

K 45635

# POPULAR COMMUNICATIONS

APRIL 2006

Special Report:  
Nuclear Nightmare In  
The Middle East?

Monitor The World:  
550+ Shortwave  
Broadcast Loggings  
Pg. 76

• Red Robinson—  
Canada's Rock And  
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R1500



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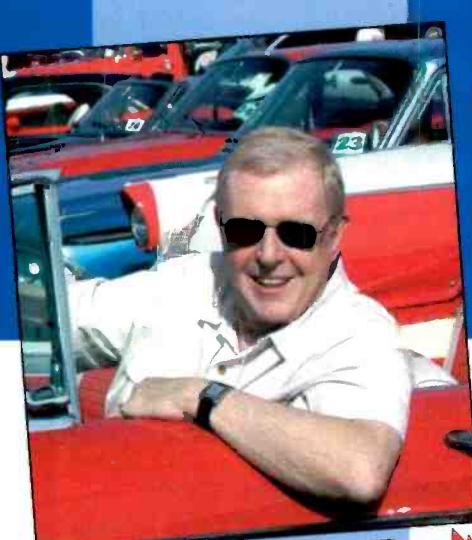
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# Contents

## POPULAR COMMUNICATIONS

Volume 24, Number 8

April 2006

### Features

#### 8 Red Robinson:

*Canada's Rock And Roll Radio Pioneer*

by Doug Bright

#### 16 Military Radio Monitoring

*Monitoring Rickenbacker Air National Guard Base*

by Tom Swisher, WA8PYR

#### 19 Utility Communications Digest

*Special Report: Monitoring On The Edge Of A Nuclear Confrontation*

by Steve Douglass

### Columns

#### 26 Aviation Action!

ScanTech

#### 36 The Great East Versus West AM DX Showdown—Is One Better Than The Other?

Broadcast Technology

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

World Band Tuning Tips

#### 46 Military Gear: Perfect For Emergencies

Homeland Security

#### 54 Antenna Tuners—The Ins And Outs

Ham Discoveries

#### 56 Propagation And Shortwave Listening

The Propagation Corner

#### 62 Building A CAT Program For Ten-Tec's RX-320

Computer-Assisted Radio Monitoring

#### 67 Long(er) Range Police And Medical Radio Tags

Radio Resources

#### 71 Early AC Receivers—A Majestic Challenge! Restoring A Majestic 90

The Wireless Connection

#### 76 New Shortwave Life For Albania And Bhutan!

Global Information Guide

#### 84 A Failure To Communicate

The Loose Connection

### Departments

#### 4 Tuning In—An Editorial

#### 6 Our Readers Speak Out—Letters

#### 31 V.I.P. Spotlight—Congratulations To Mark Meece, N8ICW, Of Ohio!

#### 32 InfoCentral—News, Trends, And Short Takes

#### 41 Washington Beat—Capitol Hill And FCC Actions Affecting Communications

#### 44 Power Up—Radios & High-Tech Gear

#### 53 The Pop'Comm Trivia Corner—Radio Fun, And Going Back In Time

### On The Cover

As the war of words heats up between Iran and the U.S., our forces, like the crew of this KC-135 Stratotanker from the 91st Air Refueling Squadron at MacDill AFB, Florida, remain on high alert in the Middle East. This month, writer Steve Douglass provides a special report titled, "Monitoring On The Edge Of A Nuclear Confrontation" beginning on page 19. Also, be sure to check out Tom Swisher's new bimonthly "Military Radio Monitoring" column beginning on page 16. (Photo by Larry Mulvehill)

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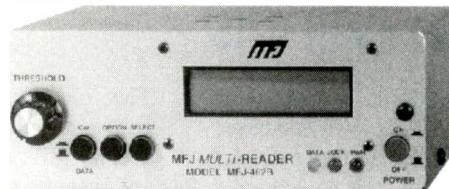
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## Meeting Of The Minds

**I**t had to happen. Frankly, I expected it a couple of years ago, but as I've learned, life's speed bumps aren't always where or when you expect them. So when I got the call from a rather irate Andrew Card, White House Chief of Staff, "We've—ahem, the President, actually—read a couple of your recent articles about what you allege as government inaction in a few areas, and, well, *he'd* like to chat with you. And by the way, can you bring Bill Price along?"

It's difficult to describe the feeling; at first your body goes into a state of shock—not so much at having to bring along Bill, but getting summoned to see the POTUS. It's not quite the same shock you get when touching a hot radio chassis while standing in the bathtub, but you still get that, "Holy crap, Marie" feeling, regardless.

But then a moment later—because the radio brain is unlike that of "regular" folks—I'm thinking how it'll really be good to vent a little, probably *very* little because after all, I'm the invitee, not the inviter. So I got all my stuff together: a few back issues of *Pop'Comm* (not that they didn't already have them), a notepad, pen, and even a handheld scanner just to show that it's really a harmless armchair hobby. Better to leave the Cat Stevens CD at home, along with my special weekend hiking boots with steel toe, the brown ones with the slide-away special agent heel where I keep extra twine and AA batteries. I wouldn't want security to make me walk into POTUS's office barefoot. (I wondered if they have any special, nifty disposable flip-flops for such occasions, just to be safe).

Bill was already at Washington's Union Station before my train pulled in at about 11:30 a.m. True to form, there he stood, holding a Dunkin' Donuts bag (as we had discussed the day before). I couldn't help wondering if the bag was empty yet.

On the way to 1600 Pennsylvania Avenue we didn't talk much about meeting POTUS or Mr. Card. The talk was of missing donuts and cold coffee, but I'll get over it one day, I suppose.

Bill did ask me what I thought about POTUS's reading those *Pop'Comms*, since he has publicly made it clear that he doesn't read the newspaper. We joked about it for a while and he laughed, "Gezzz, man, do you think that maybe it's just a joke-on-us thing; maybe he's a Rhodes Scholar and reads more newspapers and news magazines in a day than Oprah Winfrey reads books. Who knows? I suppose we'll never really know the truth."

Speaking of truth, I suggested that Bill toss his crumpled federal frequency lists and Blue Angels codenames into the trash-can before we got near the White House. He did so without hesitation, but still had that sick cat-ate-the-mouse grin as we rounded the corner on Pennsylvania Avenue.

The closer we got to the House, the more we talked. He couldn't help reminding me how I've ranted on Billy Tauzin and others through the years, "Maybe Billy and Kathleen Abernathy will be there and they'll roast you," he said with a chuckle. "What about that time you said something about how some think it's actually unpatriotic to question our leaders' actions on important issues," he chided.

"Thanks, Bill—I'm trying to gather my thoughts and all you can do is rub it in."

"Hey, old man, all I'm doing is repeating what you've said. I'll bet he's honked off."

"Really, Bill, no. I thought he was inviting us for afternoon tea and biscuits with Tony Blair."

We showed the latest issue of *Pop'Comm* and the Marine guard let us in. "Sit here and someone will be right with you," he stated in that matter-of-fact Marine voice.

This guy looked like the Marine's Marine, probably all of six feet, eight inches or more, but we were sitting down now, anyway. I leaned over to Bill and whispered, "Damn, that's the type of person that should head FEMA or Homeland Security, at least people would listen to him." Bill just nodded as he took in the grandeur of it all; sitting in the hallowed halls of the White House waiting for POTUS.

I knew I was—*thought* I was—ready for almost anything; after all we're at War and, well, he might even get a call from Dick Cheney or REACT's president while we were in his presence. It was a fleeting thought as Bill mumbled, "Didn't that guard fellow look a lot like that former FEMA guy, Michael Brown?"

Suddenly there was a commotion the likes of which I've never experienced—not in the Army or anywhere else, even at the Dayton Hamvention! Two men in dark blue suits wearing those thick-rimmed military glasses approached us with a hand gesture that said "get up now, let's go."

An imaginary butt spring seemed to catapult both of us (not an easy task, mind you!) up and forward at the same time as we walked nearly in step with each other toward a large open door that said, "Private."

"Oh yeah," Bill muttered under his breath.

There stood Andy Card, the White House Chief of Staff as the door swung open to reveal an expansive bright room. I didn't look up to check the lighting, but knew that it was a good thing we shaved! The look on Bill's face was as if we had been abducted, put in a sort of stasis, then plopped down in the White House (which really wasn't the White House) and were 32 light years from our rock.

Man, was it really quiet, except for the fellow in the big high-back chair: Mr. President himself. He was just hanging up the phone. You know, you always think you know what you'll do when Card says, "Mr. President, meet Harold and Bill, your 3:30 p.m."

"Thank ya, Andy," he responded.

"Which one of you is that Ort guy?" he sternly asked, standing up near our chairs.

I figured we were off to a bad start. Oh boy!

"That's me, Mr. President," as I raised my arm halfway into the air.

"That means," as he laughed and bobbed his head, "you're Price, huh?"

"Indeed, Mr. President," Bill shot back much too quickly and with too much levity in his voice, I thought.

"Well, you know fellas, I've been doing some of that media reading lately—and please don't write this down—and figure that now is a good time to do more things like that, even listening to the shortwaves. I like *Pop'Corn*—as a matter of fact I'm subscribing to it—in a different name, of course. I wouldn't want anybody stealing my identity."

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"Anyway," he continued, "wait, I mean Pop'Comm—that's what you call it, right?

"You probably wonder why you're here talking with me. I know I'm doing most of the talking right now, but jeepers, you guys have been doing all the writing, your President surely can do some talking with you, don't you think?"

"Sure can, Mr. President," Bill injected.

I couldn't help thinking that once Bill said something, there was more to come.

"Mr. President," he asked, raising his voice, "You've got to understand—well, I don't mean 'got to'—but I mean you really should know that Harold here just loves this country so much and wants things to work right, and the cops and agencies to communicate with those expensive radios so people..."

The President held up his hand, "Enough, Bill, I get your point. Basically you guys are really 'for us' and not bad guys, right? I can read between the lines."

"That's right, sir—good guys just pointing out some of the things our country could do better," I added.

"I know, and you're right—and please don't write this down, either—but there are those times when, well, I go to sleep thinking we shouldn't be so darned cantankerous with folks. I'm working on that.

"But getting back to why you're here. You might think your President has lost his shoelaces this time, but I assure you, everything is fine upstairs. I read that 'Tuning In' back in December, and you know what, you're absolutely right. Now Andy and Scott, my press man, can't hear me say this, so you won't read about it in the paper tomorrow morning, but you can take this to the bank: I've photocopied your little government guide for disasters and given it to everyone around here. What do you think about that?"

"Geez, Mr. President," I said, "we really didn't expect you'd..."

"Never you mind, it's good stuff, but I did change some of the wording, you know, to make it more professional-sounding and, well, like it came from me," he said proudly.

"I just don't want you to think our FEMA is a bunch of dittoheads. I'll tell you what I especially liked in that write-up you did. I've got it right here. You said something like, 'The radios don't need to be very complicated; they just need to work. An easy way to be sure it works is to try it out before a disaster strikes. We can ask our firefighters and police officers to do this. That is their job.' I tell you, I couldn't have said it better myself."

"Now," the President said as he cleared his voice and stood up again, "I think you should seriously consider having ol' Billy here put some good old-fashioned government humor in that 'Loose Connection' thing he writes. Just a suggestion, but think about it. Hey, maybe Brownie needs some freelance work; I'll give him a buzz."

As quickly as it began, it was finished. We weren't read the riot act, but then again we didn't get invited for cocktails and dinner, either. Just as well. It had been a long, grueling day, and besides, Bill still had the donut bag.

As we walked out of the office, past the big doors, the sun shone brightly and the birds chirped as if somehow aware of how that first day of April would be forever etched in our minds. And there was Bill, scooting out the door a couple of steps ahead of me, munching on a chocolate donut and wearing his new, "I met the President" baseball cap, complete with a brand new Secret Service clip-on rubber duck antenna.

"Hey, know what's weird, Hal? That big Marine guy didn't ask me to remove this battery belt and HT, or even ask what it was. You think he even saw it?"

"I don't know, Bill, but it is April 1. Give me a donut." ■

## OUR READERS SPEAK OUT

Each month, we select representative reader letters for "Our Readers Speak Out" column. We reserve the right to condense lengthy letters for space reasons and to edit to conform to style. All letters submitted must be signed and show a return mailing address or valid e-mail address. Upon request, we will withhold a sender's name if the letter is used in "Our Readers Speak Out." Address letters to: 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](mailto:popularcom@aol.com).

### I'm From The Government...

#### Dear Editor:

In the words of the late Bob Collins, No. 1 DJ on WGN radio, "I'm from the government, and I'm here to help you!" Didn't seem to matter which branch of the government was involved...always ended up screwed up further. You and Bob have it right. Keep up the good work!

Bill Simpson, N9NMT  
Via e-mail

P.S. Here in Wisconsin, we are very close to passing concealed carry...maybe they'll even let us carry radios, too.

### Money Talks?

#### Dear Editor:

Congratulations on another great article that's insightful and extremely on-target regarding the sweet smell of currency under the noses of our federal greedmongers ("Tuning In," December 2005).

Here's my take. The Feds dropped the communications ball on 9/11. They repeated their stupidity and unpreparedness in the realm of communications during the destructive hurricanes that hit our country. They failed. Period. So they had to rely on U.S. citizens' personal communications to get the job done because their inadequate junk wouldn't work. If they give any credit to hams or CBers for stepping up to the plate and accomplishing that which they have proven can be done which they cannot begin to do, they are admitting their own failure. They lose federal face. So that's why they're pushing hams and CBers aside in favor of this lovely thing called BPL.

Just wait until that garbage QRMs HF air traffic control. It will. It will prove once again that the feds are clueless losers. Government of, by, and for the people? Maybe government offending, bought, and fooled all the people. Screw 'em.

Sparky  
Via e-mail

Note: The following two letters were originally sent to writer Peter Bertini regarding his monthly "Wireless Connection" column.

### Dino's A Happy Restorer

#### Dear Peter:

I really enjoyed your latest two-part series describing the Heathkit Signal Tracers and their uses. It was very coincidental as I had just purchased a nice IT-12 on e-Bay and while I was waiting for it to arrive the *Pop'Comm* issue with your first installment showed up in the mailbox—very timely! Although the manual describes its operation, your notes really filled in the blanks.

Well done and thanks again.

Dino Papas, KL0S/4  
Via e-mail

### Heath's T-4 Signal Tracer And Mic

#### Dear Peter:

Thank you for the terrific and timely article on updating the old Heath T-4 Signal Tracer appearing in the [January] issue of *Pop'Comm*! I happen to be restoring one now and needed a schematic, which you thoughtfully provided. As a recently retired electronics tech (45-plus years) and public school teacher (32-plus years), I just can't get the odor of rosin core solder out of the system! At least that's offered as part of the rationale. So, it's back to the bench doing antique electronics restoration—for fun this time around.

Your article photos, layout, sequencing, etc. were superb. Thanks again and I'm looking forward to the next part!

Mike Adams, N3JW  
Via e-mail

## POPULAR COMMUNICATIONS

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(E-mail: [Popularcom@aol.com](mailto:Popularcom@aol.com))

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Edith Lennon, N2ZRW, Managing Editor

Richard S. Moseson, W2VU, Editorial Director

(E-mail: [w2vu@popular-communications.com](mailto:w2vu@popular-communications.com))

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25 Newbridge Road  
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**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.

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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](http://www.usascan.com) or call 1-800-USA-SCAN.

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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., 894.0125-956.0000 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](http://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.

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# Red Robinson: Canada's Rock And Roll Radio Pioneer

***Presley Flipped Him Out...And The Rest Is History!***

By Doug Bright



A youthful Red at the controls at Top Forty CKWX/Vancouver in 1957. (Photo courtesy Red Robinson)

The name Red Robinson is not well known here in the States, but across the border in his hometown of Vancouver, British Columbia, he's justifiably revered as Canada's scandal-free answer to famed DJ Alan Freed, having pioneered rock and roll music on radio in his homeland during the 1950s. During the course of his career in broadcasting, Robinson has met, promoted, and interviewed a great many legendary artists, and to celebrate the 50th anniversary of both his career and the music itself, he's released a generous sampling of his historic interviews on an exciting CD. The collection is dedicated to the Memphis-based Sun record label that launched Elvis Presley and, in Robinson's view, rock and roll in general. He cleverly entitles it "Sunrise: The Dawn of Rock and Roll."

Born in Vancouver on March 30, 1937, Robert G. "Red" Robinson was captivated by African-American rhythm-and-blues music during his student years at King Edward High School. "In those days," Robinson explains, "the only way you

Doug Bright is critic, editor, and publisher of Heritage Music Review, a monthly guide to early rock, blues, country, folk, and traditional jazz in the Seattle area and beyond. For more information, visit [www.heritagemusicreview.com](http://www.heritagemusicreview.com).

could hear that would be on a jukebox or on a black radio station. There was a little juke joint not far from the high school, called the Oakway on Broadway and Oak. The guy in there loved rhythm and blues, and he had this jukebox loaded up with interesting stuff. We used to plug it in and listen to Wynonie Harris, Lloyd Price, and Ruth Brown. The thing was that when you went to dances and hops in those days, they were playing the big bands from the War era, so I thought, 'If I ever get a chance to do my own radio show, I'm going to play this music.' That was my burning desire at 16."

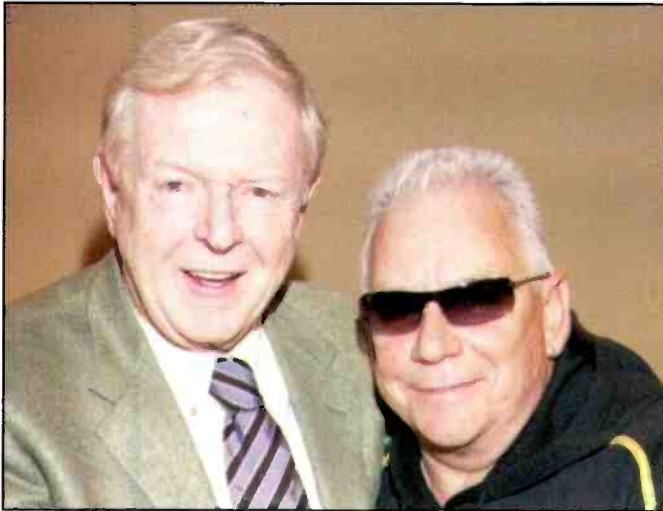
Fully aware of the degree of sophistication that radio work required, Robinson studied literature and speech, and during his off-school hours he took every opportunity to familiarize himself with show business and its key personalities. His hard work paid off in 1954 when Al Jordan, host of a show called "Theme for Teens" on Vancouver's CJOR, put him on the air for a guest spot.

"It was a half-hour long," Robinson says of the program. "I was a character, and I did voice impersonations. The guy left, and the program director said, 'Look, kid, you're the age of this audience. Why don't you go on and try it?' I actually did a half-hour live audition on the air, and he said, 'The show is yours.' I knew what my contemporaries wanted to hear, so that gave me the edge."

## Going Beyond The Safe And Simple Format

Once in possession of the program, Red Robinson developed it far beyond the safe and simple format his predecessor envisioned. "They had a playhouse, a theater that was used for radio shows," he explains, "so I invited the kids down every afternoon. They would get up in the aisles and start dancin' to things like 'Marie' with the Four Tunes. Then, of course, the Chords and the Crew Cuts. I did my first remote, and kids lined up for two and a half city blocks to get in to see this radio show. In those days I was the little platter prince of the pimply set. Rock and roll was all new!"

It was in late 1954 that Red Robinson discovered Elvis Presley, and it was the most revelatory experience of his musical life. Driving south of San Francisco at night when weather conditions produced unusually good radio reception, he heard a DJ many miles away spinning a record called, "That's All Right, Mama." The song, originated by bluesman Arthur "Big



Here's Red with the Animals' Eric Burdon, 2006. (Photo courtesy Kevin Statham)

Boy" Crudup, had just been recorded that summer by Presley. Robinson was hard pressed to tell whether the singer was black or white, but he knew that Presley's sound was the most revolutionary hybrid of blues and country music he had ever heard.

"It flipped me out!" Robinson confesses. "There was never anything so exciting, to hear somebody do that!"

With regard to rock and roll, Red Robinson was years ahead of his Canadian radio peers. Toronto, the nation's biggest English-speaking city, didn't get a rock station until 1957. With such a huge discrepancy between the American and Canadian record industries, Robinson couldn't get the records he wanted through normal distribution channels, but his can-do creativity proved equal to the challenge. "By the time "Green Door" by Jim Lowe would come out on a Canadian label," he explains, "it'd take two, two-and-a-half weeks from the time it was released before it got here. I would shortcut it all and drive down to get my advance copies out of Seattle. Vancouver was the first place in Canada to have rock and roll on a regular basis on the radio."

### 50,000 Watts!

Robinson's success at CJOR did not go unnoticed at competitor station CKWX, which had contented itself with a mainstream pop format before hiring him to transform it into Vancouver's first Top Forty rocker. "Money always motivates anybody," Robinson says of his move, "but they were going to go to 50,000 watts, which would make them the most powerful station north of San Francisco and west of Winnipeg. It was middle-of-the-road and news. Because of my success, it changed, and then, of course, I became the guy in charge of it all."

With 50,000 watts on the AM dial and shortwave outlet CKFX at his command, Red Robinson and his rock and roll format reached an audience whose size and scope must have exceeded his wildest teenage dreams. "When they fired it up," he recalls, "I was gettin' mail from Wake Island in the Pacific, from Helena, Montana, from everywhere!"

It was at CKWX that Robinson met one of the Who's Who of legendary rockers, a list that includes Buddy Holly, Jerry Lee Lewis, the Everly Brothers, and Eddie Cochran. As



The year is 1958 and Red is with Buddy Holly at his Vancouver appearance. (Photo courtesy Red Robinson)

Robinson sees it, the high point of his radio career occurred on August 31, 1957, when Elvis Presley came to town on his first Pacific Northwest concert tour. It was Robinson who served as MC for the show at Vancouver's Empire Stadium, and when it was over, he taped the interview that appears on the CD. "I hauled a 601 Ampex tape recorder, with the top-grade RCA mic, to the Elvis interview," he remembers. "They weighed 65 pounds. When you're young, you don't care. I was a fan then, and I'm a fan now."

In the course of his two years at CKWX, Red Robinson garnered an estimated 54 percent of total audience share in the Vancouver radio market. "I did a split shift in the afternoon, and then I did night from 10 till one in the morning," he recalls. "Who cared? I loved it!"

### On The Road To Oregon

In late 1958 Robinson received an invitation from an American firm, Pioneer Broadcasting, to repeat the miracle he had performed on CKWX at KGW, the company's affiliate station in Portland, Oregon. When asked what motivated him to leave his rock and roll kingdom in Vancouver and take the job, Robinson sums up the answer in one word: television. "In those days in Canada, you only had the CBC," he explains. "Unless you were an announcer with the CBC, there was no way you could get television experience. That's what I opted for, and I'm glad I did it."

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

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- Weight: 1 lb. 1oz.



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#### Features

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- Memory page customization
- Manual and auto scan, direct keypad frequency entry
- Earphones
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- Dimensions: 5"W x 3"H x 1-1/4"D
- Weight: 7 oz.



