generator shortly after its installation. (All photos by Larry Cornelison)

Another photo of the generator—it still works!

A look at WBT-AM's original studio setup.

The same studio showing the setup in 2006.

Here's the water container mentioned in the column.

The top of the survival cracker metal crate.

liked the looks of late model retro Thunderbirds and excitedly called me from some car auction with word of such a Ford wearing a mere 110,000 miles, a ripped top, bald tires, cracked passenger window, no hubcaps, scratched paint, and an assortment of dents, allegedly from a horrible Texas hail storm.

"If it goes for under ten grand, do you want it?" my kin shouted in the cell phone while competing with the auctioneer's loudspeaker and other commotion of the fast-paced event. I wondered if the radio worked okay. He laughed heartily, and then called me about 20 minutes later to say that I owed him $5,900 bucks and a steak dinner. "She's certainly no show winner now," he noted, "but the drive-train seems sound. You got a great deal that can be put right later on by any decent body shop. And, by the way," my cousin added with a smile in his voice, "the T-Bird's radio works just fine."

So Far, Two Trips/Two Stations

At $3 per gallon, gas is what I'm buying with most of my vacation money. I saved a few bucks by commissioning Dad to patch the Thunderbird's top with

Here are the oversize RCA turntables, the same ones in the WBT's regular studios in the early 1960s.

One of the two Magnecord reel-to-reel machines.

black duct tape—not the most attractive fix, but dry and cheap. In June, "Yellow Bird" and I successfully made the trip to Grand Rapids, Michigan, to visit an old high school friend and her husband.

While packing, I tucked into my suitcase a *Broadcast Pro-File* Jan Lowry had recently sent me from his radio history catalog (order yours at 28243 Royal Road, Castaic, CA 91384-3028) detailing the rise and fall of WFRS-FM, an incredibly obscure frequency modulation outlet of the late 1940s. The station hailed from Grand Rapids, so I figured there might be an opportunity to do a bit of bygone era broadcast detective work there.

Grand Plans For Post-War Radio

WFRS-FM sprang from the dreams of four World War II veterans who, in August 1946, under the corporate banner of The Grand Rapids Broadcasting Corporation, secured FCC permission to build a 3-kW facility at 93.1 on the FM dial. Plans included the purchase of a second-hand tower decommissioned by

Cold War Radio

Sometimes Fact Is Stranger Than Fiction!

by Carl Tyrie

When Hurricane Hugo swept through North Carolina in September of 1989, it toppled two of the three transmitting towers used by WBT-AM, a 50,000-watt clear channel station in Charlotte. For the next day and a half, there was also no power in the area. However, the remaining tower was still transmitting, thanks in part to Fidel Castro and Nikita Khrushchev.

"How's that?," you ask? Well, it all goes back to the Cuban missile crisis of October 1962.

According to retired WBT engineer Ted Bryan, almost as soon as the crisis ended, the federal government began paying attention to the station, primarily because of WBT's strong north-south directional pattern, which easily reached Cuba. "The government came to management," Bryan says, "and proposed that at midnight every night for about six hours, they would take over the station and broadcast propaganda in Spanish."

And they did, according to Bryan, for at least a year. After that, the government decided to treat the station as a government facility and financed a combination bomb shelter/underground emergency studio for use in the event of nuclear attack, as well as the installation of an emergency generator in case of power failure. This is the same generator that powered WBT following Hugo, and it's still going strong. "It belonged to the government until about six or seven years ago," says Bryan, "and then I got a notice saying 'Okay, we're turning it over to you.'"

The bomb shelter/studio, although no longer capable of broadcasting, remains in the basement of the 1928 transmitter building as a testament to how serious mid-60's America took the threat of nuclear attack. The only exterior indication of the shelter's presence inside is a large air intake on the side of the building. Inside the basement studio, the operator's chair sits amid reminders of 1960s vintage radio. On the left sit two oversized cabinet-type RCA turntables, while two equally large Magnecord reel-to-reel machines sit on the right. The original tube-type audio console was replaced in the '70s with a small Gates solid-state unit.

The WBT bomb shelter was part of the nationwide CONELRAD alert system, whereby all television and FM stations, along with most AMs, would go off the air in a national emergency, leaving selected AMs transmitting at either 640 or 1240 Kc. WBT's frequency is 1110. "The old RCA tube-type 50-kilowatt transmitter couldn't easily be changed to either CONELRAD frequency," says Bryan, "so the federal government bought a separate RCA 1000-watt transmitter. We were assigned the 1240 frequency and another station in the area was given 640."