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Red with Roy Orbison at Vancouver's EXPO86. (Photo courtesy Red Robinson)



Red with Elvis at his Vancouver show, 1957. (Photo courtesy Red Robinson)

Once installed at KGW, Robinson developed a TV show called "Portland Bandstand" which, like "Seattle Bandstand" on Pioneer's KING, was modeled after Dick Clark's now-legendary national series, complete with a youthful studio audience and live appearances by the most popular rockers of the day. It was a time when an exciting array of Northwest talent was emerging, and Robinson gave valuable exposure to such notable Western Washingtonians as the Frantics, the Ventures, the Fleetwoods, and Ron Holden.

Mixed with the unique opportunity of his American employment situation was an equally significant challenge, and Red Robinson accepted it without hesitation. "They warned me when I got my green card that I would have to do what all the American boys do," he explains, "and if I'm called to serve, I have to serve. A hell of a lot of guys ran back to the border, but that wasn't my sense of things. I believe that you give and take in life, and that's my ethics, so I served in the Oregon National Guard. I went to Fort Ord for six months of active duty and came home in late '61."

### Back Home In Vancouver

When his military service ended, Robinson returned home to Vancouver. "It was a personal thing," he explains. "My mother was a widow, and she was taking care of my grandparents and working at the same time. One had a stroke and the other had Alzheimer's. I just couldn't leave her in that mess, so I came home."

Remembering well what Robinson had accomplished a few years earlier at CKWX, the management of another Vancouver station, CFUN, wasted no time recruiting him when he returned home to Canada. "They had already gone to Top Forty while I had been in the Army," he explains. "A guy named Dave McCormick had turned them into a Top Forty station, but then he got an offer to San Bernardino. They called and said, 'We need a new PD. Will you do it?' I said, 'I'd love to.' I was 24 at the time and the youngest program director in Canada. I was there, on the air and as a program director, for eight years."

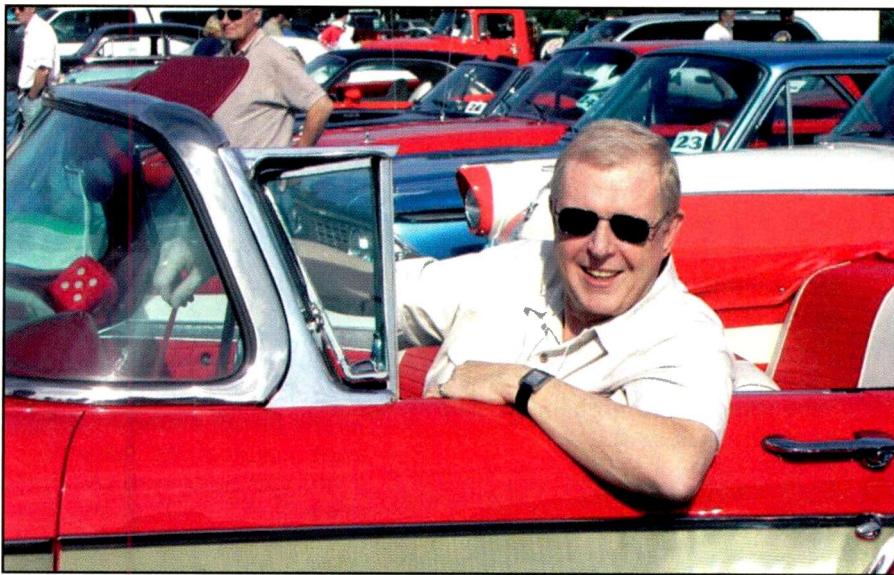
It was during Robinson's tenure at CFUN that he served as master of ceremonies for the Beatles' first Vancouver appearance in 1964 at Empire Stadium, where he had introduced Elvis Presley seven years earlier. He had been spinning their records for two years on his show and certainly recognized their place in history, but he admits that he wasn't nearly as awed by the Fab Four as by Elvis.

"I thought they were great guys," he confides, "but you have to understand something: On the same stage seven years before, I'd introduced Elvis Presley to 26 thousand people! I saw these guys and I thought, 'Oh, this is the SECOND run of rock and roll.' They brought rock and roll music back to the shores of North America. I loved them for it, but I wasn't awestruck like I was with Elvis, because Presley had a charisma that would just knock your socks off walkin' in a room!"

### The Strange Late Sixties

The late Sixties was a difficult time for Red Robinson. The more dominant the psychedelic movement became in rock music, the more alienated Robinson felt.

"There were some wonderful highlights in the midst of all that," he admits. "I loved CCR! Some of the poetry moved me a lot, but I despised most of what was going on culturally. Most



*Red relaxing in his favorite car: a 1957 Ford Fairlane. (Photo courtesy Red Robinson)*

of the losers I knew in life were walkin' around the streets smokin' weed, drivin' their old Westphalia camper with daisies on it, and it just wasn't me. Maybe I was too rigid or whatever, but I'd worked so hard for everything, and these people seemed to think there was a big free ride comin'. That wasn't my philosophy in life, and it still isn't."

In 1967 CFUN was sold to new owners who were no more willing than Robinson to take the station down the psychedelic road, but to Canada's pioneer rock jockey, the easy-listening format they chose instead was an unbearable bore.

"I found myself for three months playing 'The Sound of Music,'" he recalls disgustedly. "You do it because it's called living and feeding yourself. A lot of jocks did."

After returning to CJOR in 1969 and running it on a talk-radio format for five years, Robinson found a more compatible place for himself in the country-music sector back at CKWX. "I was in country for 12 and a half years," he says happily, "and I had free rein, which was beautiful! Today, the best of it's still rockabilly: I don't care what anybody calls it."

## Rock Matures, And The Crown Jewel For Robinson

By the mid-'80s, the rock industry had matured sufficiently to appreciate Red Robinson's role in its development. Consequently, he was able to syndicate an oldies show called "Reunion" to 300

Canadian stations. The show, which ran three years, spawned a series of similar programs on both radio and TV that has continued into the present. With 50 years of broadcast experience to his credit, Robinson has been awarded just about every honor a Canadian DJ can receive and more, having been elected to the Rockabilly Hall of Fame, the British Columbia Entertainment Hall of Fame, and the Canadian Association of Broadcasters Hall of Fame.

Among his many awards, the crown jewel for Robinson is his election to the Rock and Roll Hall of Fame. "In 1997 the Rock and Roll Hall of Fame and *R&R Magazine* sponsored all the pioneer rock jocks," he recalls, "and I was so honored to be in that company! None of us were inducted: we were elected by a series of program directors and the people at *Rolling Stone*. Only the artists are inducted, with the exception of three people in the disc jockey category—Alan Freed, Dick Clark, and Wolf Man Jack, because they were national figures. The rest of us were territorial. All of us who were in that first phase of rock and roll, before the Top Forty format, had the most incredible three-day reunion! We were all comparing notes about the problems we had. I've got it all on video."

## A Career Remembered

The impetus for Robinson's CD project came when he heard a fellow disc jockey proclaim the year 2004 as the 50th anniversary of rock and roll. "On July 5,

1954," the DJ explained to his listeners, "Elvis recorded 'That's All Right Mama' on the Sun label."

The observation prompted Robinson to remember that this was also the 50th anniversary of his own broadcasting career, making the year doubly worthy of commemoration. "Then it hit me," he writes on his website. "I have interviews with many of Sun Records' greatest stars, so why not put them all on a CD and call it 'Sunrise: The Dawn of Rock and Roll'?"

Robinson's primary marketing outlet for the "Sunrise" disc is his website, [www.redrobinson.com](http://www.redrobinson.com). The site, created by an old friend and radio colleague, allows fans on both sides of the border and around the world to order the CD through PayPal, eliminating the complications of currency exchange.

"People have got to understand what motivates people like me," says Robinson, "and it isn't money. There's hardly any profit by the time you put a 12-page booklet in it and do all the artwork. I wanted to tell my story with these guys on a CD so other people can have a historic document. I want to share these historical documents with everybody!" ■

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- Weight: 1 lb. 2 oz.
- Power Source: Built-In Rechargeable Ni-MH Battery Pack; 3 AA Batteries (not included); Crank power alone; AC Adapter (not included); AC Adapter recharges built-in Ni-MH battery pack
- Available colors: Metallic Blue, Metallic Red, Sand, Yellow



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  2. 3 AA batteries (Not included)
  3. The AC adapter alone (AC adapter not included)
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- Dimensions: 5-1/2" W x 6" H x 2-1/2" D
- Weight: 1 lb. 3 oz.

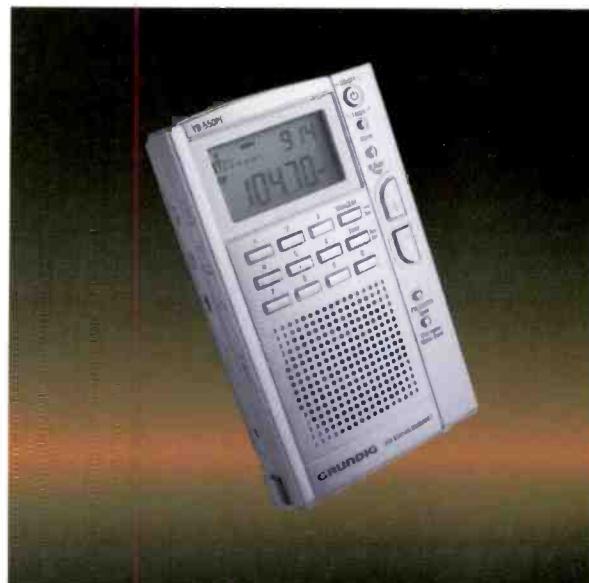


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- Weight: 10.5 oz.
- Power Source: 3 AA Batteries (included) or AC Adapter (not included)

# Monitoring Rickenbacker Air National Guard Base

*Editor's Note: A special, hearty welcome to writer Tom Swisher, WA8PYR, our new "Military Radio Monitoring" columnist. He takes over the bimonthly column from Allan Stern who will be doing a special feature for us from time to time. Tom has been a radio enthusiast for nearly 30 years and a ham for 25 of those years. As with our other writers, I encourage you to regularly send Tom your "Military Radio Monitoring" contributions in the form of comments, suggestions, loggings, and monitoring experiences. Welcome aboard, Tom!*

**A**nd welcome aboard "Military Radio Monitoring" everyone! I'm your new captain and I've got some pretty considerable shoes to fill! I was rather surprised when I received a call from Harold asking if I would be willing to step in for Allan Stern. A tip of the hat to Allan, by the way, for his fine columns up to this point. (He tells us that he'll providing special articles to *Pop'Comm* from time to time.)

By way of some background, I live in Central Ohio and have been involved in radio since the mid-1970s. I've also been a licensed ham radio operator since 1980, and currently hold an Amateur Extra class license. I've been writing for the All Ohio Scanner Club's *American Scannergam* for many years, and writing equipment reviews for *National Communications Magazine* since 1992. I've also published a few books, including *Fire Call!*, *The Trunked Radio Systems Guide*, and the *Railfan's Guide to Ohio*, as well as co-authoring the Scanner Master *Ohio Pocket Guide*.

Until mid-2004, most of my military monitoring was confined to listening to aerial refueling flights over Ohio and monitoring Global High Frequency Systems (GHFS), usually 11175 USB, although I kept tabs on MilComm changes in Ohio. Not being able to hear much of what was listed put something of a damper on my monitoring, so imagine my surprise when, after moving to a new home about five miles from Rickenbacker Air National Guard Base, I discovered that there was far more MilComm activity there than I had previously believed. I also discovered to my great delight that I was able to receive training flights in the Buckeye/Brush Creek MOA (Military Operating Area) training area quite nicely. After those discoveries, military monitoring became part of my daily monitoring routine.

And that brings us into the first part of this column—a brief primer on Rickenbacker Air National Guard Base, which in the grand scheme of radio monitoring, isn't that much different from an air base near you!

## Rickenbacker Air National Guard Base

Rickenbacker Air National Guard Base (RANGB) got its start at the beginning of the United States entry into World War II, when it was opened in early 1942 as the Army Air Corps Northeastern Training Center. Later renamed Lockbourne Army Air Field, the base figured in a variety of training missions, including glider and B-17 bomber pilot and crew training, as well as support functions.



A KC-135 of the 121st Air Refueling Wing based at Rickenbacker lands at Incirlik Air Base, Turkey, in support of operations in Iraq.  
(Photo courtesy U.S. Air Force via Air Force Link)

With the creation of the Air Force as a separate service in 1947, and after a post-war stint as an Ohio Air National Guard facility, the base was renamed Lockbourne Air Force Base, and continued as an important part of the Air Force for many years, home at various times to fighter wings as well as special operations, strategic reconnaissance and aerial refueling units. Command of the base was placed at various times under the Strategic Air Command, Tactical Air Command, and the Ohio Air National Guard.

Lockbourne was renamed Rickenbacker Air Force Base in 1974 in honor of local World War I ace, Medal of Honor recipient, and aviation pioneer Eddie Rickenbacker. The base was closed in 1980, and much of the property disposed of through sale or transfer to the Rickenbacker Port Authority. Known today as Rickenbacker International Airport, a significant portion of the old base is still owned or leased by the federal government and used as Rickenbacker Air National Guard Base of the Ohio Air National Guard (*déjà vu*, anyone?), and for other Guard/Reserve functions.

Resident units include the 121st Air Refueling Wing, which can often be heard conducting refueling operations in the refueling areas that crisscross northern Ohio, West Virginia, and Kentucky. Other units regularly using those refueling tracks include the 434th Air Refueling Wing (ARW) from Grissom AFB and the 171st ARW from Pittsburgh. Other units at RANGB include the 164th Weather Flight of the Ohio Air National Guard and most of the Army National Guard aviation units in the Columbus area, as well as various Navy and Marine Corps units.

Additional comms come from the recently completed construction of a new Navy and Marine Corps Reserve Center. This center consolidates the Rickenbacker Naval Air Reserve Center with the Navy/Marine Corp Reserve Center in Whitehall at Rickenbacker in a new \$10 million facility. The jury is still out on which frequencies they use (I'm still searching...).

## Host To Air Force One— The Movie And Real Thing

Rickenbacker was used for filming parts of the movie *Air Force One*, and even hosted the real Air Force One and Marine One during the 2004 Presidential campaign, after President Bush made a quick bus trip from Huntington, West Virginia, to Chillicothe, Ohio. After



An F-16 Fighting Falcon like those flown in the Buckeye/Brush Creek MOA. (Photo courtesy U.S. Air Force via Air Force Link)

speaking at the Ross County Fairgrounds, he was picked up by Marine One and flown to Rickenbacker, where Air Force One waited to take him on the next leg of his campaign trip.

While there is a great deal of military traffic at Rickenbacker, the majority of the activity is civilian/commercial in nature. Rickenbacker is served by a variety of air cargo and courier companies (including FedEx and UPS) as well as commercial airlines. A recent addition is charter passenger service, and a new terminal building has just been completed to enhance this aspect of the former Air Force Base.

Fire protection is still provided by the Federal Fire Service; security for the military portion of the base is provided by the Air Force and for the civilian portions of the base by the Columbus Regional Airport Authority Police Department (which uses the county's 800-MHz Public Safety trunked system).

I've included a list of Rickenbacker frequencies in **Table 1**.

## Ranges And Military Operating Areas

Ranges and Military Operating Areas (MOAs) are those areas of airspace restricted for training use by military units. They're found *all over* the United States, but primarily near military facilities.

The Buckeye/Brush Creek MOAs are good examples of these sectors. Located in southern/southwestern Ohio, they're used primarily by the 178th Fighter Wing of the Ohio Air National Guard out of Springfield, as well as the 180th Fighter Wing from Toledo and the Indiana Air National Guard's 122nd Fighter Wing out of Fort Wayne. Operations are controlled by the 123rd Air Control Squadron at Blue Ash Airport in Cincinnati.

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### Table 1. Military/Aviation Frequencies Used At Rickenbacker

(All are AM unless otherwise noted)

36.7000	Ohio Army Guard tactical (NFM "Fox Mike")
120.050	Rickenbacker Tower VHF
121.850	Rickenbacker Ground VHF
132.750	Rickenbacker AWOS VHF
228.800	Ohio Army Guard helicopters
238.800	121 ARW operations (RICK OPS)
240.900	Ohio Army Guard ops
252.100	121 ARW command post (CARDCALL)
273.500	Rickenbacker AWOS UHF
275.800	Rickenbacker Ground UHF
295.400	Rickenbacker ANGB Base Ops
311.000	ACC (Stratcom) command posts primary
311.300	121ARW operations ("Button 4")
321.000	ACC (Stratcom) command posts secondary
348.400	Rickenbacker Tower UHF
372.200	Rickenbacker ANGB pilot-to-dispatcher

#### Rickenbacker Base Operations Frequencies

413.4000 PL127.3	Fire/Crash primary
413.3250 PL97.4	Fire/Crash secondary/admin
413.2500 PL88.5	Fire/Crash patch to ground control
406.3625 PL100.0	Command post
411.7375 PL71.9	Base Security primary
407.5000 PL103.5	Base Security secondary
413.2250 PL77.0	121ARW aircraft maintenance

Frequencies used by units operating in the Brush Creek and Buckeye areas include 123.925, 225.700, 257.000, 259.400, 281.400, 301.600, 303.000, 314.600, 343.800, and various VHF-AM frequencies between 138 and 144 MHz.

While there are Ranges and MOAs all over the United States (too many to list here), some other major areas include the Bulldog, Gator, and Gamecock areas in South Carolina and Georgia; many areas off the Mid-Atlantic coast near Norfolk and Washington; the Okanogan, Roosevelt and Olympic areas in the Pacific Northwest; the Gila Bend, Goldwater, Oscura, and Red Rio ranges in the Southwest; and the Hunter, Roberts, Kane, Sundance, Turtle, and Quail MOAs in Southern California.

#### Monitoring Tip: It's Cheap—Perhaps Free!

A great way to find frequencies used by units operating in Ranges or MOAs is to trot off to your local airport. If there is a pilot shop there, you can get a sectional chart for your area for a few dollars (or even free if you catch them before they throw out the outdated sectionals). These charts show Ranges and MOAs outlined with a fringed red line. There is a wealth of information on sectional charts, showing frequencies and controlling agencies for a variety of aviation facilities.

#### Wanted: Your Input

That's it for this time. If you have any suggestions or requests for things you would like to see in this column, please send me an e-mail at milcom65@yahoo.com. Remember, this is your column—your photos, frequencies, and monitoring experiences are always welcome! See you again in June!

# Special Report: Monitoring On The Edge Of A Nuclear Confrontation

*Editor's Note: In this issue of "Utility Communications Digest," Steve Douglass breaks with tradition to cover a single topic. While "only" a single topic, it is a very complex one, and one that certainly deserves our attention here in Pop'Comm.*

Please bear with me this month as I depart a bit from antenna topics and the technical aspects of utility monitoring to focus on what I feel is the guts of why we monitor: to be at the forefront of the events that shape the human world. Whether we're monitoring the communications surrounding a natural disaster like Katrina or listening to human beings engaged in war, utility monitors are usually ahead of the curve in knowing the real stories behind the headlines.

It is the aim of this special report to place utility monitors directly inside the halls of power at a time of great crisis. Imagine what it would be like to be a fly on the wall inside a government situation room, intelligence gathering agency, strategic planning committee meeting or government think-tank, all concerned with a too real crisis, one that could very easily push the world to the brink of a limited nuclear war.

## The Clock Is Ticking

HF and MILCOM monitors should start now searching the bands and collecting frequency and station information concerning a looming crisis in the Middle East—one that could make the war in Iraq look trivial by comparison. I am *not* being an alarmist or exaggerating when I state that it is very possible that a nuclear crisis, with worldwide ramifications much like the Cuban missile crisis of the 1960s, could grip this globe very soon. Although largely under-reported by the media, sources inside the Washington beltway say the administration is quietly preparing for the worst-case scenario: a limited nuclear war in the Middle East.

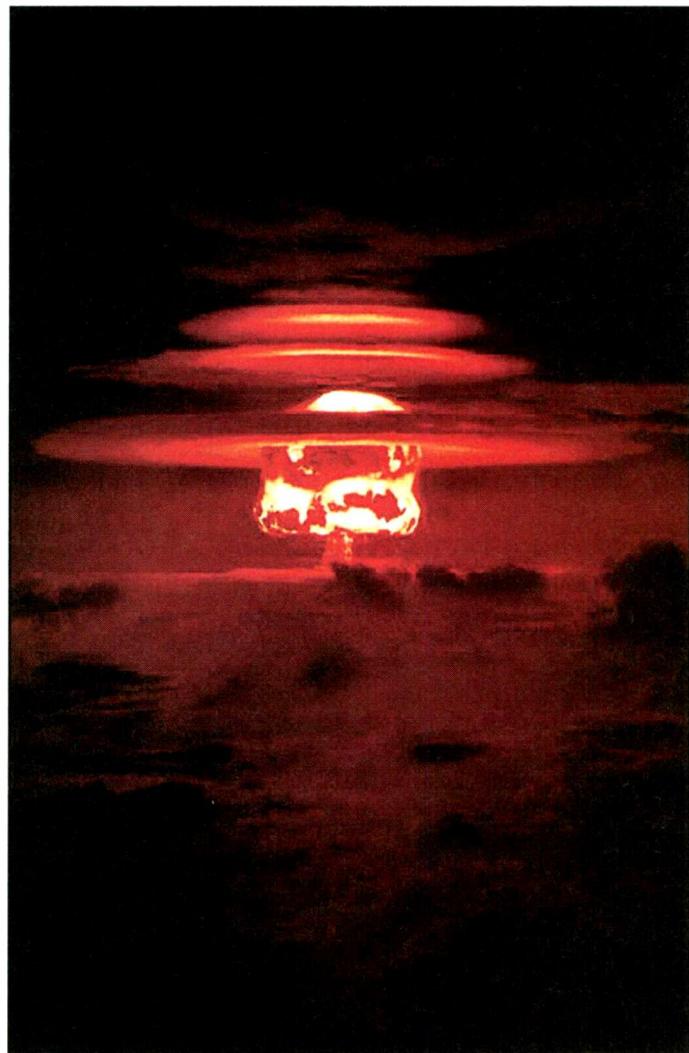
Let me outline the possible makings of this coming crisis.

As of this writing, Israel's Prime Minister, Ariel Sharon, is clinging to life after a massive stroke. Even if he survives, his days as the reigning leader of Israel are over.

Taking advantage of the political confusion in Israel, Iran's president, Mahmoud Ahmadinejad, has put the region on edge by publicly declaring that he is planning for the day when the world is "Zionist Free" and making alarming statements about wiping Israel off the face of the Earth.

This may seem like just another case of cliché Iranian sabre-rattling, but deep inside the halls of power the threats aren't being taken lightly, especially in light of the fact that Iran is proceeding with its uranium enrichment-program, which could yield enough fissionable material to build a nuclear bomb within 90 days.

If that isn't enough to lose sleep over, to counter the growing threat, the United States just sold Israel several hundred bunker-busting warheads that could be used in an Osirak-type



(Photo courtesy Department of Defense archives)

preemptive strike on Iran's nuclear facilities. Some of you may recall that in 1981 Israeli fighter bombers destroyed the Osirak nuclear facility near Baghdad when it looked like Saddam Hussein was planning to produce weapons grade material for building a nuclear bomb. (You can read more about the Osirak attack at [http://news.bbc.co.uk/onthisday/hi/dates/stories/june/7/newsid\\_3014000/3014623.stm](http://news.bbc.co.uk/onthisday/hi/dates/stories/june/7/newsid_3014000/3014623.stm).)

The key targets for such an attack on Iran would most likely be the nuclear facility at Brushehr (built with massive aid from Russia), the nuclear enrichment facilities in Natanz, and other nuclear facilities located throughout Iran.

Knowing full well that Israel has no qualms about bombing Iranian nuclear sites, Iran has made it known for the record that it would indeed strike back. To quote the deputy chief of the Iranian Revolutionary Guards, Brig. Gen. Mohammad Baqer

Zolqadr, "If Israel fires a missile into the Brushehr nuclear power plant, it has to say goodbye forever to its Dimona nuclear facility, where it produces and stockpiles nuclear weapons."

Although Israel has never confirmed nor denied that it has a nuclear arsenal, according to a report issued by the Federation of American Scientists ([www.fas.org/nuke/guide/israel/nuke/](http://www.fas.org/nuke/guide/israel/nuke/)) it is possible that Israel is sitting on a stockpile of at least 150, and quite possibly as many as 200, nuclear bombs, most probably stored in a vast underground complex under or near the Dimona nuclear facility.

## Brain Trust

In an attempt to understand how an Israeli/Iranian war might come to pass, I have interviewed at length some knowledgeable sources, including analysts working for government-funded think tanks and military-beat journalists at major publications. These people are close to the problem and (under the condition that I do not reveal their identities) have outlined the events that could lead to war.

In many midnight phone conversations and Internet chat sessions, my sources have put their heads together to produce for this column a detailed timeline of events as they see them possibly unfolding in the Middle East.

## The Trigger

The nuclear clock began ticking when Iran announced it was proceeding with its uranium enrichment program. Nuclear scientists predict that given the state of Iran's nuclear technology (aided by Russian experts) it is possible that Iran could produce enough fissionable material to build a small nuclear bomb as early as the end of March.

That doesn't necessarily mean that Iran will have the wherewithal to build a working nuclear device, but most likely, Israel would feel the need to strike Iranian nuclear facilities long before that occurs.

Since Israel is a nation surrounded by enemies and in a constant state of war, it will not risk destruction by waiting for United Nations sanctions or international pressure (in the form of formal protests, economic boycotts, or trade blockades) to convince the Iranians that attacking Israel is not in their best interests.

When Israeli intelligence operatives confirm that the Iranians are close to man-

ufacturing enough weapons-grade nuclear material to build a bomb, Israel *will* strike.

## Scenarios

The following are educated guesses made by strategic thinkers on how an Israeli pre-emptive strike on Iran—and the consequences—may very well play out.

Using special Mossad agents inside Iraq, known as the "Metsada," or possibly even a special covert action unit known as "Egoz," Israel would first positively ascertain which facilities to attack. From there, Israeli military planners would have to decide on how measured their attack should be. Should it be an all out war aimed at toppling the current Iranian government, or consist of surgical strikes aimed only at the nuclear facilities involved with producing radioactive material and nuclear bomb components? Once the Israeli government decides on its course of action, the tactical planning will begin.

## Aircraft And Munitions

Although Iran fears a missile attack on its nuclear facilities, the aforementioned delivery to Israel of several hundred bunker-buster bombs (quite possibly GLU-109s) made expressly for the purpose of cracking hardened concrete bunkers and structures like nuclear containment facilities means it is more likely the attack will come in the form of an airborne strike led by Israeli F-15 Eagles tasked with destroying the nuclear sites. Although Israeli F-16s can carry the GLU-109s, laden down with bombs the smaller single-engine aircraft is sluggish (meaning more vulnerable and less accurate), has less range, (even with additional fuel packs attached), and would be better suited to protecting the F-15s from interception by enemy fighters.

Complicating any attack is the fact that the GBU-109 is a dumb bomb and not very accurate. It isn't laser guided and relies on a pilot's skill in dropping unguided bombs on a target quite possibly while under heavy fire. Although the United States has in its inventory more precise laser-guided bunker busters (known as JDAMs for Joint Direct Attack Munitions), it is not known if any have been transferred to Israel.

There is another, *very frightening* option, one that ensures an underground target is totally destroyed, but also one that some military technologists predict

will cause the release of massive amounts of radiation. This controversial approach is to use small earth-penetrating tactical nuclear warheads capable of utterly destroying hardened underground facilities and at the same time limiting collateral damage.

However some nuclear scientists say that containing the radiation is not at all possible and trying to destroy a target in this way would only result in an agonizing death for anyone (including civilians) caught down wind and make the area uninhabitable for decades, if not centuries.

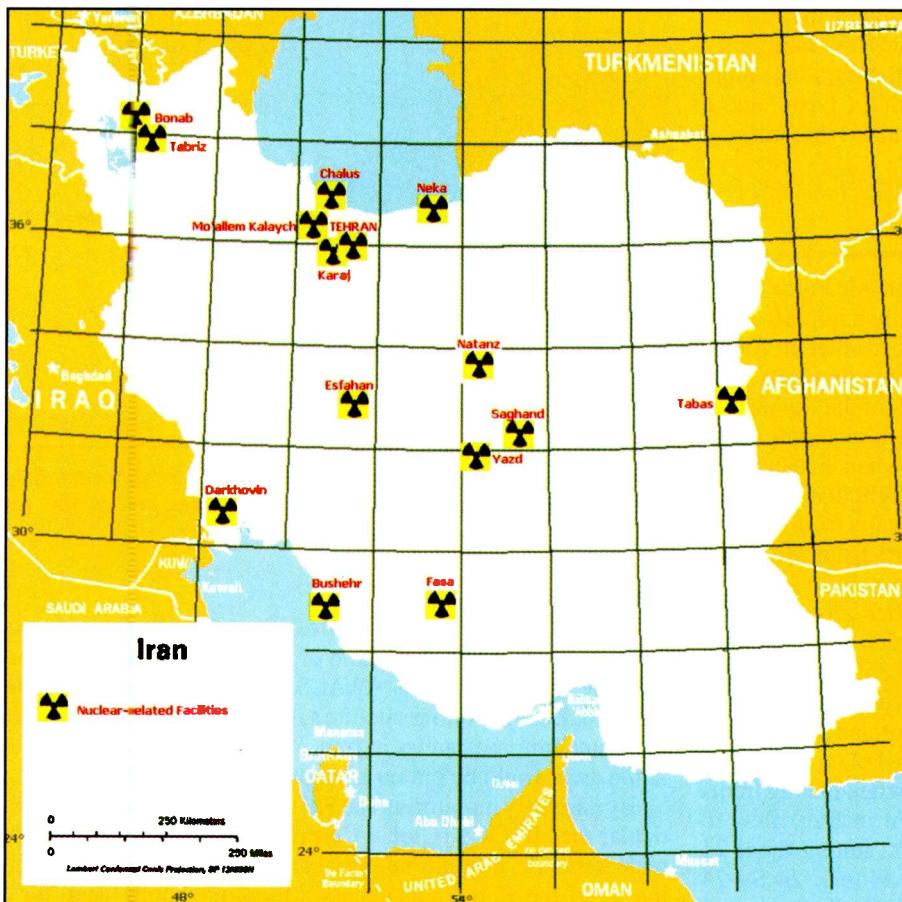
(You can read more about nuclear-tipped bunker busters and the controversy surrounding them at [www.globalsecurity.org/wmd/systems/rnep.htm](http://www.globalsecurity.org/wmd/systems/rnep.htm).) Military theorists agree that a nuclear tipped earth-penetrating warhead would be a weapon of last resort.

## Attack Tactics

The dangers involved in such a mission are many. Just getting to the target is problematical at best. It is possible to fly directly to Iran from Israel; the distance is not that great. But to get there as the crow flies Israeli bombers and fighters would have to violate the airspace of countries hostile to Israel. They could fly around these countries to avoid the political and military repercussions, but that would require considerable mid-air refueling support. Even then, the attackers would have to fly through Iranian air space avoiding Iranian radar networks, interceptor aircraft, surface-to-air missile batteries, and even fire from ground-based anti-aircraft artillery. Since Israel does not have any stealth aircraft, avoiding detection by enemy radar is also a problem. There are two tried and true methods to avoid discovery.

The first is to fly at low altitude under the radar, using hills and canyons to mask your strike team from probing radar beams. Israeli pilots are masters at this, training here in the U.S. right along side Americans in exercises such as Red Flag. The twisting, turning canyons and desert mountains in the Nellis ranges are much like the terrain in the Middle East and provide very intense and realistic practice almost as dangerous as the real thing.

Another way to avoid detection is to use subterfuge. This takes intensive pre-planning and exact timing. It also takes an intimate knowledge of international civil and military air traffic in the area. It might be possible to fool air traffic controllers and military controllers into



*Iranian nuclear sites. (Courtesy globalsecurity.org)*

thinking an Israeli strike package is just another of the many commercial flights in the region. The trick is to get close enough to a commercial aircraft so the radar signatures merge into one—difficult at best without the commercial pilot or other aircraft observing them. This would only work for a strike package made up of a small number of aircraft. Nighttime would be the best time to attempt this; however the risks at night are greater for mid-air collisions, possibly endangering innocent air-travelers.

One method (without putting civilians in danger) is for the Israeli attack package to use a faked civil aircraft transponder code of a regularly scheduled civilian flight. In this way the attack aircraft (again, if it was a small force tightly bunched) might not raise much suspicion on an air traffic controller's scope.

Consider this: Israel also has its own national airline, El Al, which could assist in covering such a strike package. El Al services many eastern countries that take their air carriers south of Iranian airspace. However, since El Al flight routes take a very long haul (going around Saudi

Arabia, Yemen, Oman, and north into the Indian Ocean) it would take considerable aerial refueling tanker support to keep the fighter/bomber aircraft in the air.

Another idea could be to disguise tankers as El AL flights with the attack force following very close behind. The force could also take advantage of spotty radar air traffic control coverage over the open oceans. For that reason, it might be wise for utility monitors to keep a close ear to the ICAO (International Civil Aviation Organization) HF Enroute Network frequencies in the region. (You can find current frequency lists on the Internet by doing a search or by directing your web browser to [www.scanaustralia.bigpond-hosting.com/planes/icoa.html](http://www.scanaustralia.bigpond-hosting.com/planes/icoa.html).)

Another way, which has much less subtlety but much more chance at succeeding, is to just go all out. Send in so many aircraft on the mission that it overwhelms Iran's air defense systems. Even though the odds are great that many aircraft would be shot down, chances are at least some aircraft would make it to the target.

Currently Israel has several hundred military aircraft in its inventory, made up

of a mixture of American and European types. Chief attack aircraft are the F-15A/B (33 available), F-15C/D (17), F-15I (25), F-16A/Bs (94), F-16C/Ds (75), and over a hundred F-16Is. (To view a list of the current Israeli Air Force inventory, direct your Internet browser to [www.aeroflight.co.uk/waf/israel/iaf\\_current\\_inventory.htm](http://www.aeroflight.co.uk/waf/israel/iaf_current_inventory.htm).) Israel also has numerous ground-attack and support aircraft, such as refueling tankers and transports aircraft, helicopters, and recon drones.

## Joint Stealth Mission?

Another almost sure-fire tactic would be to use stealth attack aircraft armed with precision laser- or GPS-guided bombs. A stealth attack aircraft, such as an F-22 or F-117, could easily slip through Iran's radar defenses and surgically take out any hardened or buried nuclear target with a few well-placed JDAMs, which can be launched from approximately 15 miles from the target with each warhead independently targeted to a different site. But, as I stated earlier, as far as anyone in the Pentagon knows (or is acknowledging) Israel does not currently have in its inventory any stealth aircraft like the F-117 or F-22.

But the United States Air Force does. Since it would also be in U.S. interests to remove any chance that the current extremist regime in Iran might acquire atomic bombs (which would totally upset the power balance of power in the Persian Gulf and be detrimental to the stability in the region) there is a possibility that the two countries would consider teaming up for a covert joint mission to ensure Iran's nuclear capabilities are destroyed. Quite possibly (in some Pentagon planning office or in a government funded think-tank) a mission is being planned, one that would be composed of a large Israeli strike force with a few embedded American stealth fighters tagging along and quite invisible. It would be the job of the Israeli force to attack soft targets in Iran and the task of the stealth fighters to take out the most important and hardened targets that have to be destroyed.

Before this joint American/Israeli attack force would leave the ground, however, there would have to be an agreement that America's part in the raid would remain unacknowledged. Even though it might become very obvious that U.S. forces must have helped the Israelis, it would have to be agreed that it never officially happened. In this way the United

States could avoid the inevitable political fallout that a joint attack on Iran would produce. The United States is working very hard to convince the Arab world that there is no huge American/Zionist conspiracy to rid the world of Islam, and a joint U.S./Israeli attack on Iran would not make this mission any easier.

## The Iranian Air Force

Although military analysts say the Iranian Air Force is not even close to being on a par with the Israelis, their aircraft could still prove a threat, not to mention that there are other air forces in the region that would be more than happy to join Iran in its dream of ridding the world of Israel. The bulk of the Iranian Air Force is also made of some American aircraft, including some aging F-14As bought from the United States when the Shah was in power in the late 1970s. However it is thought that they have been barely kept in service by cannibalizing parts from other F-14s or patched together with jury-rigged parts from MiGs and other Russian aircraft types.

According to global security.org, "Other aircraft types include Russian and Chinese built MiGs which were acquired at the onset of Desert Storm, when more than 350 advanced aircraft were bought by Iran or made operational including Russian MiG-27s, -29s, -31s, TU-22M3 Backfires, Russian Su24s, -25s, -27s, IL-76 transports, and French Mirage F-1s."

Iran acquired even more military aircraft when fleeing Iraqis pilots (thinking they would find safe haven in Iran) flew to Tehran. They acquired 115 combat aircraft, among them 24 Mirage F1s, four Su-20 Fitters, 40 Su-22 Fitters, 24 Su-24 Fencers, seven Su-25 Frogfoots, nine MiG-23 Floggers, and four MiG-29 Fulcrums. The pilots were returned to Iraq, but Iran kept the aircraft. It is not known how many of the seized aircraft are operational.

The Iraqi Su-25s, MiG-23s, and Mirage F1s are thought by some not pose a threat due to age, low capability (MiG-23s) or too few numbers (Su-25s). Other reports suggest that Iran had overhauled Iraq's fleet of 24 Mirage F-1B fighters and placed them into service.

As for radar systems, Iran imported surveillance radars from the China National Electronics Import-Export Corporation. The radar can detect targets up to 300 km away and is now part of Iran's air defense system. But even with China's help, Iran's air defenses remain porous, perhaps on a par with Iraqi capabilities, as demonstrated in the 1991 Gulf war.

Iran also lacks low-altitude radar coverage, overlapping radar network, command and control integration, sensors, and resistance to jamming and electronic countermeasures needed for an effective air defense net. Russia and Iran enjoy a close military sales relationship, and Iran has taken steps with Russian help to modernize its air defense systems, but these systems are not thought to be operational yet.

## Attack Timeline

Most likely an attack on Iran would take place at night, possibly on a weekend or holiday to reduce the chances that civilians would be injured. It is very likely that just prior to any attack, Israel would notify the United States government for several reasons, chief among them being to advise U.S. forces in the area (especially in the Persian Gulf) that the aircraft they are seeing on their scopes are not a hostile force bent on attacking American Navy ships.



*The F-16I looks radically different from other F-16s, with conformal fuel tanks, dorsal spine, and numerous fairings and bulges for undisclosed equipment.*

Since U.S. forces are in control of much of the air space in the region, including the whole of Iraq, there is no doubt that airborne systems, such as AWACS, E2C Hawkeyes, and Joint Stars (including orbiting satellite systems) would be quite aware that something was amiss in Iran. Without a doubt, U.S. forces in the area would be put on a heightened state of alert.

By carefully monitoring the HF military frequencies, in particular the HF-GCS (Global Communications System) worldwide network, it might be possible to detect when this notching-up of the alert status occurs. Monitors should listen for a dramatic increase in coded radio traffic in the affected region and a change in EAM (Emergency Action Message) length and repetition. If you don't have a current list of HF-GCS frequencies, do a Google search or subscribe to one of the e-mail list-serve discussion groups, such as MILCOM or WUN (World Utility News) on the Internet. Key frequencies to monitor at all times should be the primary (USB mode) HF frequencies of 4.724 MHz, 6.712 MHz, 6.739 MHz, 8.992 MHz, 11.175 MHz, 13.200 MHz, and 15.016 MHz.

In the weeks and days before an attack, Israeli fighters and bombers would launch from their bases on many faux sorties, not only for training purposes, but also to confuse any Iranian spies watching the bases who would give Iranian forces a heads up that an attack is on the way. Like the legend of the little boy who cried wolf, too many false alarms will have the Iranian intelligence agency losing confidence in their own agents. Once over Iran with the attack underway, if the Israelis have successfully avoided detection, they'll drop their bombs on sites almost simultaneously.

It's thought that a ring of surface-to-air missile and anti-aircraft guns protects the Bushehr nuclear power plant. Again, according to globalsecurity.org:

There is no definitive source of information on Iranian air defense deployment. Key SAM-defended areas include Tehran and centers involved in nuclear, chemical, and biological weapons programs. Iran appears to have deployed the SA-5 batteries to defend Tehran, major ports, and oil facilities, providing long-range medium-to-high altitude coverage of vital coastal installations. The I-Hawk and SA-2 batteries are reportedly located around Tehran, Isfahan, Shiraz, Bandar Abbas, Kharg Island, Bushehr, Bandar Khomeini, Ahwaz, Dezful, Kermanshah, Hamadan, and Tabriz, providing point defense for key bases and facilities. Some of these sites lack sufficient missile launchers to be fully effective.

Up to this point, the strike package will have been operating radio and electronically silent. To foil the Iranian SAMs and radars, the attacking aircraft will have to go electronically active. Once SAMs have acquired them, active electronic jamming will take place, announcing to all that an attack is underway. The electronic noise generated by the attacking force would show up on any nearby radar as a blanket of interference that the attacking aircraft could hide in, but also making it hard to distinguish friend from foe.

Close in, SAMs might be able to get a good enough radar signature on some of the attacking aircraft to lock on and could actually get a firing solution. However, when a SAM turns on its radar it becomes fair game to any aircraft holding an anti-radiation missile, which can ride down the radar beam to destroy the radar emitter. It's most likely that some of the attack force will be specially tasked to take out the SAMs.

The actual bombing itself might be a two-fold procedure with the first wave of bombs dropped to crack the hardened structures and the second wave dropped in any holes created by the first wave to penetrate structures and explode within. Hopefully the structure containing any nuclear material will cave in on itself, helping to contain any release of radiation, but chances are good that any explosion could throw pulverized radioactive material into the air. How far this highly toxic material drifts depends on how much radiation is released, the height of the debris cloud, and the strength of the prevailing winds.

Only after the Israeli attack force has cleared Iranian air space will radio contact with home base occur, and most likely that will be on HF. The communication will be on a predetermined frequency, will be brief, and consist of just one or two code words to let their commander's know if the strike was successful.

### **The Aftermath: Damage Assessment**

Shortly after the attack, American U-2s might be launched to fly nuclear sampling (SAMP) missions in the area to determine the level of radiation leakage. In a best-case scenario, the radiation spread by the attack would be minimal, with levels only high around the immediate site of the attack. MILCOM monitors should keep an ear out for ASPEN and SAMP callsigns.

Air Force communications code words signifying nuclear incidents are:

**BENT SPEAR**—Incidents involving nuclear weapons that are of significant interest but are not categorized as PINNACLE NUCFLASH OR PINNACLE BROKEN ARROW.

**PINNACLE-BROKEN ARROW**—An accidental event involving nuclear weapons or nuclear components but does not create the risk of nuclear war.

**PINNACLE-NUCFLASH**—The actual or possible detonation of a nuclear weapon which risks the outbreak of nuclear war.

**PINNACLE-EMERGENCY DISABLEMENT**—Operations involving the command disablement or nonviolent disablement of a nuclear weapon.

**PINNACLE-EMERGENCY EVACUATION**—Reports the evacuation of nuclear weapons.

**PINNACLE-EMPTY QUIVER**—The seizure, theft, or loss of a nuclear weapon or nuclear component.

**FADED GIANT**—A “nuclear reactor and/or radiological accident and incident” which does not involve nuclear weapons.

**DULL SWORD**—Reports of minor incidents involving nuclear weapons, components or systems, or which could impair the deployment of same.

Photoreconnaissance aircraft and spy satellites will be positioned over the attack area for damage assessment. From the extent of the damage or radiological threat to civilian populations, the need for humanitarian aid will be ascertained.

### **Political Fallout**

Arab nations will be quick to condemn Israel for the attack, although some leaders of Arab countries will secretly be glad that Israel removed the nuclear power stick from Iran's hands. Many European countries will also protest long and loudly, even though they, too, may be secretly relieved. Even the United States might publicly condemn the attack, although covertly it may have helped the Israelis achieve military success. Outrage by the rest of the world will be wholly dependent on the range and scope of the nuclear fallout, if there is any.

The United Nations will send into Iran special teams to make damage assessments. If civilian populations are in danger or are dead and dying, humanitarian aid will be flown into the affected areas as soon as it is feasible.

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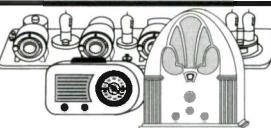
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Arab nations will call for Israel's national head on a platter.

## Iran's Military Response

Iran would most likely launch an attack on the nuclear sites in Israel and, in particular, the Dimona nuclear facilities. Because Israeli air defenses are some of the tightest in the world, an air strike would probably be ruled out. The Iranian weapon of choice will most likely be the Shahab-5/Kosar missile armed with a large conventional warhead.

However it could be that during the preemptive strike by Israel the Shahab-5/Kosar missile launch sites were destroyed or damaged, making the majority of the sites unusable. The range of Shahab-5/Kosar missile is 3,500 to 3,750 or 4,000 to 4,300 kilometers dependent on the warhead size, which would most likely be a conventional 1,000-750 kilogram high explosive warhead.

There is a slight possibility that military and intelligence analysts have underestimated how far along Iran's nuclear weapons program is and Iran could possibly retaliate by lobbing a nuclear warhead-tipped Shahab-5/Kosar missile (with an explosive power in the 1 to 10 kiloton range) into Israel. Depending on the Iranian mind-set at the time, targets could range from military to nuclear facilities and even population centers such as Tel Aviv.

Key strategic sites in Israel are protected by the advanced Arrow 2 theatre ballistic missile defense system developed by the MLM Division of Israel Aircraft Industries in cooperation with the United States and Boeing. The system, carrying the codename Homa or Fence, is deployed in batteries, including one battery near Tel Aviv and one near the Dimona nuclear facilities.

Each Arrow 2 battery typically is equipped with four or eight launch trailers, each with six launch tubes and ready-to-fire missiles, a truck-mounted Hazelnut Tree Launch control center, a truck-mounted communications center, a trailer-mounted Citron Tree fire control center, and the units of a mobile Green Pine radar system. Although never used in actual combat, tests of the Arrow system have been very successful. The Arrow 2, with a launch weight of 1,300 kg, was first tested in 1995. Arrow 2 has successfully acquired, tracked, and destroyed TM-91 Arrow missile targets from ranges of 60 km and 100 km.

If the system works as designed, Iran would have a very hard time penetrating this missile defense. Even if it did get lucky and managed to get a missile past the Arrow 2 missile defense system, the missile would also have to deal with the second layer of the missile defense system, a close-range Patriot PAC 3 antimissile battery. Israel currently uses upgraded PAC 3 as part of a two-tier anti-ballistic missile defense system, with Arrow 2 in the role of high-altitude interceptor and the Patriot PAC 3 for point defense. Patriot PAC 3 is also known to be deployed around Israel's nuclear reactor and nuclear weapons assembly facility at Dimona.