When the U.S. government installed the original equipment in the mid-60s, it also provided supplies and equipment. "We had a closet down there stocked with water, food and everything else," says Bryan. While most of the supplies have disappeared, those that remain provide insight into Civil Defense preparations at the time. A 17.5-gallon water container is still there, offering double duty when empty—printed directions on the outside tell how to convert the container into a commode. A full metal crate of crackers remains, along with some blankets. And there's a Civil Defense Sanitation Kit, a barrel-shaped cardboard container dated 1962 that includes items like toilet tissue, a can opener, sanitary napkins, a commode seat, and commode chemicals.

Space Hasn't Been Used For Decades... And Weak Links?

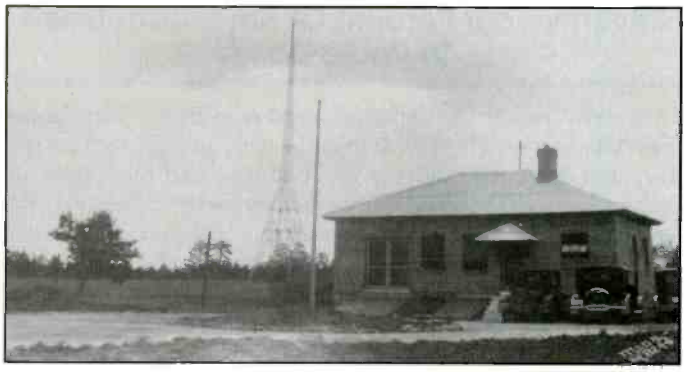
According to Bryan, WBT stopped maintaining the underground shelter/studio in the mid-70s. The studio equipment probably remains only because, except for storage, the station has had no real use for the space for several decades. The shelter's contents, however, serve as a reminder of the CONELRAD days. Still sitting near the operator's desk is an April 1963 "Handbook for Radiological Monitor" explaining, for example, procedures for operating a Geiger counter. The handbook includes a radiation exposure record filled out in November 1969 by someone named John G. Carey, who recorded several tests. One suspects that John was either testing a measurement device or just fooling around.

A question that remains more than 40 years after the underground studio was built is whether the setup would have worked. In other words, could an operator have survived in the basement studio following a nuclear attack?

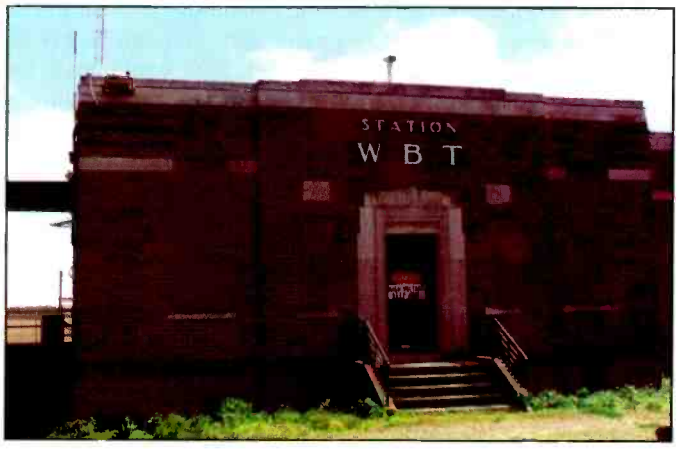
There appear to be two weak links in the system: an open stairway leading down to the basement with no door above or below, and the airflow system. According to Bryan, who was the WBT engineer from 1986 to 2000, the air-intake system appears to have no special filters. "I haven't gotten up there to see," he said, "but they're probably fiberglass filters of some sort to filter out the particles, but I don't know of any special filters for radiation. It's made me wonder all these years."

The open stairwell from the ground floor also raises questions about the threat of radiation, unless the constant inflow of air through the ducts was somehow supposed to constantly push air and radiation upward through the stairwell and out the door, similar to the theory behind the floating roofs in some basketball arenas built in the 1970s. Bryan, however, is fairly certain he would not have wanted to be a mid-60's test case trying to live for a week down in the bunker. "If I was sitting here and someone told me I had seven days to sit here until the radiation dissipated, I'd be wondering," he says.

Ted Bryan, retired WBT engineer, at the console in 2006.



An archive black and white photo of the WBT transmitting building in the late 1920s.



The same building in 2006.