The Patriot PAC 3 is no longer the much-maligned system that was rushed into service during the first Gulf War. The PAC 3 missile is smaller than the early Patriot rounds that came before it, and is more accurate due to its high maneuverability and use of terminal active radar homing. This means that the missile contains fully functional radar, which can detect the target at short ranges (during the terminal phase of flight) and make corrections to the missile immediately before it hits the target. Because of the reduced size, a launcher trailer can carry 16 PAC 3 missiles (four canisters with four missiles per canister) rather than the four missiles carried by the PAC 1 or PAC 2 trailers (four canisters with one missile per canister).

If it does turn into a shooting war and missiles begin to fly between Iran and Israel, utility monitors listening to the ICAO HF Enroute Network, Major World Air Route Area (MWARA), frequencies in the region would be some of the first to know. During the first Gulf War, when Saddam launched Scud missiles into Saudi Arabia, special NOTAMS (Notices to Airmen) could be heard on HF frequencies (even here in the United States) advising whenever a Scud was fired.

## The Best And The Worst

If indeed Israel launches an attack on Iran to take out its nuclear weapons manufacturing capabilities, the best we could hope for is that the facilities are destroyed without radiation leakage and major loss of life. In response Iran would retaliate by launching missiles into Israel. Most likely these missiles would be intercepted by Israel's missile defense system and would fall harmlessly into the desert.

If some Iranian missiles should get past the missile defense systems and hit

Dimona, it is possible that the Israeli government had the time and forethought to remove all nuclear weapons and radioactive materials from the site so the damage would be limited to the buildings.

But, on the other hand, it is possible that massive amounts of radiation could be released into the atmosphere from a meltdown of the nuclear reactor at Bushehr or at the Israeli reactors at Dimona. This radiation could kill thousands, maybe even hundreds of thousands, of people in the region. Eventually a cloud of nuclear contaminants could encircle the Earth causing cancer rates to skyrocket worldwide.

In a worst case scenario, Iran could retaliate with a nuclear tipped missile that intelligence analysts didn't know they had, perhaps one Iran itself had developed or one it had obtained on the black market from Russia or North Korea. A direct nuke strike on Tel Aviv could kill millions and trigger a full-on nuclear war in the Middle East. Millions could die, hundreds of millions could be radiated, and the world would suffer holocaust of unimaginable scale.

## In Closing

It is imperative that rogue extremist-terrorist states like Iran do not acquire nuclear weapons. It is also imperative that Iran consider the consequences that using such a weapon against an enemy would bring about. Not only would it invite the total destruction of Iran and its people, it would also mean the deaths of millions of others, including Arabs, Palestinians, Christians, Buddhists, Hindus, and Muslims. The effects of nuclear weapons are not just contained to the radius of their explosive power. Since these warring countries are located in close proximity to each other, what affects one affects the other.

To quote the late President John Kennedy, "Our most basic common link is that we all inhabit this planet. We all breathe the same air. We all cherish our children's future. And we are all mortal."

I hope you found this special report intriguing, somewhat disturbing, and a rare peek into what military and political analysts do every day: try to ascertain the coming threats and figure out what needs to be done to stave off disaster. If by some chance you think this report was in any way revealing tactical secrets, think again. When and if there is a real attack, most likely what we

described here has already been considered and probably dismissed.

However, you can bet if there is the possibility that war, a terrorist act, or desperate political action is brewing in one of the world's hot spots, somewhere behind closed doors there are people tasked with researching and writing scenarios much like this one, wondering things like, "what would it take, how many ships, and how many men would we need to save lives, stop wars, protect a region or preserve a nation?"

In closing I want to thank all the experts that contributed to this report. Remember, this report is speculative. It's quite possible that every scenario listed could be totally wrong.

In the coming months, let's hope and pray that smarter and cooler heads will prevail and, if something has to happen concerning Iran's nuclear threat, that only the best-case scenarios listed here will come to pass. If the region does become embroiled in a Cuban missile-type crisis, utility monitors will undoubtedly be at their stations, twiddling the dials and scanning the bands in search of the real story behind the headlines.

## Readers Logs

Due to the length of this month's special report, the reader's logs are a bit truncated. Fear not, we will be back to our usual format next month. In the meantime, don't forget to send those logs in!

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

**2252.0:** 6HB USN vessel making callouts at 0100. (MC)

**3349.0:** NNN0BNJ opening USN/USMC MARS 4G1B SC Traffic Net at 0102. (MC)

**3349.0:** NNN0SDL taking check-ins to 4D2B Georgia Area Traffic Net at 0232. (MC)

**4724.0:** Andrews HF-GCS clg OMNI 02 at 1652. (MC)

**5320.0:** CAMSLANT clg USCGC PATOKA (WLR 75408) at 2119. (MC)

**5696.0:** P9A wkg CAMSLANT to report a Go-fast with white hull and black top at 1454. (MC)

**5696.0:** KILLER 29 wkg RING LEADER for alternate frequency at 1621. (MC)

**5708.0:** REACH 505 (C-5A) ALE initiated call to TACC at 0140. (MC)

**5732.0:** Parkhill encryption followed

by RAZORBACK wkg OMAHA 470 at 0159. (MC)

**6715.0:** HALIFAX MILITARY radio check with TRENTON MILITARY followed by RTTY transmission monitored at 0142. (MC)

**6761.0:** INDY 85 (KC-135R, 74 ARS/434 ARW) radio check with TAZZ 84 (KC-135R, 145 ARS/121 ARW) at 0015. (MC)

**8971.0:** BAT 22 wkg BLUESTAR (TSC Comalapa) to report ops normal. Mention of a TOI at 2240. (MC)

**8983.0:** CAMSLANT informs CG 2141 (HU-25) that CGAS Cape Cod reports they are entering a live fire zone in W-102 at 1822. (MC)

**8992.0:** RFR 7496 p/p via Andrews HF-GCS to Lajes Meteo for WX at Lajes and Santa Maria at 1351. (MC)

**9025.0:** CG 1503 ALE initiated call to District 1 Command Center regarding tasking at 1754. (MC)

**11175.0:** JSTARS 33 (E-8 JSTARS) (also uses STARGATE) p/p via McClellan

HF-GCS to Radar Maintenance heard at 1730. (MC)

**11220.0:** Andrews HF-GCS and ANDREWS 01 troubleshooting data comms with TAPESTRY at 2256. (MC)

**11232.0:** BANDSAW LIMA (E-3 AWACS) p/p via TRENTON MILITARY to OAKIE SAM at 1739. (MC)

**11271.0:** DRAGNET VICTOR (E-3 AWACS) (also uses SENTRY 61) p/p via TRENTON MILITARY to Radar Maintenance for troubleshooting heard at 1427. (MC)

**11494.0:** OMAHA 57B with ops normal & position report to HAMMER at 2325. (MC)

**13907.0:** OMAHA 54X wkg HAMMER to report they are over 25 foot TOI at 2137. (MC)

**13200.0:** Z8L p/p via Puerto Rico HF-GCS to STATION 1 with Exercise Highly Esteem Alpha traffic at 1421. (MC)

All logs contributed by Mark Cleary, Charleston, SC. ■

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# Aviation Action!

**A**viation scanning is something most scanner enthusiasts sometimes ignore. There's not a lot that happens there when compared with the likes of a police pursuit or a multi-alarm fire. Most of the traffic is completely routine. Added to this is the idea that there's a lot of shorthand that you'll need to get used to, and many die-hard scanner fans don't ever find their way down to that part of the spectrum.

Aviation fans, however, know that's a big mistake. There's lots of interesting listening on that band if you know where to look, along with some very entertaining comments from time to time by pilots and controllers. The trick is really to spend some time getting to know the band and the type of routine communications that takes place so you'll recognize the abnormal when it happens.

You'll need a scanner that covers the air band you're interested in monitoring. The aviation band for *civil* aircraft runs from 108 to 137 MHz (though 108 to 117 is used for navigation aids, so there isn't much traffic of interest in that range). The *military* uses 225 to 400 MHz. A lot of aviation enthusiasts are also military buffs, as a lot of the military traffic relates to aircraft in flight (at least in North America).

All air traffic is AM mode, so your scanner will need to have this mode if you want to listen. Any scanner that includes an "air band" will also have AM coverage, but unfortunately only scanners toward the high-end of the market will cover the military bands.

With the recent security concerns, the days of sitting at the airport on an observation lot or at the end of the fence are probably over, or at least you must approach with caution. If you're sitting in a parked car someplace close to the airport it's almost

certain that security will be by in short order. Don't push them—they have enough to worry about. Luckily, it turns out that you can hear quite a bit of what's going on without even being close to an airport, and you can hear the ground controllers several miles away, too.

## So What's To Hear?

The aviation monitor can listen to a wide variety of en route communications. Some listeners even go so far as to track flights on a regular basis, and if you're lucky enough to live near a major airport you can follow them all the way into or out of the airport on a trip. Many shortwave enthusiasts enjoy monitoring the overseas flights as they come across the ocean and then transition to the VHF air band as they get closer to land.

Aviation listening on HF (shortwave) is one of the very few services that look like it's going to be on HF for some time to come. There are discussions of satellite-based services replacing the HF networks, but no immediate plans that I'm aware of have been finalized. No doubt it will eventually switch over, but it will probably be a number of years after transoceanic flights switch that domestic traffic will follow suit.

Air traffic controllers and pilots alike are trained to make all communications routine. Sometimes when they break that training it can be some of the best listening on the air band, and often it's quite humorous. As an example, pilots try to minimize time on the radio and can leave out certain key words.

Another area that gets a bit confusing to the beginner is the expression of altitudes. Near the airport on takeoff or landing and at lower altitudes, the height is given as feet above sea level.



Airports can provide hours of great listening. In addition to the aviation frequencies, there are many company frequencies as well as all the radio communications required to keep the airport itself running.

"Climb and maintain 4000" is clearance to four thousand feet, although the pilot is likely to shorten the readback of that to "Roger, climbing for 4." At these altitudes, and in close proximity to the ground and airport, the local barometric pressure is set on the altimeter to give as accurate readings as possible. You'll quite often hear a controller read off the altimeter setting with a landing instruction, just to give the pilot a last chance to set it as accurately as possible. "American 470 cleared to land runway 22, altimeter 29.98."

At 18,000 feet, however, something weird happens. The altitudes become "flight levels," at which point the altimeter is set to 29.92 (standard pressure) and everyone uses that regardless of the actual air pressure at a particular location. You can then travel long distances without having to worry about resetting the altimeter, and since everyone will be using the same number, the readings will be off by the same amount for any given area. What gets confusing is that the flight levels drop the last two zeros, so 18,000 becomes flight level 180.

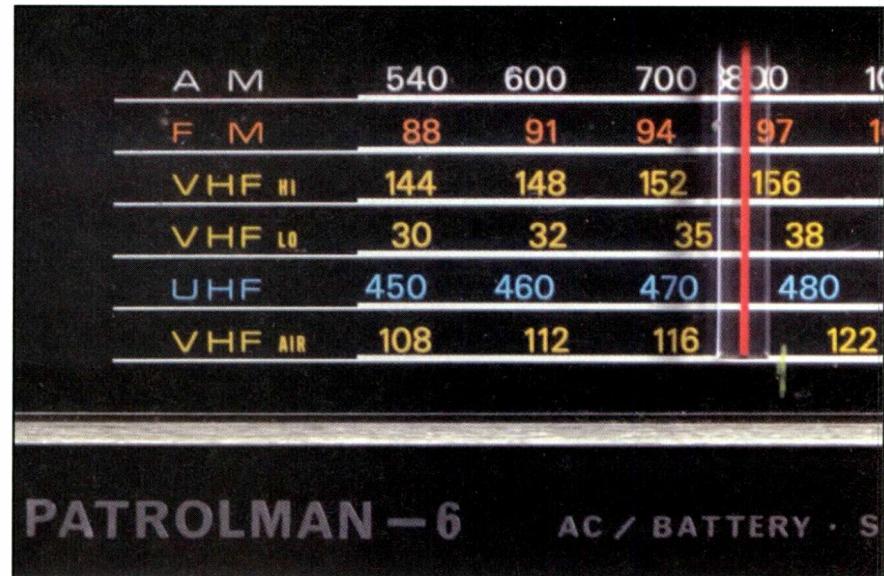
Controlled airspace extends to flight level 600 (60,000 feet). There's an old joke about an SR-71 spy plane calling the controller and requesting flight level 700. The controller thinks about that for a second and then replies, "If you can get up there, you can have it as there isn't anything else that high."

And then the pilot replies, "Roger, descending to 700." It's all relative.

## ATIS Broadcasts Runway And Airport Info

One of the first places a pilot tunes to (and you can, too) is ATIS, the Automated Terminal Information Service. This repeating broadcast includes information about what runways are active, what the current weather is and what altimeter settings are, plus any information about airport operations or things happening nearby that might be of concern to all pilots operating in the area.

The first broadcast of the day is called "Alpha." As it's updated, the ID is changed so that everyone, particularly the pilots and ground crew, know that the information they have is current. They simply step through the ICAO (International Civil Aviation Organization) phonetic alphabet each time it's changed and start over if they run out (see sidebar). You'll sometimes hear a pilot call "with Bravo" and the controller will



*Many aviation enthusiasts got started with multiband radios like this one that had the air band tucked at the bottom. A spare one of these probably won't set you back much if you can find one at a flea market or garage sale.*

reply that "Charlie is current." They'll send him back to the ATIS frequency to get the updated information. If weather is constant, it might be alpha all day. In bad weather, or rapidly changing conditions, it can change every few minutes. I've never heard it happen, but presumably if they reach Zulu they would just start over, as Alpha would be 26 versions and at least a few hours old by then.

Sometimes, depending on the airport, the broadcast also includes frequency information for contacting ground or approach controllers. If not, this information is readily available in many publications, on the Internet, or just by searching for a few minutes. In fact, ATIS is one of the first things I look for when I'm in a new area because the transmitter is always on. If I can hear an ATIS broadcast, I can probably hear the tower, too. It doesn't take long to find active frequencies in your area and at least get a feel for the type of activity for which, that frequency is being used.

## Information Is Widely Available!

One of the key differences between aviation scanning and public safety scanning is that the information is so widely available. You can simply visit your nearest pilot supply shop and come out with charts and books of all sorts that list frequency and usage information. Much is also available on the Internet, and some

times you can even find pilots who will give you old or outdated charts. They're not legal to use for navigation any more, but they don't change frequencies that often. Visit a nearby pilot shop or flight training center and tell them what you're looking for and why. If they don't have any, I'll bet you could talk someone into holding some for you the next time they expire for the price of a cup of coffee. They're a wealth of information and you'll learn a bit about chart reading in the process.

## Types Of Traffic

Let's take a quick look at the types of traffic you'll hear on a typical scan through the band. We've already covered ATIS, so let's touch on ground control. Ground control is responsible for the movements of the aircraft on the ground to and from the runways and terminals. Sometimes, the ground controller can have a worse traffic jam than the air controllers, and you just can't pull an L-1011 off to the side and let a 767 pass.

Some of the larger airports also have a "ramp" controller. This controller will have responsibility for the immediate area around the gates and getting planes in and out of the "ramp." So the ramp controller might be the first person a plane actually talks to before it starts moving.

Often, also at larger airports, you'll find a frequency used for "clearance delivery." At smaller airports, the ground

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controller also handles this function, but as the ground controller gets busier at a larger airport, there isn't time to read lengthy clearances back and forth. Initial clearances often have many restrictions on them to help the plane and air traffic control steer clear of potential hazards with other traffic. Clearance delivery will have the official clearance for the plane from Air Traffic Control based on their expectations. You might hear something like this:

"ATC clears American 554 to Houston as filed. Climb and maintain 5000 feet, expect higher 5 minutes after departure."

This means that American 554 has filed a flight plan to Houston (or is a regularly scheduled flight, in which case they might have gotten their clearance from flight ops before they even got into the plane, if nothing's irregular). However, for some reason, usually because of other planes that will be in the way, this clearance has been restricted to an altitude of 5,000 feet, and they're telling him to expect a higher altitude five minutes after departure. If all goes well, the new clearance will come before he hits 5,000 feet and the passengers will never know it was restricted. But the pilot cannot climb above that altitude until he receives further authorization en route to do so.

After clearance delivery, ramp and/or ground control will provide instructions to get to the runway. At a large airport, this can be very entertaining listening if they're busy, or if weather is causing an unusual number of planes to be on the ground at the same time. Otherwise it's pretty routine stuff.

The ground controller will get the plane out to the runway, but that's it. At that time they will switch to the tower frequency. Tower controls the runway and all the airspace around the airport, but only out to a distance of five miles. After that, departure takes over.

Departure and approach can be on the same frequency if there isn't too much traffic in the area, or they may be segregated. There may even be more than one departure and approach frequency in use at an airport if there's lots of traffic. All traffic from the south will use one frequency; all traffic from the north will use another. If you listen to the tower, the controller will tell the planes what frequency to contact departure on, and if you listen for a while, you may hear a couple of frequencies. If you listen long enough, you may also hear them give the approach fre-

quency for some reason, so finding the frequencies shouldn't take long once you get started. Sometimes that's half the fun!

Once at a certain altitude or a certain distance from the airport, that departure controller will hand the plane off to an en route controller. These are high-altitude controllers who work in one of the 20 air route traffic control centers (ARTCC) across the country (see box for ARTCC locations). Don't be alarmed if there isn't

**The ICAO/APCO  
Phonetic Alphabets**

Phonetic alphabets have long been used as aids in communications. The ICAO (International Civil Aviation Organization) alphabet is used in aviation, but also sometimes by public safety agencies also, so it might not be new to you. However, most public safety agencies use the APCO (Association of Public Safety Communications Officers) alphabet, which uses different words. You'll often hear taxiways referred to by these names when planes are given taxi instructions.

Letter	ICAO	APCO
A	Alpha	Adam
B	Bravo	Boy
C	Charlie	Charles
D	Delta	David
E	Echo	Edward
F	Foxtrot	Frank
G	Golf	George
H	Hotel	Henry
I	India	Ida
J	Juliet	John
K	Kilo	King
L	Lima	Lincoln
M	Mike	Mary
N	November	Nora
O	Oscar	Ocean
P	Papa	Paul
Q	Quebec*	Queen
R	Romeo	Robert
S	Sierra	Sam
T	Tango	Tom
U	Uniform	Union
V	Victor	Victor**
W	Whiskey	William
X	X-Ray	X-Ray***
Y	Yankee	Young
Z	Zulu	Zebra

\* Pronounced Kay-bek

\*\* How many words with V are there?

\*\*\* Worse than V!

## Frequencies Of General Interest

Some frequencies in the airband are nationwide. Put these in your scanner if anything interests you.

108–118—Navigation aids. You won't hear much voice down here (except for some automated weather and "talk-through systems," where a remote flight service station transmits through a navigation aid's transmitter. For the most part, you can leave these out of your scanner.

121.5—The universal emergency frequency; 243.0 is the military equivalent. Not much traffic here, but what traffic there is is very important.

122.0—Flight Watch. En route weather and information for mostly private aircraft.

122.8—Unicom. Used at many smaller uncontrolled airports for pilots to talk and coordinate.

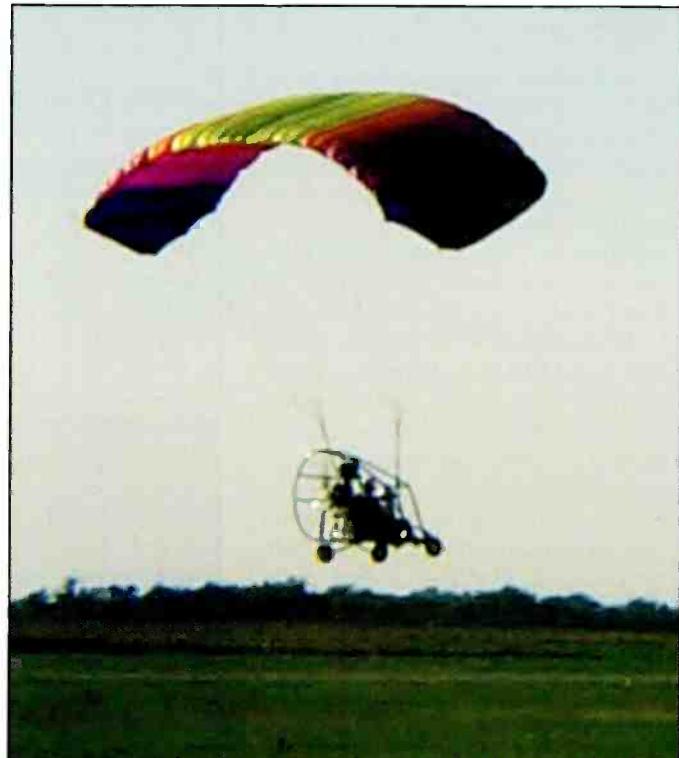
122.9—A second Unicom frequency

123.0—Unicom in some areas, sometimes used by helicopter operations.

123.025—Helicopter operations.

123.45—Plane-to-plane (a sometimes very informal chat channel).

126.2—Military towers. Many military installations have restricted airspace around them and need a way to communicate with civilian aircraft. This frequency is used quite often for this purpose.



Many small airports become active on weekends when good weather allows for some of the less common aviation activities. Small craft like ultralights and this hang glider may or may not be radio-equipped.

an ARTCC in your neighborhood. They use remote transmitters all over the place to keep in touch with planes for long distances. And even if you can't hear the ground, you can hear the planes for a very long way.

As the plane progresses on its flight, it will get passed from one controller to the next along the way. Sometimes it's even the same person monitoring both "sectors," but the frequency has to change to keep in contact with a nearby ground station. As the plane approaches its destination, the ARTCC will begin clearing the plane to lower and lower altitudes and eventually hand it off to an approach controller, who will hand it off to a tower, who will hand it off to ground, who will hand it off to the ramp once it has landed.

In addition to all the controller traffic, you'll also find company dispatch frequencies in the air band. Here's where a pilot can talk back to the mechanic or scheduling people for information or problems in flight. There are some inflight weather frequencies, including 122.0, the nationwide "Flight Watch" channel. On this frequency all across the country, you can hear weather reports and information passed back and forth.

There are also the Unicom frequen-

cies. These are used at smaller airports that don't have a tower as community "advisory" frequencies. The frequency 122.8 is the most common, and a plane taking off will use it to advise its intentions just in case someone else is landing. You'll also hear a bit of chit-chat between planes. Also, 123.025 is used nationwide for helicopter operations. There are lots of others, but those will get you started.

## Ground Based Sport

Frequently, I get asked about listening while on the plane. The bottom line on this is *don't!* First of all, it is against the

rules on all carriers after 9/11. Some airlines used to allow it once airborne, but not any longer. There is a chance that the receiver's circuitry could generate enough of a signal to cause interference or reduced performance in aviation radios on the plane. It can happen! In most cases, other systems on the plane could be used to replace the one that was being interfered with, so it's probably unlikely that it would cause a catastrophic problem, but it would be something for the crew to worry about that they really don't need. They're busy enough without scrambling for backup plans!

Safety considerations aside, airborne scanning really doesn't work very well.

The Adventures of Scanner Dweeb  
by M.A. Coletta

Mail.....  
Knock Knock Knock

All right!!!  
This months issue  
is finally here...