KMPC in Hollywood. This 125-foot stick was rebuilt on Grand Rapids' Dias Hill, mated to some antenna bays, and onto a transmission line leading below to the cement block transmitter building. Jan's vintage sources report 316 Murray Building in Grand Rapids as home to WFRS-FM's studios and offices.

On January 25, 1947, the station debuted with a mix of Mutual network and local programming. Just shy of six months later, the Commission ordered WFRS-FM to edge down the dial to 92.5 megacycles, but eased the blow of related technical and other expenses, which included the need to replace letterhead and station literature wearing the 93.1-mc frequency, with an authorized power boost to 10.5-kW.

Soon, coupled with this juice jump, came a governmental okay to increase antenna height to 390 feet above average terrain. It appears that the erstwhile KMPC tower on Dias Hill was abandoned by WFRS-FM in favor of an installation at 92nd Street South East in Grand Rapids. Or, maybe it was relocated to the new site. According to period publicity, the September 1947 improvements gave the four vets bragging rights to owning "the most powerful FM station in Michigan." (This superlative is curious, though, because other Michigan-based FMs, including direct competitor WLAV-FM Grand Rapids, were listed in *Broadcasting Yearbook* as having far greater RF energy.)

No matter the power status, however, the available frequency modulation audience of the late 1940s/early 1950s was too tiny to be marketable by any but the most tenacious FM broadcasters.

Broadcast Pro-File says FCC archives don't specifically mention money trouble, but Jan Lowry understandably speculates that "economic reasons" caused the WFRS-FM veteran partners to take their station dark in late 1952. The FM was officially "junked" the following June when the FCC deleted the WFRS-FM callsign and cancelled its license, a sad defeat to what had likely begun as the war vets' victory in battling the odds to get their dream radio station on the air.

Incidentally, my Grand Rapids hosts got into the adventurous "radio relic hunting" spirit just long enough for the three of us to make a quick pilgrimage to 92nd Street where we gazed at the still stately, four-legged, self-supporting tower originally erected there for WFRS-FM. I had barely begun pointing out the nest of non-broadcast antennas homesteading on that impressive Eiffel Tower-esque stick when they happily interrupted with a roster of their favorite restaurants from which I was to immediately select our next stop.

Can't Hush Sweet Charlotte's Big AM

With my new T-Bird radio regaling me during the long ride home from Michigan, I decided to see how far into the night I could drive. For a considerable stretch, 1110 WBT provided company. The distant Charlotte AM often boomed into my car, reminding me of the evenings that the North Carolina flame thrower would be a part of the 50,000-watt fare flowing from that old Thunderbird radio Dad had lovingly souped up for me back in Connecticut all those years ago.

As you read this column, I'm on a second summer excursion; this time on a leisurely (hopefully!) business trip to a port of call not too distant from WBT's city of license. I've got my fingers crossed that I'll be able to find time to visit WBT or maybe some smaller stations along the way. Coincidentally, several weeks before my planned departure, Carl Tyrie, a communication studies professor at Appalachian State University, Boone, North Carolina, contacted me about a fascinating bit of WBT's past he's discovered. Carl graciously consented to serve as guest broadcast historian while I'm out of the office. So this month, I'll let his words in "Cold War Radio" end this day of broadcast history in *Pop'Comm*. Thank you, Carl! ■

Seventy-Four Percent Of Americans Listen To Radio Daily

Americans rate the importance and relevance of local commercial radio very highly, despite the entry of high-technology competition, a national survey commissioned by American Media Services shows. Seventy-eight percent of those surveyed said radio is important in their everyday lives, and 91 percent said radio is important in American life in general. Nearly three-quarters (74 percent) said they listen to radio at least once a day. The telephone survey of 1,004 American adults was conducted by Omnitel, the weekly omnibus survey by the national polling firm of GfK NOP of Princeton, New Jersey. The survey is considered accurate within plus or minus three percentage points.

The new findings complement those in AMS' initial survey in January: 64 percent said they were listening to radio as much as, or more than, they were five years ago. The availability of music, news, and reports on weather and traffic continues to be the most often cited reasons for listening to the radio, with 98 percent of respondents saying they listen to radio for one of those features.

Broadcast Electronics Demonstrates Four-channel HD Radio

Broadcast Electronics hosted the first public demonstration of four audio program channels over HD Radio, plus a closed-caption radio service for the hearing impaired designed by NPR Labs that runs on part of the Advanced Application Services data stream. The demonstration, which took place at NAB2006 in April, was sponsored by BE in partnership with iBiquity Digital Corporation, with participation from National Public Radio (NPR).