RF rated foldout  
Nothing beats  
a glossy scanner  
picture...  
And these type  
foldouts, mother  
lets me pin up on  
my wall...

A cartoon strip titled "The Adventures of Scanner Dweeb" by M.A. Coletta. It features a character holding a newspaper with the headline "Mail..... Knock Knock Knock". Another character is holding a newspaper with the headline "All right!!! This months issue is finally here...". A third character is holding a newspaper with the headline "RF rated foldout Nothing beats a glossy scanner picture... And these type foldouts, mother lets me pin up on my wall...".

## 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*.

In keeping with our aviation theme, let's give 119.1 a try. If you don't hear anything there, check out the entire 118.0 to 120.0 range. Most airports that have a tower operate in this range. You might have to leave your scanner on it for a little while, but you should hear some traffic there sooner or later. Let me know what you're hearing and we'll enter you into the drawing for a one-year subscription or extension to *Popular Communications*.

You can reach me at radioken@earthlink.net via e-mail, or at Ken Reiss, 9051 Watson Rd. #309, St. Louis, MO 63126 via more traditional methods. Make sure you note the frequency in the subject of the e-mail, or on the front of the card/envelope so it can be entered for our drawing.

## Contesting in Africa

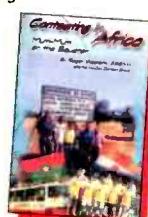
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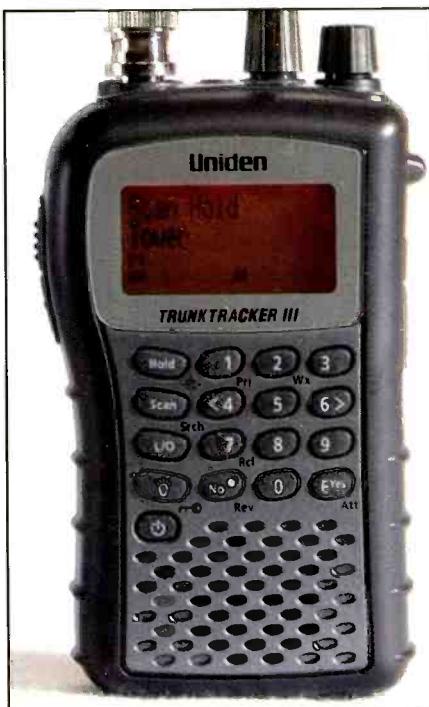
## Air Route Traffic Control Centers (ARTCC)

ARTCCs handle planes at altitude as they travel between airports and crisscross the country. Don't worry if there isn't one right in your backyard; you're still likely to hear one of their remote transmitter sites in your area.

Albuquerque	Denver	Kansas City	New York
Atlanta	Fort Worth	Los Angeles	Oakland
Boston	Houston	Memphis	Salt Lake
Chicago	Indianapolis	Miami	Seattle
Cleveland	Jacksonville	Minneapolis	Washington (D.C.)



Aviation scanning has been featured on most scanner models since the early days of programmable scanners. This early Bearcat had "service search," a one-touch feature to scan the entire air band. It was a good way to find frequencies if you didn't know what was around.



Most modern scanners feature the air band. Try programming a few active frequencies in your area into a spare bank and see what you hear!

You're in a nice high spot, so the altitude of your receiver is great, but you're also in an aluminum can! Very little radio energy comes through the window, and that's about the only way it can get there. So why do the aircraft systems work so well? This is one time where the answer really is blowing in the wind! (Sorry, I just couldn't resist that one.) Remember the plane's communications systems work because all their antennas are outside "in the breeze."

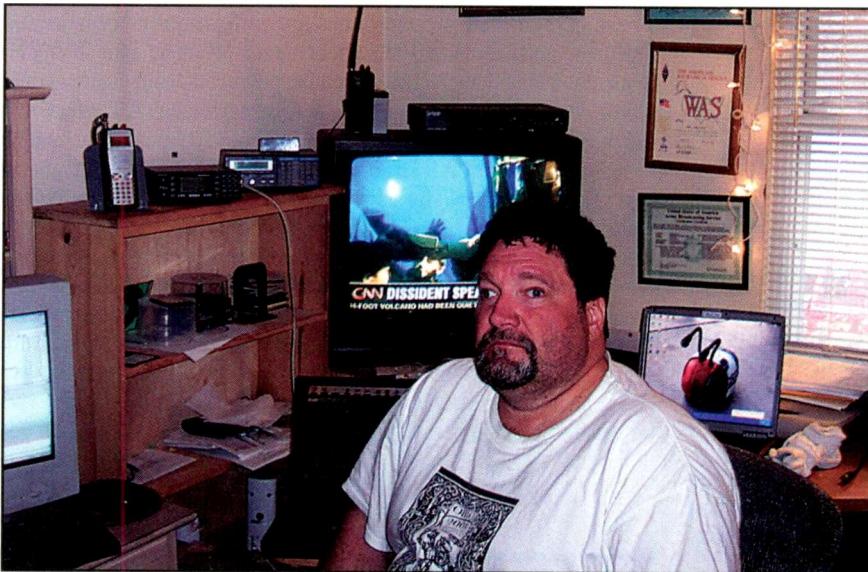
### So Have A Listen!

Check out the air band in your area. You might be surprised at just how active it is, even if you're not close to a major airport. Sometimes small airports actually generate more traffic and even more excitement because the pilots are in training or don't fly as a profession. Sometimes just listening to an ARTCC relay can be interesting to see what's passing overhead.

And remember, you can hear planes for a very long way even if the ground isn't audible. Check it out! You, too, may become an aviation scanner enthusiast! See you again next month.

## V.I.P. SPOTLIGHT

# Our April Winner: Mark Meece, N8ICW, Of Ohio!



Mark Meece, N8ICW, at his well-appointed listening post in Franklin, Ohio.

Pop'Comm reader Mark Meece, N8ICW, of Franklin, Ohio, tell us:

My interest in radio monitoring started in my early teens when I used to tune around a multi-band radio for hours. It really took off in the late 1970s when I received my first scanner as a present: a RadioShack PRO-53 eight-channel crystal scanner. Less than a year later I moved on to the first 50-channel programmable, the RadioShack PRO-2002. In the mid-1980s I discovered the wonders of shortwave, and by the late 1980s I was into the hobby full bore. In 1986 I passed and received my Novice class amateur radio license, later upgrading to General class, as N8ICW.

In 1988 I began writing the Southwestern Ohio column for the All Ohio Scanner Club and I'm still writing it 18 years later! I also write for other hobby publications. I was the elected Chairman of ANARC (Association of North American Radio Clubs) from 1996 to

2004. My main interest lies in federal-military monitoring and railroads, but I listen to everything DC to daylight. What I love most is to always be on the lookout for new frequencies and trunked radio system talkgroups. I also enjoy hanging out with my radio friends at events like the Winter SWL Fest each March in Kulpsville, Pennsylvania.

My current equipment consists of a Yaesu FT-767GX, PRO-2006 with OS456 board installed and running Probe v7.0 24/7; a BC-780XLT in which I have installed a discriminator tap; a PRO-96 for the local digital systems; and a BC-245XLT monitoring my county's trunked radio system full time.

I still have the PRO-53 and a rarely used PRO-2023. Of course, there are several computers to run and program some of the radios. However, the real pride and joy of the shack is a R-392/URR vehicle-mount military HF receiver still in excellent working order. My other interests include all type of sports and anything Sci-Fi. ■

*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](mailto:popularcom@aol.com)

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# News, Trends, And Short Takes

## John Sweeney, K9EL, To Direct New CQ DX Marathon

*CQ* magazine Editor Rich Moseson, W2VU, has announced the appointment of John Sweeney, K9EL, of Schaumburg, Illinois, as Manager of the new *CQ* DX Marathon program. The Marathon is part of *CQ*'s three-pronged "Waking Up DXing" program announced in the magazine last year. The year-long DXing competition began on January 1.

John is an accomplished DXer, with some 30 years of experience both in chasing DX and being DX, operating from a variety of rare locations during the course of a nearly 30-year career with Motorola. He is now a telecommunications consultant. He has worked more than 300 countries on each of the major HF ham bands, except 80 and 160 meters, but he's closing in on 80, with 280 confirmed. He needs only North Korea on CW to have "worked them all" on both phone and CW.

"We are very pleased to have K9EL at the helm of the Marathon program," said Moseson, "and we are very confident that he will get it off to a solid start, both in terms of logistics and promotion."

"I am very excited to have the opportunity to participate in this program and I look forward to working with the DX community," said Sweeney. "*CQ* has given me so much over the years. Here is my chance to give something back."

The *CQ* DX Marathon is a cross between an award and a contest. It runs for a full year at a time, with competitors trying to contact as many countries and *CQ* zones as possible within the year. There are no carryovers from year to year, however, and everyone starts fresh each New Year's Day.

The original *CQ* DX Marathon was run in 1947 as an effort to promote DXing activity as ham radio came back to life after World War II. After one year, the program "morphed" into the highly successful *CQ* World Wide DX Contest. The decision to bring it back was part of a three-pronged response by *CQ* to perceptions that DXing activity outside of contests was dropping off. The other two new programs are the *CQ* DX Field Award and the *CQ* iDX Award. Information on all three programs is available on the *CQ* website at [www.cq-amateur-radio.com](http://www.cq-amateur-radio.com).

## Eton Corporation And American Red Cross Announce Licensing Partnership

Eton Corporation and the American Red Cross have announced a licensing partnership to deliver new radios for emergency use. With a built-in flashlight, cell-phone charger, and no battery requirement, the FR350 and FR400 are two new, exclusive models that share the Eton and American Red Cross brands. These Red Cross by Eton radios are a necessity for every home, office, and for use when traveling. AM/FM/TV-VHF/NOAA radios provide instant access to local news, critical weather, and other emergency alerts so users can be prepared and informed during a wide range of emergencies. AM/FM/shortwave radios will allow live broadcasts and international news to be accessed from around the world, directly from the source.

The Red Cross and Eton will offer self-powered radios to help people stay prepared and informed in times of emergency. These co-branded preparedness and information tools include features such as AM/FM, shortwave, NOAA, and TV/VHF. Both the FR250 and FR300 can be powered from four sources: a built-in rechargeable battery, AA batteries, an AC adaptor, or the dynamo hand crank. The "3-in-1" FR350 houses an AM/FM radio, 12 international shortwave bands, a built-in flashlight and cell phone charger. The FR400 features AM/FM radio, NOAA weather channels, and TV VHF channels and is the Red Cross' recommended choice for emergency preparedness. A built-in cell-phone charger, white LED light and red flashing LED light sources, and water-resistance make it ideal for inclement weather conditions. In addition, a pamphlet suitable to be kept in the home containing vital Red Cross preparedness information will be included with each radio. The Eton and Red Cross radios will be available in stores, catalogs, and on the Web starting at \$50.

## BBC Worldwide Agrees To Investment In Indian Radio Company

Indian broadcasting company Mid Day Multimedia Limited has announced on its website that BBC Worldwide Holdings BV has entered into an agreement with it to invest nearly \$7 million dollars in the equity shares of Radio Mid Day West (India) Private Limited. These funds will be used by Radio Mid Day West (India) Private Limited for bidding for licenses under Phase II of the Private FM Radio Broadcasting Policy announced by the Ministry of Information and Broadcasting.

## Pro-democracy Program To Maldives Temporarily Closes

The cause of freedom and democracy in the Maldives has suffered a blow with the temporary closure of Minivan Radio, an independent and non-partisan radio program that has broadcast into the archipelago for the past 16 months, and the closure of the popular [MinivanNews.com](http://MinivanNews.com) website. Both services, which began in September 2004, were put on hold on January 1. The closure follows a visit to the Minivan office in Sri Lanka by eight members of the Interpol division of the Sri Lankan police, according to Dave Hardingham, founder of the Friends of Maldives in the United Kingdom and whose group sponsored the broadcasts and website.

In an interview on the [clandestineradio.com](http://clandestineradio.com) podcast, Global Crisis Watch, he said that the visit stemmed from accusations of sedition by the Maldivian regime, which claimed that Minivan Radio was broadcasting without a license within Sri Lanka and that its journalists were involved in an attempt to smuggle arms and weapons into the Maldives.

## FCC Authorizes WorldSpace Subsidiary To Launch AfriStar-2

WorldSpace Satellite Radio has received authorization from the Federal Communications Commission for its satellite oper-

ating subsidiary, AfriSpace, to launch and operate the AfriStar-2 satellite. The AfriStar-2 satellite is already constructed and is currently in storage in Toulouse, France. It is intended that AfriStar-2 be placed into geosynchronous orbit at 21 degrees east longitude. The satellite will be co-located with AfriStar-1, which has sufficient capacity to serve at least one linguistic market in Western Europe. AfriStar-2 will allow WorldSpace to expand its digital satellite radio services into Western Europe. It is also intended to serve as a replacement in certain areas currently covered by AfriStar-1 when that satellite reaches the end of its operational life.

Since 1999, WorldSpace has offered fixed and portable satellite radio services in Western Europe via AfriStar-1. WorldSpace has priority rights throughout Europe, the Middle East, and Africa to use the L band frequencies allocated by the International Telecommunication Union (ITU) for satellite radio. Currently, WorldSpace is developing a new mobile receiver for distribution to consumers in the European market. This new receiver, coupled with AfriStar-2's additional broadcast capacity, will enable WorldSpace to offer a variety of Euro-centric music, sports, news, and talk radio programming to mobile and home subscribers throughout Western Europe.

In addition to granting this license, the Commission waived the requirement that WorldSpace pay a \$3 million bond, because the orbital location and frequencies requested for AfriStar-2 are being used currently by AfriStar-1.

## Radio Open North Korea Begins Regular Transmissions

Radio Open North Korea regular transmissions at 1500 to 1600 on 5880 kHz in Korean to North Korea. The contents comprise mostly the programs of "Radio Free North Korea" by the organization of the refugees from North Korea, on the violations of human rights in North Korea. KBS News reported that the broadcast was done by an organization in United States. The test broadcasts, conducted between November 23 and 27 at 1500 to 1600, were produced by this unidentified organization in United States. The first day's broadcast was well heard in Japan and South Korea without jamming.

The programming is sent out on the air from a shortwave transmitter because more and more North Koreans are obtaining shortwave radios. Free NK uses shortwave frequency 5880 kHz for the time being. The location of the transmitting station has not been disclosed so North Korean authorities don't intervene.

## Uzbekistan Bars Radio Liberty

Uzbekistan's Foreign Ministry has informed the U.S.-funded broadcaster Radio Free Europe/Radio Liberty that it would no longer accredit its journalists or bureau in Tashkent, effectively outlawing its reporters. A letter from the Foreign Ministry to RFE/RL's acting president, obtained by Reuters, accused the broadcaster of breaking its rules by using freelance Uzbek journalists who had no accreditation.

In October 2005, Britain's BBC World Service closed its office in Tashkent and withdrew its journalists, saying that authorities were intimidating them. RFE/RL and the BBC World Service were the main sources of independent news in the Uzbek language when troops forcefully suppressed an uprising in Andijan in May.

## Extension Of "Shiokaze" Broadcast

According to Asian Broadcasting Institute, the "Shiokaze" broadcast by the "Investigation Commission on Missing Japanese Probably Related to North Korea" has announced that the hours of broadcast will be extended to one and a half hours per day. The group first intended to extend the broadcast to one hour, but in negotiation with VT Communications, VT agreed to broadcast for one and a half hours for the price of one. The new broadcast hours are planned as 1400 to 1500 and 1900 to 1930 UTC.

## Australia's WIA Proposes New 40-Meter Plan For Hams

The Wireless Institute of Australia (WIA) is in the process of completing a new 40-meter band plan that aims to encourage operation above 7.100 MHz. The WIA says that it knows there is broadcast QRM to contend with, but it also believes it to be essential for VK hams to start to spread out operation into the segment above 7100. This is because of international pressure on the HF spectrum from other services who want more of it. The WIA says that it wants to create an operational broadcast segment from 7.130 to 7.150 MHz.

The reason for going so high up in the band is to avoid QRM from a Papua New Guinea broadcaster on 7.120 MHz. The new upper limit has also been set to cater to the existing AM service from VK2WI on 7.146. The WIA says it's now looking for member input on this revised 40-meter band plan proposal. ■

## Popular Communications April 2006 Survey Questions

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# The Great East Versus West AM DX Showdown—Is One Better Than The Other?

**T**here's more than just the Continental Divide separating the Atlantic and Pacific coasts. There's a huge divide between mediumwave DX on the left and right. Some differences are obvious, others not so obvious.

To make my point, I'll use two popular U.S. coastal DXpedition sites for comparison: Rowley, Massachusetts (42°45'N 70°50'W), and Grayland, Washington (46°48'N 124°06'W), as we investigate east versus West Coast AM broadcast DXing.

## Ocean Specific

It might appear obvious that the difference in the size of the Atlantic and Pacific oceans would impact transoceanic DXing. The Pacific is the largest of the world's oceans, larger than the total land area of the Earth according to the CIA's *The World Factbook*. Although the Pacific is at least twice the size of the Atlantic Ocean, it doesn't necessarily represent twice the challenge for transoceanic DXers.

On the surface, a simple comparison of distances might indicate that transatlantic DXers have a distinct advantage over their transpacific counterparts. For example, the distance from Grayland to typical DX targets like Tahiti is 4,697 miles, to Tokyo, Japan, it's 4,746 miles, to South Korea 5,388 miles, to Wellington, New Zealand, 7,119 miles, and to Sydney, Australia, 7,656 miles.

Compare this to typical distances from Rowley to England (at 3,130 miles), Madrid, Spain (3,370 miles), Paris, France (3,415 miles), Netherlands (3,452 miles), and Algiers, Algeria (3,829 miles). While transatlantic DXers often reach greater distances to Middle Eastern targets, such as Egypt (at 5,356 miles) and Djibouti (at 6,828 miles) from Rowley, it's clear that transpacific signals have to cover more distance overall. However, because of the positive affect of sea gain due to the high conductivity of salt water (see *Popular Communications*, November 2005), distance *does not* play a significant role in the ability to receive transoceanic mediumwave signals on either coast. Surprised? Read on, as some less obvious circumstances might be more surprising.

## Practice, Practice, Practice

The language barrier can be a major obstacle for anyone taking on the challenges of transoceanic AM broadcast DXing. Unlike shortwave broadcasts, mediumwave radio stations are typically domestic services broadcasting in native languages. With practice, however, transpacific DXers learn to recognize basic differences between Chinese, Korean, and Japanese, but understanding station identifications is far more difficult and may require years of dedicated listening to become fluent in key words and broadcaster slogans.

Transatlantic DXers will encounter a similar scenario when attempting to identify Middle Eastern and North African radio stations. Learning the subtle differences between Arabic, Berber, Farsi, and Turkish, along with the phrases used in station identification, is not easy. A familiarity with the romance languages from high school and college courses, primarily French and Spanish, does give the transatlantic DXer a head start with European reception, whereas unfamiliar and more exotic languages like Indonesian, Tagalog, and Vietnamese represent additional challenges in transpacific listening. When beginning to tackle the language barrier, the *World Radio TV Handbook* is a good place to start with standard announcements listed in primary languages for many radio stations.

## Uncoordinated Universal Time

How's your sense of timing? Unless you're an early morning person (yawn), the best time for transoceanic listening probably favors the transatlantic DXer. East coast sunset is prime time for transatlantic signals. If the receiver location is directly on the coast, such as Rowley, then many signals will begin to appear well before sunset. It's common to receive signals from Algeria, Morocco, Saudi Arabia, and Spain an hour or so before East Coast sunset, when it's already been dark for a few hours across the Atlantic. On the other hand, transpacific DXing may not begin in earnest until some 12 to 15 hours later, with prime time reception often during West Coast sunrise when waves of down-under and Southeast Asian signals arrive at coastal receiver locations like Grayland, thanks to transmitter site dawn enhancement.

## Caution: High Power

One definite advantage transatlantic DXers have is power. Many of the signals arriving before East Coast sunset are big-gun flamethrowers, operating with hundreds of kilowatts of power, some with megawatts. For example Croatia is widely received on 1134 kHz with 600 kilowatts, while Norway covers the North Atlantic on 1314 kHz with 1200 kilowatts of power. Then there's the super signal from Saudi Arabia heard halfway around the world on 1521 kHz with 2000 kilowatts, that's an astounding 2 megawatts of power!

On the other hand, most transpacific targets are flea-powered by comparison, not operating with anything more than a meager 50 kilowatts, and yet received over considerably greater distances. There are a couple of exceptions: VOA Thailand on 1575 kHz with 1000 kilowatts and AIR India on 1566 kHz also with 1000 kilowatts, a sought-after signal by both transatlantic and transpacific DXers. But overall it's the

European, Middle Eastern, and North African broadcasters that'll peg the signal meter.

So far it looks like East Coast DXers may have the edge over their West Coast amigos. Listeners in the east benefit from the most powerful signals, a more convenient time for listening, and hopefully some useful foreign language skills retained from school. But what if I said that the continental divide between east and West Coast DXers has very *little* to do with any of the above? Perhaps I've led you astray with the discussion about transoceanic DXing. The most significant difference between east and west actually involves the North Pole and Latin America.

## Great Circle Mapping

First, to help understand why DXing from the east is so different from the west, let's take a look at Great Circle Maps for our example locations, Grayland and Rowley. A Great Circle Map is a projection of the Earth, or what the Earth looks like, from a specific reference point on the planet. This type of map is also called an Azimuth Map, because it shows the bearing of the shortest path to any location from a reference point. In other words, using a Great Circle Map centered on your receiver location as the reference point, you can obtain the general bearing of the *shortest path* to anyplace in the world. This short path is termed the Great Circle Path. Note that the bearing is measured in degrees, using north as the baseline direction at zero degrees and increasing in a clockwise rotation like a compass with east at 90 degrees, south at 180 degrees, and west at 270 degrees.

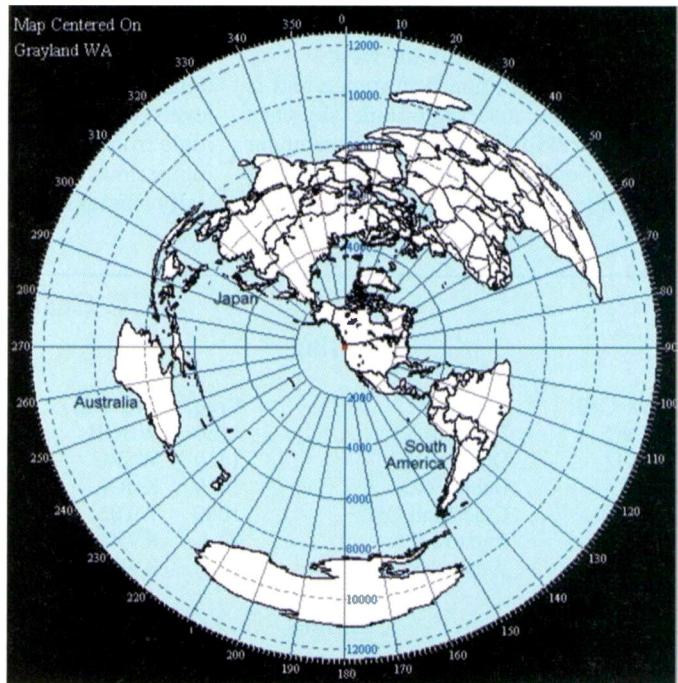
Once you've determined the general bearing to a DX target on the Great Circle Map, you can use a compass to aim your antenna accordingly. For example, using the Great Circle Map centered on Grayland, you can easily see that the bearing to Japan is about 300 degrees, the bearing to eastern Australia between 240 to 250 degrees. I digress, though, as we aren't really interested in degrees as much as the actual *path* for our comparison of east and west.