The demonstration was representative of how stations might broadcast multiple services over HD Radio. A news/talk main channel, along with two HD2 channels of music and yet another HD2 channel of reading services for the visually impaired was broadcast simultaneously on a single HD Radio carrier. A separate data channel illustrated closed captioning of the news/talk program for the hearing impaired.

China Launches Commercial Mobile Television And Radio Services Using DMB And DAB-IP Technology

Digital audio and visual broadcasting using the Digital Audio Broadcasting (DAB) family of standards takes a leap forward this year as China launches commercial mobile television and radio services using Digital Multimedia Broadcasting (DMB) and DAB-IP technology. Both systems are based on DAB, which is already bringing digital radio services to more than 500 million potential listeners in 40 countries around the world.

China is a key market for the DAB, DMB, and DAB-IP family of standards. Not only is it the powerhouse of the global supply chain for products, with the largest population in the world, but the adoption of DAB in China will also have a huge effect on the worldwide development of DAB.

DAB, DMB, and DAB-IP trials are currently underway in several parts of the country, and three broadcast licenses have been issued covering Guangdong Province, Beijing, and Shanghai. Commercial DMB services from several companies will launch during the first half of 2006 in Guangdong and Beijing. Manufacturer Samsung Electronics has agreed to supply 500,000 DMB phones to two major Chinese DMB operators.

New Radio Netherlands Logo Launched

Radio Netherlands recently rolled out a new logo and corporate identity. The old branding has always been something of a compromise, according to the station. In Dutch, the full name is Radio Nederland Wereldomroep, in conversation abbreviated to Wereldomroep. But the logo simply had the letters RN. But now, the logo has been changed to RNW, and the corporate name in English will be Radio Netherlands Worldwide. There will be no change to the on-air identification as "Radio Netherlands." The new logo is the same design as the old one, but the shade of blue is lighter. The new design will be replacing the old one gradually over the next few months.

California Agency Approved Broadband-over-power-lines Test

The California Public Utilities Commission (CPUC) has approved a plan allowing providers of high-speed Internet services to test electricity lines to deliver online access throughout the state. CPUC commissioner Rachelle Chong, who drafted the plan, said broadband over power lines, or BPL, could become a new competitor to Internet services delivered via telephone, cable and satellites and help reduce prices for consumers.

BPL uses existing utility lines delivering power to neighborhoods to carry broadband signals into homes. It has been touted by equipment makers and regulators as a possible competitor to cable and telecommunications services, which handle almost all of the roughly 40 million U.S. residential broadband connections. "BPL technology also could allow utilities to develop so-called smart grid applications to more actively monitor and manage the distribution of electricity," said Chong, a former member of the Federal Communications Commission.

Until recently, U.S. utilities interested in BPL have faced various financial and technical problems. The signals that carry data over electrical lines can cause interference with radio equipment and can travel only a short distance before weakening, requiring repeaters in many areas. The Commission adopted guidelines for electric utilities and companies that wish to develop and test projects in California, but turned down an alternative plan that proposed some slightly different regulations.

Among the adopted guidelines, electric utility affiliates and other developers can invest in and operate BPL systems. Utility affiliates would have to follow CPUC rules for transactions between a utility and a BPL affiliate to protect against cross-subsidies, the Commission said. Companies installing BPL equipment on utility poles also would have to pay a fee for the attachments.

Radio Loktantra Ends Transmission After Restoration Of Democracy

A local Nepal FM radio station in Dhading district, called Radio Loktantra, has halted its operation saying loktantra (democracy) has been restored in Nepal. The station, based in an undisclosed location, broadcast at 107.0 FM and started operation on April 9 on the initiative of two Nepalese students,

Deepak Koirala and Uttam Dhamala. Two local businessmen had supported them for installation of equipment. Initially, the station was located at Dhading Guest House in the Dhading Besi but had to frequently change locations in its 18-day-long broadcast because of threats from the local authorities. The radio station aired programs related to the pro-democracy movement led by a seven-party alliance. The anchors of Radio Loktantra said they were having technical difficulties and that they were planning to restart the transmission in the future. Similar radio transmissions with the callsign of Radio Prajatantra were begun during an earlier democratic movement in 1951. This is the second time that radio has been used to advocate democracy.