## Latin America

The major divide between east and west is in the reception of Latin America, predominantly the Caribbean and South America, and to a lesser degree Central America and Mexico. Comparing the Great Circle Maps for Grayland and Rowley, the reason becomes clear.

Take a look at the path from Rowley to Venezuela on the north coast of South America; the path is over salt water, making it an easy trip, due once again to the positive effects of sea gain. Now take a look at the path from Grayland to Venezuela; much of the path is over land. A mediumwave signal may retain a significant percentage of its signal strength over salt water, even over thousands of miles, but quickly loses strength over land. Thus while signals from places like Brazil, Colombia, Cuba, and Venezuela are received on a regular basis at East Coast locations due to sea gain, those same signals never make it to the West Coast due to land loss.

Now the million dollar question: Why don't West Coast DXers receive signals from the Pacific coast of South America, like East Coast DXers receive the Atlantic coastal stations of the continent? Again, look at the Great Circle Paths. The path from Grayland to countries on the Pacific coast like Chile, Colombia, Ecuador, and Peru, is mostly if not entirely over

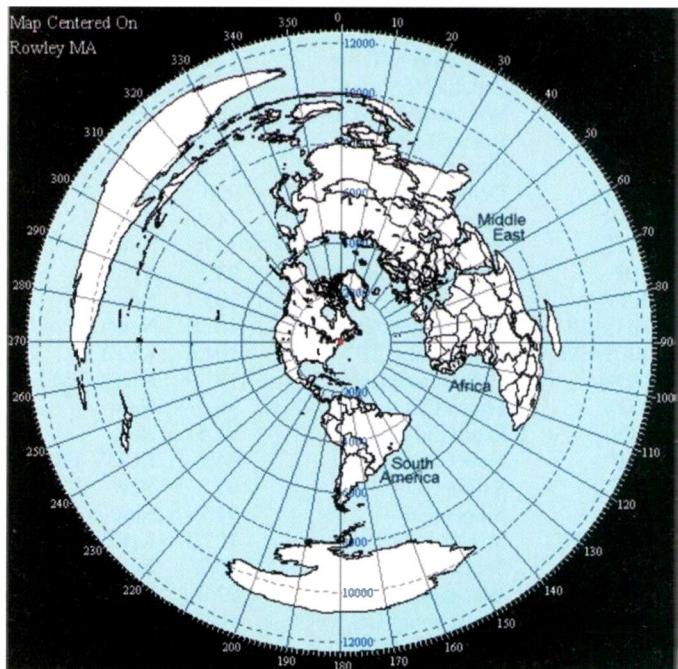


Great Circle Map centered on Grayland, Washington.

land, crossing the southwestern United States and most of Mexico. But wait, there's more!

## The North Pole

Take a look at the recent depiction of the auroral dome from the NOAA Space Environment Center ([www.sec.noaa.gov](http://www.sec.noaa.gov)) during the present solar minimum, or bottom of Sunspot Cycle 23. Notice how much farther south the auroral dome covers on the East Coast versus west. The auroral dome extends to the North Carolina-Virginia state line at about 36.5 degrees latitude in the



Great Circle Map for Rowley, Massachusetts.

east, while it doesn't even reach California or 42 degrees latitude in the west.

This is a common occurrence and is important because high-angle skywave signals, or skip, from radio stations under the cover of the auroral dome will be subdued, allowing low-angle signals to slip

underneath the edge of the dome. The bright colors in the center of the auroral dome, which represent higher intensity levels, will expand beyond 36 degrees latitude from the east into the Midwest during periods of high solar activity, essentially knocking out signals normally

heard at night, making signals from tropical latitudes easier to receive.

Only the most extreme solar storms will cause the auroral dome to spread into California and the desert southwest to produce similar results. Why? The auroral dome is centered on the *magnetic*

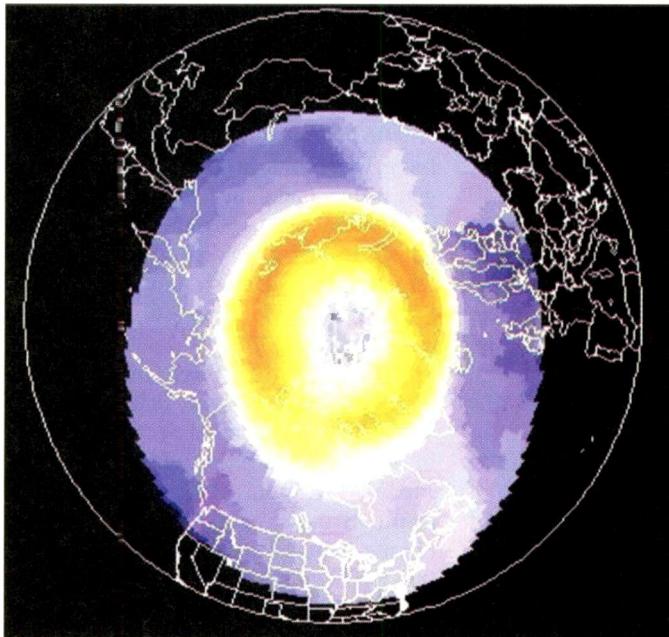
### FCC Callsign Changes

#### Pending

New Call	Location	Freq.	Old Call
WDJO	Florence KY	1160	WBOB
WRJD	Durham NC	1410	WSRC
KDKT	Beulah ND	1410	KHOL
WCVX	Cincinnati OH	1050	WTSJ
KODV	Barstow CA	89.1	KVID
KOJK	Weatherford OK	97.3	KWEY-FM

#### Changes

New Call	Location	Freq.	Old Call	New Call	Location	Freq.	Old Call
KYNG	Springdale AR	1590	KZRA	WPAW	Calhoun GA	91.3	New
KWSX	Stockton CA	1280	KUYL	WTHM	Thomson GA	89.9	New
WTWP	Washington DC	1500	WTOP	KTKB-FM	Agana GU	101.9	KTKB
WTJV	Deland FL	1490	WNDA	KLCW-LP	Hailey ID	105.5	New
WNPL	Golden Gate FL	1460	New	KTPD	Hazelton ID	94.3	New
KTKB	Tamuning GU	675	New	KSQS	Ririe ID	91.3	New
KPTO	Pocatello ID	1440	KBET	KISI	Twin Falls ID	102.1	New
WMYJ	Martinsville IN	1540	WSKT	WHHL	Jerseyville IL	104.1	WRDA
KDTD	Kansas City KS	1340	KCKN	WXNU	St. Anne IL	106.5	New
WWKU	Glasgow KY	1230	New	WEJK	Boonville IN	107.1	WYXY
WIST	New Orleans LA	690	WTIX	WLRX	Charlestown IN	104.3	WEGK
WTOP	Frederick MD	820	WXTR	WMYJ-FM	Oolitic IN	88.9	WMYJ
WMKM	Inkster MI	1440	WRJD	WYBV	Wakarusa IN	89.9	New
WHIT	South Haven MI	940	WSPZ	WXTF	Shelbyville KY	101.7	WJZO
KLBB	Brooklyn Park MN	1470	KLBP	WHYR-LP	Baton Rouge LA	96.9	New
KMNV	St. Paul MN	1400	KLBB	WREA-LP	Holyoke MA	104.9	New
KZRG	Joplin MO	1310	KOCR	WPEE	Gagetown MI	88.5	New
KSAM	Whitefish MT	1240	New	WHIT-FM	Hartford MI	103.7	WSPZ-FM
KOTK	Omaha NE	1420	KHLP	WMAX-FM	Holland MI	96.1	WVTI
KBET	Winchester NV	790	KWLY	WAQQ	Onsted MI	88.3	WAAQ
KCKN	Roswell NM	1020	KINF	WMKD	Pickford MI	105.5	WADW
WTIX	Florence SC	1230	WOLS	WAAQ	Rogers Heights MI	88.1	WAQQ
KZRA	Denison-Sherman TX	950	KYNG	KBJI-LP	Bemidji MN	92.3	New
WCFR	Springfield VT	1480	WNBX	KGLU	Gideon MO	103.9	New
KPWL	Newport WA	1370	New	KJUL	Moapa Valley NV	104.7	KWLY
KDJF	Delta Junction AK	93.5	New	KELU	Clovis NM	90.3	KKCC
KKSY	Kensett AR	105.7	New	KXFR	Socorro NM	91.9	New
KHHS-LP	San Diego CA	107.5	New	WLPS-FM	Lumberton NC	89.5	New
KKCS-FM	Canon City CO	104.5	KSTY	WIST-FM	Thomasville NC	98.3	WIST
KGDQ	Colorado Springs CO	101.9	KKCS-FM	KBEP-LP	Bismarck ND	93.7	New
KTDX	Frisco CO	90.3	New	WFOT	Lexington OH	89.5	New
KTOL	Leadville CO	91.5	New	KKCM	Sand Springs OK	102.3	KRTQ
KJEB	New Castle CO	94.5	KCUV-FM	KOGL	Gleneden Beach OR	89.3	New
KTPF	Salida CO	91.3	New	WBLQ-LP	Ashaway RI	96.9	WCTD-LP
KTSG	Sidney CO	91.7	New	WKIV	Westerly RI	88.1	WBLQ
KCUV-FM	Strasburg CO	102.3	KJEB	WNGA	South Pittsburg TN	97.3	WMAX-FM
KTDL	Trinidad CO	90.7	New	KQXE	Eastland TX	91.1	New
KTWX	Walsenburg CO	91.3	New	KGWP	Pittsburg TX	91.7	KKXI
KWCS	Walsenburg CO	101.3	New	KJAZ	Point Comfort TX	94.1	KAJI
KTAW	Westcliffe CO	89.3	New	KLGO	Thorndale TX	99.3	KJAZ
WYFZ	Bellevue FL	91.3	WWKO	WTYD	Deltaville VA	92.3	WSRV
WROO	Callahan FL	93.3	WPLA	WRPC-LP	Hampton VA	103.7	New
WPLA	Jacksonville FL	107.3	WROO	WBQK	West Point VA	107.9	WTYD
				KAYO-LP	Aberdeen WA	94.3	KGHO-LP
				KFIO	East Wenatchee WA	88.1	KTRW-FM
				KGHO-LP	Hoquiam WA	98.5	New
				KIJZ	Vancouver WA	105.9	KRVO
				WPJY	Blennerhassett WV	88.7	New
				WHLK	De Forest WI	93.1	WHIT-FM
				WSLK	Mount Horeb WI	106.7	WYZM
				WSWG	Valdosta GA	44	WVAG
				KEFB	Ames IA	34	New
				KVNV	Ely NV	3	KBJN
				KUPT	Hobbs NM	29	KHFT
				KWBZ-TV	Wolfforth TX	22	KUPT



The auroral dome (NOAA Space Environment Center).

North Pole, not the geographic North Pole. The magnetic Pole itself is a moving target, steadily but ever so slowly drifting with natural changes in the Earth's magnetic field.

The position of magnetic north is currently estimated to be at coordinate 82°N 114°W, placing it somewhere along the Arctic Ocean shores of the Queen Elizabeth Islands in Canada, south of the geographic North Pole. This, combined with the position of

the Earth in relation to the Sun and the tilt of the Earth's axis, gives the auroral dome an elongated shape equatorward over eastern North America during nighttime listening hours. The dome tends to retreat to a more circular shape as dawn approaches the east. Of course I'm oversimplifying, as the dynamics behind the position, shape, and intensity of the auroral dome and its effects on the ionosphere are far more complicated and well beyond the scope of this discussion.

In terms of understanding the auroral advantage in the east, well you get the idea. The news isn't all bad for the west, though. Pacific coast DXers may not enjoy the same level of Latin American signals when solar activity is high, but reception from down-under is enhanced by the reduction of domestic interference from radio stations consumed by the auroral dome.

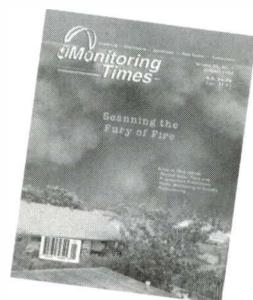
So mediumwave broadcast DXing is indeed quite different in the east and west. Each location presents a unique set of challenges, part of what makes the hobby so fascinating. To learn more about solar activity and auroral domes, visit the Space Environment Center website at [www.sec.noaa.gov](http://www.sec.noaa.gov), and, of course, get more in-depth analysis and theory from "The Propagation Corner" by Tomas Hood NW7US, right here in *Popular Communications*. The Great Circle Maps, created with software by Paul Burton AA6Z, are available for free at [www.geocities.com/aa6z@sbcglobal.net/AZMapWeb.html](http://www.geocities.com/aa6z@sbcglobal.net/AZMapWeb.html). Visit BAMLog at <http://members.aol.com/bacconti/bamlog.htm> for quick links to these and other broadcast DX resources.

## Broadcast Loggings

It appears that solar activity has reached close to minimum with the end of Sunspot Cycle 23 approaching. It's been so quiet



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that both the A and K indices have bottomed out to zero at times. This has resulted in outstanding transoceanic DX conditions, highlighted in this month's selected logs and QSLs. All times are UTC.

**531 DRS Beromünster, Switzerland**, heard at 0740 good with pop music and telephone talk in German, parallel 531MW webradio at [www.drs.ch](http://www.drs.ch). With 1062 Denmark and 1314 Norway so strong, I was looking for Faroe Islands on this frequency, no such luck of course. (Conti-NH)

**585 Radio Nacional de España, Madrid, Spain**, at 0245 with a great flamenco music program, time pips at :00, then a jingle and woman saying "Radio Nacional de España; Informativo!" into news. A very good signal on peaks with minor domestic slop, my best reception of this and my best transatlantic reception! (Chiochiu-QC)

**675 Arrow Rock Radio, Lopik, Netherlands**, at 0318 an excellent, S-9

signal, with just a little slop from 670 WSCR Chicago and 680 CFTR Toronto, heard playing "Let's Spend the Night Together" by the Stones (Rolling). (Renfrew-NY)

**747 Radio 747/VPRO Radio Ein, Flevoland, Netherlands**, 0235-0310 heard with strange electronic music (slow and haunting piano/chimes), news at 2200, ID as "VPRO Radio Ein" at 2202, conversation with a man and a woman, and assisted by parallel with DX Tuners in Netherlands. (Renfrew-NY)

**864 ERTU Santah, Egypt**, at 0240 a good signal over France Bleu, with a public speaker in Arabic, then probable ID beginning with "Idha..." but lost to a burst of noise, thanks to Murphy's Law of Station Identification. (Conti-NH)

**963 CRI China**, full-detail QSL card with postcard of Shanghai received in 56 days for \$1, report and CD. The QSL card is totally in Russian and the time is in local China Time. Also enclosed was a letter in Russian which I can't read. Mainland

China QSL #35. Address: China Radio International, Russian Service, CRI-26, PO Box 4216, Beijing, P.R. China 100040. (Martin-OR)

**1062 Danmarks Radio, Kalundborg, Denmark**, at 0511 heard with a reggae-influenced dance vocal, then Danish talk; to fair peak. (Connelly-MA) From 2309 to 2317 a very good signal with a female host in Danish and pop tunes by Stevie Wonder and Carole King. (DeLorenzo-MA)

**1071 JOWM Obihiro, Japan**, a beautiful QSL card, sticker, and letter from Y.Matsuzaki-Technical Section, received in 80 days for a report with CD and \$2. Japan MW QSL #111. Address: STV Radio Broadcasting Co, Ltd, Nishi 8-chome, Kita 1-jo, Chuo-ku, Sapporo, 060-8705, Japan. (Martin-OR)

**1215 Voice of Russia, Bolshakovo, Kaliningrad, Russia**, at 2145 fair over/under COPE Spain and Virgin UK with talk in an unidentified language, then flute music that seemed parallel a weak 7445-kHz signal, no het or rumble that would indicate off-frequency Albania. Chris Black in Massachusetts also heard this, and sent an audio clip to a Czech DXer who confirmed it as Russia. (Conti-NH)

**1314 NRK Kvitsoy, Norway**, at 2157 a woman in Norwegian, then the Wilson Pickett oldie "634-5789," with a good signal, stronger than adjacent 1310 WLOB. At 2206, INXS "Need You Tonight," an S9+30 local-like signal! (Connelly-MA)

**1386 CRI Sitkunai, Lithuania**, at 2140 fair with Chinese instrumental music and a woman in accented English, parallel 9490 and 9600 kHz. (Conti-NH)

**1431 Radio Sawa, Arta, Djibouti**, at 2158 with dance music, then two Radio Sawa IDs by woman in Arabic; good. (Connelly-MA)

**1521 BSKSA Dubai, Saudi Arabia**, at 2107 heard parallel 9555 and 9870 with news by a man in Arabic; fair to good. At 2200 an Arabic public address by a man in a large hall. A local-like signal, annihilating 1520 kHz. (Connelly-MA)

**1548 Voice of Russia, Grigoriopol, Moldova**, at 0533 with Eastern European talk and Ukraine mention; a good signal. (Connelly-MA)

Thanks to our transoceanic loggers Bogdan Chiochiu in Quebec, Mark Connelly and Marc DeLorenzo in Massachusetts, Patrick Martin in Oregon, and Jim Renfrew in upstate New York. 73 and Good DX!

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# Capitol Hill And FCC Actions Affecting Communications

## Two FCC Appointees Confirmed By U.S. Senate

The U.S. Senate has confirmed the White House nomination of Republican Deborah T. Tate and the reappointment of Democrat Michael J. Copps to the Federal Communications Commission. The confirmations came by voice vote December 21 in a late-night session, according to published reports. Tate will complete the term of former FCC Chairman Michael K. Powell, which expires June 30, 2007. Powell departed the FCC in March 2005. Tate, 49, had been director of the Tennessee Regulatory Authority. Copps, 65, whose new term will expire in 2010, has been on the Commission since 2001.

According to reports on the confirmation hearing, Tate described herself as a mediator in testimony before the Senate Commerce Committee in early December 2005. Copps said his objective would be to "help bring the best, most accessible, and cost-effective communications system in the world to all of our people" wherever they live and whatever their status. The FCC had been operating with four members for most of 2005 and with three members since the December 9 departure of FCC Commissioner Kathleen Q. Abernathy. Powell was succeeded by Kevin J. Martin as FCC chairman.

In her departure announcement, Abernathy praised the FCC's increasing reliance on competition rather than regulation. "Our largely market-driven approach to advanced services has helped create a vibrant market for new wired and wireless telecommunications products," she said, "and our spectrum reform initiatives have improved our ability to put this scarce resource to its most effective use."

President George W. Bush must fill the remaining opening on the five-member FCC with a nominee to succeed Abernathy, who never was appointed to a full term.

## Automatic Control Privileges Suspended For LA-area Repeater

Ongoing problems plaguing the 147.435-MHz 2-meter repeater covering Southern California have prompted the FCC to suspend automatic control privileges, now requiring that the licensee or designated control operator be at the machine's control when it's operational. The Commission alleges inadequate station control, deliberate interference, failure of users to identify, and use by unlicensed operators.

FCC Los Angeles District Office Director Catherine Deaton wrote in November to station operator Jeffrey Stieglitz of Torrance: "Your amateur station AE6NZ is under review by the Enforcement Bureau for numerous and continued apparent violations of the Commission's rules."

According to the American Radio Relay League's *ARRL Letter*, "Stieglitz told ARRL he encourages users of the busy repeater to comply with Part 97 rules and to make a reasonable effort to identify unlicensed operators. 'I believe that the 147.435 repeater attracts people to the hobby and, overall, is consistent with the purposes of Amateur Radio,' he said. Stieglitz added, 'Sometimes the talk on the repeater may resemble that of a boys locker room, but I think we more than make up for it with charitable activities and technical sophistication.'

If AE6NZ is operated under automatic control prior to notification from her office, enforcement action up to and including a license revocation and suspension hearing, a fine or both could follow, Deaton said. The director also asked Stieglitz to submit in advance the names and contact numbers of other licensees who serve as control operators. "During any times that no control operator is available, the repeater must be shut down," Deaton said.

The odd-split 147.435-MHz repeater (the primary input is 146.400 MHz) "has been a lightning rod for controversy," the *ARRL Letter* reported. "In 2001, the FCC terminated the automatic control privileges of the then-W6NUT repeater while it was reviewing its operation. Since then the repeater has changed hands a few times, and enforcement issues seem to have followed. Stieglitz believes 'heat from the FCC' was behind the frequent ownership changes."

FCC Enforcement Bureau Special Counsel Riley Hollingsworth told the ARRL: "The repeater has been out of control long enough, and we have been too patient too long."

## Harris Corp. Contract For Military Radio Systems Expanded

The U.S. Marine Corps Systems Command has increased the ceiling value of a five-year \$75 million contract for advanced radio systems awarded to the Harris Corp. to \$586 million. Under the agreement, which was originally announced in March 2005, Harris is supplying the Marines with high-frequency AN/PRC-150(C) Falcon II radio systems for applications including tactical, secure, and joint communications. In addition to the Falcon II manpack, the corporation will also supply its AN/VRC-140(V)3 vehicular system, according to media reports.

The AN/PRC-150(C) is an advanced HF radio covering 1.6 to 60 MHz and features embedded communications security that has been certified for transmission of classified information. The AN/VRC-104(V)3 vehicular product is a fully integrated communications system that includes the Harris AN/PRC-150(C) tactical radio and 150-watt high-frequency power amplifier. This system also covers the 30- to 60-MHz frequency range offering secure Type-I interoperability with the Marine Corps' AN/PRC-117F(C) multi-band, multi-mission radios.

The radios will be used to modernize the Marine Corps' active duty and reserve high-frequency tactical radio systems, the MRC-138s and GRC-193s, and will also be used for other USMC programs, according to press reports.

## ARRL Renews BPL Interference Complaint With FCC

The American Radio Relay League has filed with the FCC a renewal of its complaint against Ambient Corporation's broadband over powerline (BPL) system in Briarcliff Manor, New York, the ARRL announced. The League alleged that despite causing interference across the 20-meter amateur radio band, Ambient's experimental license was renewed by the FCC for an additional term, from August 2005 to August 2007.

"The Briarcliff Manor BPL system currently (still) causes harmful interference to amateur radio communications and it is not compliant with applicable FCC part 15 regulations," the ARRL complaint stated. "Neither is it compliant with the terms of the experimental authorization granted by the Commission, most recently on August 1, 2005."

"The ARRL reiterates its request, now more than a year old, that the BPL facility...be instructed to shut down immediately; and that it not resume operation unless the facility is shown to be in full compliance with Commission rules regarding radiated emissions and with the non-interference requirement...of the Commission's Rules and the terms of the experimental authorization," the ARRL reported on its website. ■

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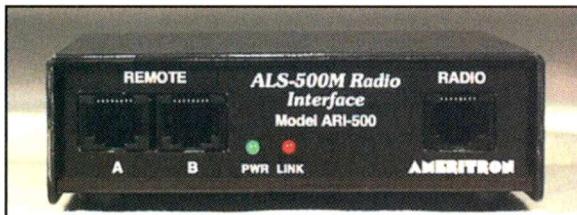
This listing is designed to help you hear more shortwave broadcasting stations. The list includes a variety of stations, including international broadcasters beaming programs to North America, others to other parts of the world, as well as local and regional shortwave stations. Many of the transmissions 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	UTC	Freq.	Station/Country	Notes
0000	11780	Radio Nacional do Amazonas, Brasilia, Brazil	PP	0300	9790	China Radio Int., via Cuba	
0000	9880	Radio Canada Int., via China		0300	7260	Radio Cairo, Egypt	AA
0000	11710	Korean Central Bc. Station, No. Korea	KK	0300	4052.5	Radio Verdad, Chiquimula, Guatemala	SS
0000	4845	Radio Mauritanie, Mauritania	AA	0300	17880	Radio Free Asia, No. Marianas	CC
0000	4319	AFN/AFRTS, Diego Garcia		0300	7200	Republic of Sudan Radio	AA
0030	4319	AFN/AFRTS, Diego Garcia	usb	0300	7290	VOA Relay, Sao Tome	
0030	4985	Radio Brazil Central, Goiania, Brazil	PP	0300	4965	Radio Uganda	
0030	7110	IBC-Tamil, UK, via Germany	Tamil	0300	4910	The Voice-Africa, Zambia	
0030	9875	Radio Vilnius, Lithuania		0300	4910	ZNBC/Radio Zambia	
0100	9400	Radio Bulgaria		0300	9765	Radio Romania Int.	SS
0100	9840	RAI Int., Italy	PP	0300	3255	BBC via South Africa	
0100	4780	Radio Cultural Coatan, San Sebastian, Guatemala	SS	0300	5010	RTV Malagasy, Madagascar	vern
0100	9715	RDP Int., Portugal	PP	0300	9780	Republic of Yemen Radio	AA
0100	7300	Voice of Turkey	TT	0330	0330	China Radio Int., via Albania	CC
0100	6536	Radio Difusora Huancabamba, Peru	SS	0330	9570	Kol Israel	HH
0100	6973	Galei Zahal, Israel	HH	0330	7545	Radio Budapest, Hungary	
0130	9675	Radio Cancao Nova, Cachoeira Paulista, Brazil	PP	0330	9775	La Voz Evangelica, Tegucigalpa, Honduras	
0130	5995	Radio France Int. Relay, French Guiana	FF	0330	4819	Trans World Radio, Swaziland	vern
0130	11133	Radio La Red, Argentina (irregular)	SS/usb	0330	15745	Radio Sri Lanka/SLBC	
0130	4800	Radio Buenas Nuevas, San Sebastian, Guatemala	SS	0330	7390	Channel Africa, South Africa	
0130	7390	Voice of Russia, via Samara	SS	0330	3345	Channel Africa	
0130	5910	Radio Ukraine Int.		0330	6139	Radio Lider, Colombia	SS
0130	6010	Radio Republica (clandestine to Cuba)	SS	0330	9720	RTV Tunisienne, Tunisia	AA
0200	7345	Radio Prague, Czech Republic		0345	4775	Trans World Radio, Puerto Lleras, Colombia	
0200	5025	Radio Rebelde, Cuba	SS	0400	5910	Marfil Estereo, Suriname	SS
0200	6000	Radio Havana Cuba		0400	4780	RTV Djibouti	FF
0200	3250	Radio Luz y Vida, San Luis, Honduras	SS	0400	4990	Radio Apinte, Guinea	DD
0200	6185	Radio Educacion, Mexico City	SS	0500	5005	Radio Nacional, Bata, Eq.. Guinea	SS
0200	7350	Voice of Russia, via Vatican	RR	0500	4950	Radio Nacional, Luanda, Angola	PP
0200	9440	Radio Slovakia Int.	FF	0500	4777	RTV Gabonaise, Gabon	FF
0200	11710	RAE, Argentina		0500	7255	Voice of Nigeria	
0230	3279	La Voz del Napo/Radio Maria, Tena, Ecuador	SS	0500	5885	Vatican Radio	GG
0230	6110	RAI, Italy, via Ascension	II	0530	5054	TIFC, San Jose, Costa Rica	SS
0230	9935	Voice of Islamic Rep. of Iran	AA/Farsi	0530	6070	CFRX, Toronto	relay CFRB
0230	9895	Radio Nederland Relay, Madagascar	SS	0530	6070	CFVP, Calgary, relay CKMX	
0230	3240	Trans World Radio, Swaziland		0530	6090	Radio Bandeirantes, Sao Paulo, Brazil	PP
0230	3320	Radio Sondergrense, South Africa	Afrikaans	0530	3340	Radio Misiones Int., Tegucigalpa, Honduras	SS
0230	7125	Russian Int. Radio, via Moldova	RR	0600	4915	Radio San Miguel, Riberalta, Bolivia	
0230	4939	Radio Amazonas, Puerto Ayacucho, Venezuela	SS	0600	4760	Ghana Broadcasting corp.	
0300	7285	Voice of Croatia		0600	7125	ELWA, Liberia	
				0630	4783v	RTV Guineenne, Guinea	FF
				0630	5030	RTV Malienne, Mali	FF
				0800	5020	Radio Burkina, Burkina Faso	FF
				0900	6030	Solomon Is. Broadcasting corp.	
				0900	6090	CFVP, Calgary, relay CKMX	
				0930	6090	Radio Bandeirantes, Sao Paulo, Brazil	
				1000	3291	Radio Misiones Int., Tegucigalpa, Honduras	
				1000	4904	Voice of Guyana	
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UTC	Freq.	Station/Country	Notes	UTC	Freq.	Station/Country	Notes
1000	4498	Radio Estambul, Guayaramerin, Bolivia	SS	<b>1600</b>	9560	Radio Ethiopia	
1000	5952.5	Radio Pio XII, Llallagua- Siglo XX, Bolivia	SS	1600	11680	Adventist World Radio, Guam	unid
1000	4717	Radio Yura, Yura, Bolivia	SS	1600	11690	Radio Jordan	
1000	6010	Radio Mil, Mexico City	SS	1600	11570	Radio Pakistan	
1000	4902	Radio San Miguel, Riberalta, Bolivia	SS	1600	17755	Radio Exterior de Espana, Spain	SS
<b>1030</b>	6010	La Voz de tu Concencisa, Puerto Lleras, Colombia	SS	<b>1630</b>	12050	Egyptian Radio	AA
1030	6035	La Voz del Guaviare, San Jose Guaviare, Colombia	SS	1630	11860	BBC Relay, Seychelles Is.	
1030	4919	Radio Quito, Ecuador	SS	<b>1700</b>	11705	Sudan Radio Service, England	AA, etc.
1030	4955	Radio Cultural Amuata, Huanta, Peru	SS	1700	12133u	AFN/AFRTS, Key West, FL	
1030	3220	HCJB, Ecuador	QQ	<b>1730</b>	11500	CVC Int., England	
1030	4910	Radio Chaskis, Otavalo, Ecuador	SS	<b>1800</b>	12105	Radio Bulgaria	
<b>1100</b>	11735	Radio Trans Mundial, Santa Maria, Brazil	PP	1800	9885	Voice of Greece	GG
1100	11960	HCJB, Ecuador	SS	1800	12035	Deutsche Welle Relay, Sri Lanka	Tigrina
1100	9970	RTBF, Belgium	FF	<b>1830</b>	15180	Trans World Radio, via UAE	
1100	9935	Radio Makedonias, Greece	GG	1830	17780	BBC Relay, Cyprus	FF
1100	7400	Radio Makedonias, Greece	GG	1830	15360	RAI Int., Italy	II
1100	11770	Deutsche Welle, Germany, via Irkutsk, Russia	GG	1830	15475	KBS World Radio, South Korea, via UK	RR
1100	Xinjiang PBS, Urumqi, China	CC		1830	15475	Africa No. One, Gabon	FF
<b>1130</b>	4905	Xiang PBS, Lhasa (Tibet) China	CC	<b>1900</b>	17680	Voz Cristiana, Santiago, Chile	SS
1130	2310	VL8A, Alice Springs, Australia		1900	9965	Public Radio of Armenia	
1130	9580	Radio Australia		<b>1930</b>	15205	Deutsche Welle relay, Rwanda	AA
1130	13730	Radio Australia Int.	GG	<b>2000</b>	17765	Radio Canada Int.	PP
1130	15615	VOA Relay, Greece		2000	9545	Voice of Indonesia	
1130	13710	All India Radio, Bangalore	Tamil	2000	15220	VOA Relay, Morocco	FF
1130	6120	Radio Japan/NHK, via Canada		2000	9635	Adventist World Radio, via South Africa	CC
1130	9430	FEBC Radio Int., Philippines	CC	2000	15120	Voice of Nigeria	
1130	3235	Radio West New Britain, Papua New Guinea		<b>2030</b>	15485	Voice of Greece, via Delano, USA	GG
1130	11610	Radio Sweden	Swedish	2030	15555	RDP Int., Portugal	PP
1130	7245	Voice of Vietnam		2030	6055	Rdf. Rwandasie, Rwanda	FF
1130	3205	Radio West Sepik, Vanimo, Papua New Guinea		2030	9680	Radio Exterior de Espana, Spain	
1130	4890	NBC, Port Moresby, Papua New Guinea		2030	11715	Radio Tanzania, Zanzibar	AA
1130	7115	Radio Thailand	various	<b>2100</b>	9990	Radio Cairo, Egypt	AA
1130	9440	China Radio Int., Kunming	CC	2100	13630	Radio Australia	
<b>1200</b>	4605	Radio Republik Indonesia, Serui, (Papua)	II	2100	15720	Radio New Zealand Int.	
1200	9595	Radio Nikkei, Japan	JJ	2100	15345	RTV Marocaine, Morocco	AA
1200	4860	All India Radio, New Delhi	EE, other	2100	11965	Star Radio, Liberia, via Ascension Is.	
<b>1230</b>	9605	BBC, England, via Japan		<b>2130</b>	13710	VOA Relay, Botswana	
1230	11740	Radio Japan/NHK, via Singapore	JJ	2130	11740	BSKSA, Saudi Arabia	AA
1230	6185	Radio Singapore Int.	CC	<b>2200</b>	4830	China Huayi Broadcasting Corp., Fuzhou, China	CC
1230	11945	BBC Relay, Thailand		2200	9580	Africa No. One, Gabon	FF
1230	9810	Radio Thailand		2200	7320	Radio Jamahiriya/Voice of Africa, Libya, via France	AA
1230	7120	Wantok Radio Light, Papua New Guinea	EE/vern	2200	6235	VOA Relay, Kuwait	
<b>1300</b>	11620	All India Radio, Delhi	Sinhala	2200	9575	Radio Medi-Un, Nador, Morocco	AA
1300	9885	Radio New Zealand Int.		2200	9870	Broadcasting Service of Kingdom of Saudi Arabia	AA
1300	9335	Voice of Korea, North Korea	FF	2200	7600	Radio Varna, Bulgaria	BB
1300	11580	KFBS, Saipan, No. Marianas	CC	<b>2230</b>	5930	Radio Prague, Czech Republic	
1300	9525	Radio Polonia		2230	15345	Radio Nacional, Argentina	SS
1300	11655	Voice of Russia, Armavir	Dari	2230	11665	Radio Japan/NHK	JJ
1300	9445	Trans world Radio via Uzbekistan	unid	2230	5470	Radio Veritas, Liberia	
1300	11850	Radio Polonia, Poland		2230	6165	Radio diffusion Nationale Tchadienne, Chad	FF
<b>1330</b>	11660	Radio Australia	CC	<b>2300</b>	6150	Radio Record, Sao Paulo, Brazil	PP
<b>1430</b>	15140	Radio Sultanate of Oman		2300	9720	Radio Victoria, Lima, Peru	SS
1430	15265	Radio Solh, via UK	Dari	2300	11810	Radio Veritas Asia, Philippines	II
1430	9290	European Music Radio, via Latvia	irregular	2300	9505	Radio Veritas Asia, Philippines	II
1430	6110	VOA Relay, Philippines		<b>2330</b>	11760	Radio Nacional, Venezuela, via Cuba	SS
<b>1500</b>	17870	Radio Rhino Int, England	to Uganda	2330	5035	Radio Aparecida, Brazil	PP
1500	15240	Radio Sweden, via Canada					
<b>1530</b>	17770	Channel Africa, South Africa					
1530	13765	Vatican Radio					

# New, Interesting, And Useful Communications Products



*The new Ameritron ARI-500 Amplifier Radio Interface lets you mount your ALS-500M amplifier out of the way in your trunk, in the luggage compartment of your van, or in the back of your motor home.*

## New Auto Bandswitching For Ameritron ALS-500M Mobile Amplifier

The Ameritron ARI-500 Amplifier Radio Interface, which sells for \$119.95, reads band data from your ICOM, Yaesu, Kenwood, or Alinco transceiver so they can remotely and automatically bandswitch your ALS-500M Solid-State Mobile 500-Watt amplifier. This lets you mount your ALS-500M amplifier out of the way in your trunk, in the luggage compartment of your van, or way in the back of your motor home.

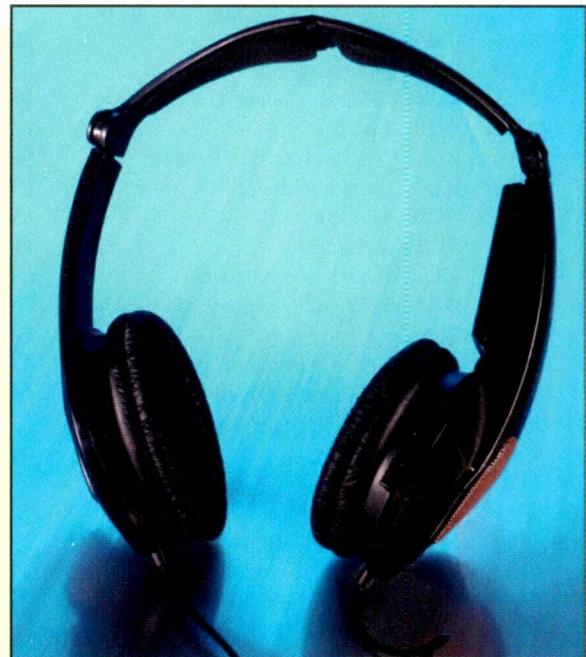
The ARI-500 works with ALS-500M amplifiers with serial numbers above 13049; serial numbers below 13049 require the ARF-500K, which sells for \$179.95. This remote kit (for ALS-500M amplifiers serial numbers below 13049) includes the ALS-500RC remote head, filter/relay board for ALS-500M, cables, hardware and instructions. ALS-500RC provides manual bandswitching.

To order, get a free catalog, or for your nearest dealer, contact Ameritron, 116 Willow Road, Starkville, MS 39759; Web: [www.ameritron.com](http://www.ameritron.com); Phone: 800-713-3550; Fax: 662-323-9810. Please tell them you read about it in *Popular Communications*.

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NoiseBuster contains patented ANR technology that, according to the company, makes it the highest performing and most stable ANR headphone on the market. It delivers 18 dB of



*NoiseBuster can be used on its own for peace and quiet or in conjunction with a portable audio device for excellent music clarity without over amplification and distortion.*

active noise reduction across a wider frequency range than other consumer audio headphones available on the market, allowing the user to enjoy audio at reasonable volume levels.

NoiseBuster is available from Pro Tech online at [www.noisebuster.net](http://www.noisebuster.net) or by calling 800-468-8371.

## MFJ Upgrades Its Voice Keyer And Phone Patch Models

MFJ Enterprises Inc. tells us its MFJ-434B and MFJ-624D are now available with 8-pin round and 8-pin modular micro-



*The new MFJ 434B Contest Voice Keyer lets you save your voice with just the push of a button for commonly used phrases.*

phone jacks (RJ-45 type). This lets you plug any type of radio into the unit and switch between different radios, great news for field day operation or when you travel with different types of radios.

The MFJ-434B is MFJ's Contest Voice Keyer. It lets you save your voice and just push a button for commonly used phrases, such as "CQ Contest, this is AA5MT," or "You're 59." The MFJ-434B saves your voice and keeps you operating past the normal time of fatigue. The MFJ-434B is transparent to your microphone: your mic's audio characteristics do not change when your Voice Keyer is installed.

The MFJ-624DM is MFJ's deluxe Hybrid phone patch. It gives you a crisp, clear, hum-free audio and is jumper selectable for Kenwood, ICOM, Yaesu, and Alinco rigs with 8 pin round or 8 pin modular microphone plugs. Use VOX or push-to-talk. RF pi-filters and pc board eliminates RF feedback. A built-in VU meter monitors phone line levels to prevent cross-talk.

Both are protected by MFJ's *No Matter What* one-year limited warranty. To order, get a free catalog, or for your nearest dealer, contact MFJ, 300 Industrial Park Road, Starkville, MS 39759; Web: [www.mfjenterprises.com](http://www.mfjenterprises.com); Phone: 800-647-1800; Fax: 662-323-6551.



Cobra's CPI 2550 Power Inverter can handle multiple loads; its power handling capability is 5000 watts peak, 2500 watts continuous.

### New Cobra CPI 2550 Power Inverter

Cobra's CPI 2550 12-volt DC-115-volt AC Power Inverter has 2500 watts continuous power handling, 5000 watts peak, with three AC receptacles, an LED volt/amp meter, and is remote on/off capable.

With an input voltage from 10.0 to 14.9 volts DC, you can power a multitude of AC appliances, including a 1/2-HP submersible pump that draws (typi-

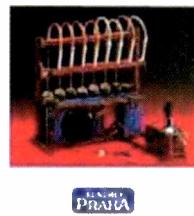
cal) 1400 watts, can openers, fans, audio products (TVs, recorders, VCRs, etc.), and "heavy duty" tools, including circular saws and 10 gallon wet/dry vacs. The CPI 2550 has a low voltage cutoff of 9.5 volts. It weighs in at 10 pounds, six ounces and measures 2.75 x 9.125 x 14.5 inches (HWD).

For more information on the Cobra CPI 2550 Power Inverter, which sells for \$329.95, visit the Cobra website at [www.cobraelectronics.com](http://www.cobraelectronics.com) or call them at 773-889-8870.

**QSL**



**Otto Wichterle**



One of the new 2006 special QSL cards from Radio Praha features Otto Wichterle, a Czech chemist who patented 150 inventions, the most famous of which is hydrogel, used to make the first soft contact lenses in the world. This QSL card depicts his machine for making lenses circa 1961. (Photo courtesy National Technical Museum)

### Radio Praha New QSL Cards For 2006

The Czech Republic's Radio Praha, on shortwave and online at [www.radio.cz](http://www.radio.cz), has a brand new series of QSL cards with the theme "Czech Scientists And Inventors" for listeners who send in reception reports. The station sent us the series and in a word (or two!) they're very professional looking and would be a great addition to your QSL card collection!

For more information visit the Radio Prague website or e-mail the station at [cr@radio.cz](mailto:cr@radio.cz). Radio Prague's complete shortwave schedule is also online.

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# Military Gear: Perfect For Emergencies!

**A**s long-time readers of this column might remember, I have an extended military background going back to 1967 when I signed on with the USAF. What followed was a 20-year career in military communications (MilCom) and a passionate love of "green radios" and the folks who used and maintained them.

While some might consider what follows as straying from the "Homeland Security" theme, let me assure you that what we're going to discuss over the next couple of installments is directly related to "HOMSEC" communications gear and can be a real life saver. Warning: this spin-off could possibly lead to an obsessive endeavor to collect, restore, and use some of the most interesting, legendary, and rugged communications equipment ever conceived.

In an emergency, MilCom gear, used on HF and VHF amateur radio frequencies, can provide some extremely rugged, highly survivable means of communications. I mean this stuff is designed to survive the rigors of combat! What could be better than having a radio that you literally can't kill? As we will see in these next two installments of "Homeland Security," collecting, restoring, and using MilCom equipment is fun, relatively inexpensive (as long as you stay away from e-Bay), extremely addictive, and can yield huge rewards in the EmComm arena.

## Okay To Buy And Use

MilCom gear can be purchased, owned, and operated by civilians. There is absolutely nothing wrong with that, provided the initial procurement was lawful (i.e., not stolen government property). If you intend to actually use this gear once you've restored it, then you must have the appropriate FCC license to put it on the air. Normally, a ham license with HF privileges is all it takes to have some real fun in the radio hobby. Of course, if you have a Technician class (VHF) license, then you will be limited to the MilCom gear that covers the amateur radio bands above 30 MHz. Either way, you can become involved with one of the most rewarding facets of the radio hobby.

I'll confine our discussion of MilCom radio gear to the more popular units that can still be acquired on today's market. I'll concentrate on post-WWII communications gear because this surplus comm equipment abounds, there are plenty of people out there in the MilCom hobby to help you out when you need questions answered, and, finally, parts procurement is normally not a problem. There are several Internet groups that specialize in MilCom gear, just search for "grc," "trc," "urc," and "military radios" and you'll be rewarded with an abundance of URLs.

To the uninitiated, military communications equipment can be quite intimidating. The gear is normally big, heavy, green (sometimes black), has lots of cables, switches, and knobs, and features hefty instruction manuals called "TMs" or "Tos." Then there are the power supply issues. Most MilCom gear requires some hard-to-find power supplies (or, better yet, a dynamotor) furnishing some really weird voltages to be fully operational.



*The AN/TRC-77(A) is a 5- to 15-watt CW-only transmitter/receiver designed specifically for clandestine operations. Used by U.S. Special Forces, Air Force Special Ops, and Navy SEALS, the TRC-77(A) is a rugged, hybrid (all transistor except for the driver and final amplifier, which are vacuum tubes) design that was used by forward elements when they were out of VHF FM voice range. The transmitter can load up into almost any type of wire antenna. It features six crystal-controlled channels in the 3- to 8-MHz range. The transmitter is keyed using a J-45 straight key or a GRA-71 high-speed (300 wpm) code burst device.*

In actuality, though, most MilCom gear is pretty standard communications equipment designed and engineered to meet the extreme physical requirements of combat. True, the voltages are somewhat unusual (24 VDC, for example) but certainly not a showstopper for someone not afraid to melt a little solder. Cables and connectors can provide endless hours of amusement or torture, depending upon your frame of mind. However, these small hurdles are easily overcome if you will do a little research, ask some questions of the "old timers" (a.k.a. OTs), and be prepared to learn a little about our hobby.

## ARC-5 Command Sets— A Humble Beginning

My early exposure to MilCom equipment came in my Novice ham radio days of the early 1960s. One of my early "Elmers" in the radio hobby was the town cobbler, Mel Sims, W7CIS. Mel owned and operated the shoe and leather repair shop in my hometown of Palouse, Washington. Mel and my other Elmer, George Comstock, W7CJ, shepherded my early attempts to get my ham license. Mel offered to loan me a surplus receiver to help me obtain my Novice license. This rare and unique device was the start of a 40-plus-year love affair with "green radios" (although this particular receiver was actually done in black wrinkle finish).

After WWII the surplus market was flooded with all sorts of MilCom equipment. Among the most treasured were the ARC-5 Command Sets that saw combat in many Allied aircraft during the war. These sets were distinctive in that each receiver and



No MilCom HF radio set can be considered complete unless you have a mil-spec field strength meter (FSM). Of course, the DoD came to the aid of all HF operators with this ME-61/GRC tunable FSM. The meter movement is quite sensitive and when I use mine with my TRC-77A or GRC-106, I can check transmitter tuning quickly with this meter.

Cost of one of these little accessories was about \$30 on e-Bay.

transmitter covered a different range of frequencies, and in order to get adequate band coverage in your shack, you ended up with at least three or four receivers and as many transmitters along with their associated equipment racks, shock mounts, modulators, dynamotors, and cabling, etc.