WRN Launches Podcasting

WRN, the World Radio Network, has announced the launch of a new podcasting service featuring a line-up of international content. WRN content became available in May for download direct from the WRN website at www.wrn.org/podcasting and from iTunes and other podcast directories. International program producers providing weekly downloadable shows for the WRN podcasting service include Radio Prague, Radio Poland, Radio Slovakia International, RTE Ireland, and Radio Guangdong from China. This list is set to grow over the coming months. The WRN Podcasting Team will also be producing exclusive podcast-only content for the service.

High Demand For BBC Podcasts

The BBC Radio Player had a record month in March with more than 20 million hours of online listening and 12 million on demand requests, illustrating the enduring popularity of radio streaming in the podcasting world. BBC Radio 1 led the way with four million hours of live listening and more than 87 million page impressions through a record 3.5 million unique user agents. BBC radio podcasts received 2.8 million downloads in March, up more than a million from February. Overall traffic to BBC Radio websites exceeded 290 million page impressions for the first time in March, with a record 9.3 million unique user agents logging on over the course of the month. ■

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by Bill Price, N3AVY

Back On The Farm...

Norm showed up last weekend to give me some radio things and help me put up the antenna that would assure us of eternally free long distance communication, forever and ever, amen. Like e-mail, only with static. And fade.

My landlord is perhaps the most easygoing person this side of the Mississippi. It seems that no matter what I want to do, his answer is, "Sure, just don't hurt anything." That included my request to fasten the antenna to a concrete silo and a huge oak tree.

There were no remaining climbing rungs on the silo, and we sure didn't have any 50-foot extension ladders or anything close to it. My substantial girth prevented me from even *thinking* about any means of climbing or scaling the wall, no matter what type of ropes, pulleys, or even winches were involved. While I have no fear of heights—but weigh too much—Norm is wiry but doesn't care for scary altitudes, so we mixed up some lemonade and pondered the situation from a couple of lawn chairs.

As much as I love my guns, I don't think there's a safe, sane, or effective way to connect a piece of fishing line to a bullet and fire it up to some high place and "thread the needle" with the fishing line so that you can then haul up a heavier piece of line and eventually pull up your antenna wire, and it's one of the *few* things that neither Norm nor I will even try to design. Even *we* know it's too dangerous and risky.

That left us with:

1. a crossbow
2. a regular bow and arrow
3. a slingshot

The only crossbow we could borrow took both of us to pull back and cock. That told us it would be way too dangerous for a couple of lunatics ("a man's gotta know his limits") like us to handle, so we borrowed a simple, ordinary bow (without all the pulleys, laser sights, v-6 engines, and steel cables) and bought a few target arrows and a spin-casting reel—a very cheap one which Norm asked if he could return if his nephew already had one. The man is *really* cheap.

When I was a wee lad, I was a fair shot with bow and arrow. Richard Greene was playing Robin Hood on television (in living black and white) and I was 10 or 12. Friends and I would shoot each other with some pretty dangerous "safe tipped" wooden arrows. We could have put our eyes out. Where were Ralphie's parents and teachers to warn us?

These are NOT the 1950s, and I am not a good shot with bow and arrow. The only way I could have hit the barn would have been from the *inside*. Norm was no better. We practiced and eventually were able to shoot the arrow through one of three remaining climbing rungs near the top of the silo, which would act as a pulley for us to haul up one end of our antenna.

Connecting the monofilament fishing line to the arrow was easy. We did it 10 or 15 times before it actually stayed there when we shot the arrow. We eventually drilled a tiny hole through the arrow, near the back, because almost every other method left the line sitting there as the arrow went sailing away. We were glad not to have an audience.

Then came the attempted coordination of firing the arrow into the air (while aiming for the small target opening at the top of the silo) while the other moron (we took turns) held the fishing reel and pressed the button at almost the right time, but not quite. Our results varied from the line stopping the arrow five feet in front of the bow, to the arrow pulling the fishing reel from our hands. We eventually got that part right, too, but the addition of the fishing line to the arrow added some aerodynamic variations that we had not considered when practicing our aim.

The sun set on that first day without one successful shot through the rung. And it only would have taken one successful shot to have us on our way to some sort of communications history. We called it a day, put the weapons away, and went to supper. Norm held firmly to his decision not to sleep in a house where rodents might crawl onto him during the night, and insisted that he had some free coupons for a local motel which I knew doggoned well had never issued a coupon in all of its existence. Oh well.

The next morning, we had coffee in the lawn chairs, stared menacingly at the silo, and decided to get our weapon once again while we had an entire day ahead of us. Eventually, my landlord came to tell us that some of his farmhands told him we were trying to skewer an owl on some fishing line and we explained what we were trying to do. He asked for a shot, we handed him the bow and Norm manned the fishing reel. Zing. We couldn't believe our eyes. He made it in one shot. He just smiled and handed us the bow, climbed back into his truck and drove off. We tied a heavier string to the fishing line and pulled it up and through the rung, then connected a length of nylon rope and one end of our G5RV antenna and hauled it up so that the end of the antenna was about 10 feet from the silo, then looked for a place to tie off the nylon rope.

In my life, I have never seen a place so entirely devoid of even the slightest projection, onto which I might have tied off that rope. We eventually tied it to a brick and drove off to get a masonry drill, a rawlplug, and a lag bolt, which took us over an hour to fasten to the side of the concrete silo so we could tie off our line. The other end *had* to be easier.

We must have lost a dozen arrows that remained in the branches, (and I *know* they will fall, point-down, into my head someday when I have forgotten all about them). It was easier to hoist this end up and tie off our nylon rope to a branch, but of course we didn't have enough feedline (and the thought of actually *buying* feedline went against both our upbringings like nails across a blackboard).

So Norm left for the Sunbelt without actually seeing the antenna perform, but he knows it's there, and he knows that I'm only about 50 feet of RG-8 away from connecting that rig. I'm running out of excuses. How am I ever gonna tell him I don't know how to use a microphone? ■

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Discover these Accessories & Add to your Capabilities.

Antennas for the Great Outdoors

DA3000: a 16 element receive wideband discone antenna with useable frequency coverage from 25MHz to 2GHz. Using different length elements to ensure true wideband characteristics, the DA3000 also includes one 'loaded' element to enhance low frequency performance. Engineered and manufactured to AOR's exacting standards, the DA3000 comes with 50 feet of quality RG58/U coaxial cable terminated in a BNC plug for the radio connection and a low-loss TNC plug in the antenna base. Pole clamps are also standard.

Designed for areas where space is a problem or when an "unobtrusive" installation is essential, **SA7000** is a super wideband coverage receive antenna with useable frequency coverage of 30 KHz to 2 GHz. The SA7000 is a passive arrangement with two whip elements: a long element for short wave up to 30 MHz and a second shorter loaded whip antenna for frequencies up to 2 GHz. The loading coils are tuned around 150 & 800 MHz to enhance VHF & UHF performance.

Antennas for Indoor Enjoyment

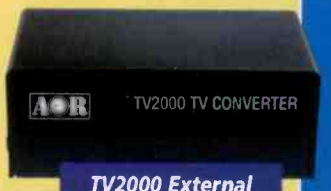
AOR has made performance even better with the new **LA380** indoor antenna as successor to the popular LA350. The LA380 features full frequency coverage (40KHz – 500MHz) using a single receiving element. Designed to provide reception when away from the main monitoring location or when large external antennas are not practical, the LA380 is a compact active (1 foot diameter) loop antenna which features an internal high-gain amplifier (20dB for 40KHz-250MHz) and excellent overall strong signal handling (high IP3 +10dBm). The loop design allows directional control and nulling noise or interference. Perfect for listening in remote locations or in antenna-restricted areas.

Accessories for Added Monitoring Capability

Now you can monitor APCO 25 signals using an AR8600MKII. The **P25-8600 APCO25 Decoder** can be installed in the AR8600MKII receiver to automatically decode the APCO25 signal. The decoded audio is then output from the receiver's speaker. *(Installation is required.)*

The **TV5000A NTSC TV Internal Converter** adds the ability to receive broadcast television signals (NTSC) and allow monitoring video feeds from a variety of sources including broadcast TV channels, public safety agencies, aircraft, Amateur Radio FSTV, news media video and more when used with AOR AR5000A series of communications receivers.

The **TVA-1 External NTSC TV Converter** is compact, lightweight and easy to install. Designed to be used with the AOR AR5000A series of communications receivers, its simple operation uses the 10.7 MHz IF input from your receiver. Audio and video outputs allow monitoring a variety of sources such as broadcast TV, public safety agencies, aircraft, Amateur Radio FSTV, news media video and more.



The **TV2000 External NTSC Video Decoder** is designed to be used with the AOR SR2000. Compact and lightweight, no external power supply is required (power is supplied from the SR2000). The video output is available from the rear panel of the TV2000 and audio is provided from the SR2000 through the external speaker jack.

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