Many OTs are familiar with the receiver that Mel had given me, an old ARC-5 Command Set receiver. These receivers, along with their companion transmitters, were powered by dynamotor power supplies (the early version of a DC-to-DC converter) that used 24 or 28 volts from inside the aircraft, tank, troop carrier, etc. While the Command Sets were in abundance, you needed several of them to cover the major bands due to their limited tuning range. In my case, Mel provided me with the BC-455/R-19, a 6- to 9-MHz version that covered 40 meters. If I wanted to work 80 meters, I'd have to get another ARC-5 (BC-454/R-17) that covered the 3.5- to 4-MHz part of the spectrum.

Many hams removed the dynamotors and built a small AC power supply onto the rear deck area where the dynamotor used to be. This was handy, but it destroyed the originality, not

*The BC-611 was the radio that won the war—WWII, of course! This little HF transmitter/receiver gave frontline GIs instant communications between various units in combat. Rapid communications in the combat area was one of the major contributors to the Allies' winning the war. The BC-611 put out about 300 mW on 75 meters (most were rocked up on 3885 kHz). Modulation of this unit was high-level AM and range was one-quarter to a half-mile under most conditions.*

to mention the collector value of the set, which in this day and age is of primary importance.

As I gained experience with Mel's loner receiver, I longed for more frequency coverage and finally persuaded Mom and Dad to allow me to get a Heathkit HR-10 ham band receiver that covered all the major HF ham bands of the day. I still have that receiver and use it regularly, just so I never forget my roots! Mom and Dad were only too happy to front me the money for my new Heathkit receiver thanks to two totally unrelated events.

Prior to obtaining Mel's ARC-5 receiver, I had attempted to build a receiver from the 1959 *ARRL Handbook*. This ended in a minor disaster when, after applying power, the shack was showered with sparks and the air was filled with the pungent smell of melting insulation and boiling lacquer (from the power supply's transformer windings). Dad came flying into the room with a stunned look on his face and a small fire extinguisher in his hand. Thankfully, I had not managed to set the entire house on fire, just a small portion of my workbench, namely the area that held the 1959 *ARRL Handbook*. (There is an object lesson there; I just haven't figured it out yet. Hey, it's only been 40-plus years!)

The second incident centered upon the ARC-5 set itself. Dad and Mom were always a bit leery after that incident, and when I brought Mel's receiver into the shack, they looked over the power supply and the receiver with its dynamotor, and they decided that there just had to be a better way. Mom was really wary of the dynamotor as she was under the distinct impression that motors were not required to listen to a radio. Well, Mom was partially correct: *most* radios don't require motors, but the *really neat ones* do!

During the few months I had the ARC-5 in my shack I became quite good at tuning it and developed my skills of separating out Novice CW stations, letting my brain become my "active" CW filter. My main complaint was that the Trimm 2000-ohm headphones became uncomfortable after a couple of hours! This initial MilCom experience was filed away as a "data point" (as my good friend Joe Everhart, N2CX, would say) in my cerebral cortex for future reference.

That future reference came while in tech school at Kessler AFB in Mississippi in 1967-68. One of the guys in the barracks had a BC-455/R-19 receiver and a small two-tube crystal-controlled transmitter on 40 meters. Using an end-fed wire out the second floor window of the barracks and a 33-foot counterpoise draped around on the floor, he and I would get on the air in our limited spare time and have some fun on 40-meter CW.

Over the years of my USAF career, I was exposed to all sorts of MilCom radio gear, owing to the fact that I spent my entire





*The AN/PRC-6 replaced the BC-611 just prior to the start of the Korean War. The Prick-Six was a wideband FM handheld radio that used pencil tubes and a high-voltage battery to produce a whopping 250 mW of RF power. The frequency range was low-band VHF, which means you can convert one of these handhelds to work on 6 meters (51.0 MHz) in fine style. Range is around one mile.*

career in Air Force Comm Command. I developed a love/hate relationship with much of the “green radio gear,” but never really had any overpowering interest in obtaining anything beyond a couple of ARC-5 receivers and transmitters and a BC-221A frequency meter. In 1973 that all changed.

## Of Jeeps, Radios, And Beer

One of the neatest radio sets I ever saw in my entire life was packed into a military jeep at the Third Mobile Comm Group (3rd Herd) at Tinker AFB, Oklahoma. The military nomenclature for this highly mobile bundle of RF communications was the MRC-107 (pronounced “Mark-One Oh Seven”). The jeep, either an M-151 “Mutt” or the earlier M-38 vehicle, was modified to hold an entire suite of Collins RF equipment (HF through UHF) to allow communications with air and ground units at a forward location, in addition to long-haul, point-to-point comms. You knew you were in a “forward” area when the jeep and radio gear started picking up extra ventilation holes from incoming small arms fire!

I immediately fell in love with the MRC-107. We had two of them in the 3rd Herd, and I always wanted to take one of them out on a Field Day just to see how it would perform. The radio gear, made by Collins, consisted of a GRC-106 (pronounced “Jerk-One Oh Six) for tactical and long-haul HF SSB/FSK/AM operations, a PRC-71 (pronounced “Prick-Seventy One”) for UHF FM tactical air/ground communications, a PRC-47 man-pack HF SSB/CW radio for back-up HF coverage, and either a PRC-25 or PRC-77 for low-band (35 to 70 MHz) tac-

tical FM voice for ground-to-ground radio operations.

In order to cram all this stuff into the back of a jeep, the passenger’s seat was removed and turned around 180 degrees, which meant that the passenger became the radio operator. This was a two-person vehicle to be sure. Man, I was in heaven! A four-wheel drive Jeep, a cluster of antennas, a boatload of RF gear, and guns! The only things missing were a case of beer (or two) and some scantily clad women

sporting fully automatic weapons! Life was good!

Antennas for the radio gear bristled from the rear deck of the jeep. Long antennas for HF, short stubby antennas for UHF A/G, slightly longer vertical whips for VHF Tac—man, this thing was a beauty to behold. I was sold! I gotta get me one of these!

Thirty years have passed and I still don’t have my own MRC-107, however, I have seen two in private collections, so that goal is still attainable. While I don’t have an MRC-107, I do have a small eclectic bunch of “green radios” (along with a couple of black ones) in my humble, but growing collection. At this juncture I must confess that I do not merely collect gear, whether MilCom, QRP or boatanchors. All the gear in my possession works and is used on a regular basis. Nothing sits on a shelf. Nope, no “hangar queens” in the K7SZ shack.

## History In Action

In 1994 I became interested in obtaining some of the MilCom gear I knew I could use on the HF bands. My first purchase was a GRC-109 Special Forces/CIA spy set left over from the Cold War.



*The AN/PRC-64 was the CIA’s choice for a small, clandestine HF CW rig during the Vietnam era. Made by Delco, the PRC-64/Delco 5300 covered 2.2 to 6 MHz and 3 to 8 MHz, respectively. It can receive AM/SSB/CW and transmit AM phone and CW. Power output is 5 watts on CW and 1.5 watts on AM phone. This unit, like the TRC-77(A) and GRC-109, can be interfaced with the GRA-71 code burst transmission unit to transmit messages at 300 wpm! This unit was all solid-state and weighed in at 5 pounds. The radio was a four-channel crystal-controlled rig that served with CIA operatives as well as U.S. Special Forces.*

Fair Radio Sales was offering the complete set, receiver, transmitter, and large power supply, for around \$125. I ordered two and gave one to a friend who was a retired Marine Gunnery Sergeant, named Gunny Rake, N3 PBL.

Over the last few years Gunny Rake and I have attended all but one of the Military Radio Collector's Association (MRCA) meets in northeastern Pennsylvania. It was at one of these meets that we met a tremendous group of like-minded hams that took pleasure in obtaining, restoring, and using this vintage MilCom gear. The wealth of information that these guys have at their fingertips is truly amazing. They are a friendly bunch and always ready and willing to help the "newbie" in the hobby with hard to find schematics, advice, modifications, and operating tips. This group is truly amazing.

My GRC-109 has seen use on the 80-, 40-, and 20-meter ham bands. It's a 10-to 15-watt output, crystal-controlled CW transmitter, covering 3 to 22 MHz with a matching receiver covering 3 to 24 MHz in three bands. The receiver drifts, it is wide as a barn door, doesn't like passive or active audio filters (the receiver wanders around too much to make good use of a narrow audio filter), the transmitter chirps a bit, even on steady AC power, and the entire thing weighs in at about 50 pounds.

Can you believe that Special Forces troops (Green Berets or, as we in the Air Force like to call 'em "Green Beanies") actually jumped with this gear into the jungles of Vietnam, humped this mess through all sorts of inhospitable jungle terrain, and used it to contact their rear area bases by means of a handful of crystals, a J-45 telegraph key strapped to the leg of the radio operator, a GRA-71 high-speed (300 wpm) CW burst encoder, a GN-58 hand-cranked generator, and wire antennas? And they did all this while engaging a hostile enemy who was hell-bent upon their untimely demise! Now that is *real* radio!

I think you can see where I am going with this. Collecting MilCom gear is more than just finding a green radio and putting it on a shelf. The experience is rewarding, as all the MilCom gear has a place in the history and in the formation of our country. By refurbishing and using these vintage boatanchor radios you are not only saving and restoring a bit of history, you are using some extremely well-made and rugged radios that are well suited to life on the ham bands.

Rugged? You have absolutely *no* idea! Most of this gear was state-of-the-art (or beyond) for its time and cost the American taxpayers a few thousand dollars *each* to procure for our troops. While the gear is highly "ruggedized," much of it is extremely complicated in theory (don't take my word for it, check out the auto tuning system on a T-195 HF transmitter!), but that is offset by the thorough Technical Manuals or Tech Orders that outline the operation and maintenance of these radio sets. These TMs and TOs are written on a sixth grade reading level, and are quite comprehensive in their coverage of the theory of operation, alignment, and use of

*Here's the accessory bag for the PRC-74. Note the antenna sections, mount, handset, and all sorts of odds and ends. No MilCom packset is complete without the accessory bag!*



The AN/PRC-74 is a great HF man-pack radio that can be procured for around \$500 on e-Bay or at swap meets. This unit is a synthesized solid-state HF transceiver capable of transmitting and receiving USB voice from 2 to 12 MHz (PRC-77(A)) and 2 to 18 MHz (PRC-77(B & C)). This Vietnam-era radio and was the world's first synthesized HF packset. Power requirements are 10-17 VDC; it weighs in at 24 pounds.

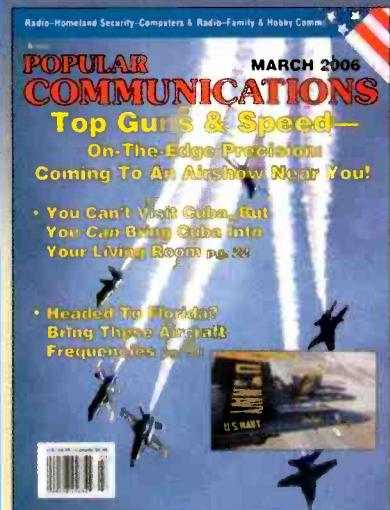


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each piece of gear. A good TM/TO library is mandatory for restoring and repairing MilCom gear. Thankfully, these documents abound on the Internet both in the hard copy format and on CD ROM.

My GRC-109 has garnered its fair share of CW QRP contacts over the years, and it's really fun to tell the other station about my rig. It's amazing hearing the reactions you get from the other operator when you send: "**RIG HR IS GRC 109 SPY SET**." In one instance the distant end op came back to me saying that he well knew what a GRC-109 was because his father, a retired U.S. Army Green Beret colonel, had used these sets early in his military career as an advisor in Vietnam!

### **Good Reading**

If you're interested in getting into the MilCom end of the hobby, I suggest obtaining the book *Mil Spec Radio Gear* by Mark Francis, KIØPF. This book is a real godsend to folks like me. Mark offers a good treatment of many of the post WWII MilCom gear that you can readily lay your hands on. He reviews the rigs, listing their frequency coverage, power requirements, accessories, tune-up hints, troubleshooting ideas, etc.

In all, *Mil Spec Radio Gear* is a must-read for anyone interested in MilCom gear. Mark's writing style is very readable and we "newbie's" can readily digest the information he presents. The book is available from CQ Communications, 25 Newbridge Road, Hicksville, NY 11801.

### **Till Next Time**

That's a wrap for this month. I hope you've enjoyed our trip down memory lane with the old MilCom gear. Remember, although this stuff may be 50 years old, it was designed to work under the worst of conditions and can be relied upon when other gear breaks down. Therefore, as a good EmComm volunteer, you should look seriously at obtaining some MilCom gear to augment your comm gear. Also remember that vacuum tube gear is all but impervious to electromagnetic pulse (EMP) discharges that occur when a nuclear device is detonated. In the event of a terrorist nuclear attack, your tube gear will be operational and the solid-state gear will be great looking paperweights.

That's all for now. Till next time, remember: Preparedness is not optional. ■

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# Radio Fun And Going Back In Time

**Q.** How far into space do you think amateur radio can go?

**A.** Well, we've already had astronauts giving testimony before Congressional committees from orbit and ham-built OSCARs (Orbiting Satellites Carrying Amateur Radio). All that is pretty far. Of course NASA and some other U.S. agencies are planning a bunch of satellites to orbit Mars. The robot satellites, to be called Mars Telecommunications Orbiters, are supposed to fly at about 250 miles above the surface and give digital guidance to ever more sophisticated Mars Global Surveyor Vehicles operating on the surface. All this is set for launch in 2009 and will cost something north of \$800 million. For that much of our money I think NASA should include some OSCARs in the program, amateur frequency assignments, and work out a reciprocal licensing agreement with Mars.

**Q.** What is the latest with radio and "eye in the sky"?

**A.** Retailers have been using radio waves to keep track of inventory that might walk out of a store. You've seen the tags on merchandise haven't you? You've heard about stolen cars being found by satellite technology built in at the factory. The technology is still being developed. Ranchers use the same technology to keep track of stray cattle that may wander off the range. Aircraft or satellites can spot them little doggies and tell the cowboys where to find them from the cattle's radio sensitive ear tags, which emit a signal when scanned from above. There are even those who think that the same technology could be used to keep track of second graders wearing badges who might stray from the playground. The jury is still out on that one though.

**Q.** All the old spy movies show the FBI chasing Nazi and Japanese agents all over this country and trying to find secret transmitters. Did they ever find any?

**A.** We do know that there were secret trials of 10 Nazi agents who had been inserted into the country by submarine. Seven were executed and three were jailed until after the war was over, but transmitters didn't play much of a part in those trials.

We do know that in May of 1942 a San Francisco radio operator pleaded guilty to transmitting information to a foreign government. He admitted to making a slight shift in the transmitting frequency of the commercial CW transmitter he was operating and transmitting a message that was supposed to contain vital information about West Coast defenses. Fortunately he made the transmission for an undercover FBI agent who gave him the message and paid him \$75. He admitted, however, that it was not the first time he had made transmissions on that frequency.

The operator lost both his commercial and amateur licenses, which were revoked for life. This was done even though he had never used his amateur station for illegal purposes. Three days after losing his licenses he was sentenced to six years in the Federal Pen. It was considered a light sentence at the time.

**Q.** What is the latest from the battlefield on the use of radio to direct bomber attacks?

**A.** You are probably talking about the Air Force Forward Ground Controllers. Basically, Forward Ground Controllers are the guys who crawl up to where they can see a target that they think needs taking out. They shine a laser beam from a target designator on the target, which tells them exactly how far they are from the mark. Then they pull out an off-the-shelf \$250 GPS and find out what their exact map coordinates are. Then using a VHF air-to-ground radio they vector in the bombers for a strike on the target. God bless all the Forward Ground Controllers. They certainly earn their pay.

**Q.** There was a lot of spying in Berlin and West Germany during the Cold War. Did the Communists use radio to instruct their agents?

**A.** Yes, they did quite a bit of that across the Berlin Wall. One of East Germany's Stasi tricks was to find a commercial radio station, then tune to a frequency just off the signal of the station. They then would send CW just outside the commercial signal. Since reception of the signal didn't require any special equipment, no search of the agent's home would turn up anything showing they were in contact with the Evil Empire.

**Q.** What part did radio intercepts play in the beginning of Operation Iraqi Freedom?

**A.** Like Desert Storm, Operation Iraqi Freedom was supposed to begin with 48 hours of air attacks called Shock and Awe. The ground attack was to begin two days later, giving Special Forces and Air Power a chance to "shape the battle space" and give the ground troops air support. Radio intercepts indicated that Saddam Hussein had ordered sabotage teams into the Rumilyah oil complex to begin destroying the more than one thousand oil wells and related facilities as soon as the first planes made their attacks anywhere in the country. Making \$50 million per day, the Baathists didn't want to move too soon. They didn't, however, want the oil fields captured to help rebuild Iraq after they were gone.

To foil Saddam's plan, the 1st Marine Expeditionary Force took off a day earlier than the air attack began. Without air cover, the Marines surprised the saboteurs and secured the Rumilyah oil complex, saving it for the new Iraqi government.

## Looking Back...

### Five Years Ago In Pop'Comm

Writer Ken Reiss hit the nail on the head when reviewing the "new" ICOM R-3, saying the first word out of your mouth would be, "WOW." Hot then and still hot, the R-3 got Ken's thumbs up in April 2001. Still a great read is Bill Hoefer's "Plane Sense" column, on page 20 of that April *Pop'Comm*. His topic: "Controller And Pilot Talk—What It All Means."

### Ten Years Ago In Pop'Comm

Back then we sometimes called them "features," but Alice Brannigan's pieces were regular columns. One excellent example of her work, in April 1996, was entitled, "WJAZ: It Was One Of A Kind!"—as was the article itself, with great old-time photos and a storyline that's right out of a "you've got to be kidding me, right?" file. In a look at 1974, when radio was radio and not the same-old, same-old rant across the band you hear today, WABC's "Musicradio 77" appeared on page 58 of the April '96 *Pop'Comm* with its "survey" of current hits. Number One? "Seasons in the Sun" by Terry Jacks.

### Twenty Years Ago In Pop'Comm

The year—and month—for photos was April 1986. There he is! A picture of Tommy "the Man" Kneitel with his Jag XK-150 appeared on page 6 of the April 1986 *Pop'Comm* (though the photo is circa 1966). Then there were some old, classic scanners thrown in throughout the issue, including a Sony Air-8, Bearcat 20/20, and Regency M100. Did we actually print Alice Brannigan's photo on page 25? Hmmm.

# Antenna Tuners—The Ins and Outs

**W**hen I was starting out as a ham, commercially made ham radios didn't have automatic antenna tuners built inside them. The tuners were all external, and the automatic versions were *very* expensive and tended to be made for equally expensive military radios.

When internal, automatic tuners became the rage, I noticed that some hams found them especially useful, while others had terrible luck making them do anything useful! At the time I was mystified as to why. Now that I understand antenna tuners a whole lot better, I'm still mystified that many beginners are taught the same outdated concepts that I had to stumble through!

Just the other day a couple of my friends were discussing the ins and outs of how to use a built-in tuner. I'm not divulging their names to protect the guilty! One said the internal tuners were good for tweaking an already resonant antenna (such as using a dipole cut for the low end of 80 meters on the high end of the band), while the other thought it was fine to use them to "tune" a "random-length dipole" on multiple bands, eliminating the need for an external tuner.

As my friends' good-natured quarrel illustrates, antenna tuners—and the myths surrounding their use—are as popular as ever. New types and new applications make choosing and using an antenna tuner (or choosing not to use one) potentially confusing, especially for newcomers.

## Myths And Legends

There's a lot of hype and folklore surrounding antenna tuners, especially when it comes to what they can and can't do. Figuring out whether your station really needs one is half the battle. The other half is finding an antenna tuner with the right features at a price you can afford.

Where to begin? Basically, your transmitter wants to "see" an antenna that's as close to an impedance of 50 ohms as possible. If you're like most hams, a length of 50-ohm coax connects your antenna to your transmitter.

When an antenna is properly matched to your transmitter (meaning that the antenna is *resonant* or nearly so), most of the power sent through the transmission line reaches the antenna and is radiated into space (good!). If the antenna isn't properly matched, some of the energy in the transmission line bounces back and forth between the antenna and the transmitter instead of being radiated (not so good!). Serious mismatches can *greatly* reduce your transmitted signal and might even damage or destroy your transmitter or transmission line! The greater the mismatch, the less power your antenna radiates.

The term for measuring this match (or mismatch) is called SWR (standing wave ratio), and it's measured with an SWR meter (of course!). Simply put, a ratio of 1:1 (or close to it) is



*Radios come and go, and with each passing a special tear is shed. But one the thing that never goes away—in my shack, at least—is my trusty SGC SG-231 auto-coupler! The business end of the coupler is shown here. I've been dragging this thing around since 1999, through harsh Minnesota winters, in the camper, atop the tower, wherever, and like a Timex watch from the 1970s, it "takes a licking and keeps on ticking." Like Charlton Heston's rifle, they'll have to "pry it from my cold, dead, hands!" I'm sure you get the point by now. See it and its cousins at [www.sgcworld.com](http://www.sgcworld.com).*

best; 2:1 is usable; and 3:1 or greater probably indicates a serious mismatch (for antennas fed with 50-ohm coax, anyway).

Cutting a wire antenna (or tuning a beam antenna) so it presents a 50-ohm load to your transmitter is pretty easy—if you're interested in operating on a narrow range of frequencies on one band! If you want wider coverage from the same antenna you can insert an antenna tuner between your rig and your antenna. Most operators put the tuner at the shack end of the transmission line, but much better results are usually achieved by putting the tuning network at the antenna feed point, but more on that later.

By adjusting the tuner's controls, you can "trick" your radio into putting out full power (and be "happy" in the process). When properly adjusted, there's a nearly perfect match between your rig and the tuner (1:1 SWR). There's *still* a mismatch between the tuner and the antenna, but if you're using a good-quality transmission line, most of your precious radio energy makes it to the antenna and is radiated happily into space.

In this simplified scenario, a shack-mounted antenna tuner works best at HF; the lower in frequency the better, as coax losses increase with frequency. Also, the antenna being "tuned" should be reasonably resonant (meaning that the impedance at your operating frequencies is pretty close to 50 ohms, which often rules out operation on a wide variety of bands).

Using your antenna tuner to tweak a dipole that's resonant on 7.0 MHz to work at 7.275 MHz is a good idea. So is using a tuner to load a 40-meter dipole on 15 meters (or an 80-meter dipole on 10 meters), because the bands are harmonically related in a way that results in reasonable feed line SWRs. Using your shack-mounted tuner to load a 40-meter dipole on 80 meters (or an 80-meter dipole on 160 meters, etc.) is a *terrible* idea. Although the SWR between your rig and your tuner

might be 1:1, the SWR on the coax that runs between your tuner and your antenna will be extremely high, which results in *horrible* losses.

To get around the punishing SWR losses that result from high feed line SWRs you'll have to feed your antenna with 450-ohm ladder line, which is nearly lossless compared to coax, or mount your antenna tuner at the feed point of your antenna. Completely automatic tuners designed to be mounted at the antenna feed point are available from SGC ([www.sgcworld.com](http://www.sgcworld.com)), LDG Electronics ([www.ldgelectronics.com](http://www.ldgelectronics.com)), and others. Once prohibitively expensive, auto-tuners, especially those that mount at the antenna feed point, are an excellent, often the best, way to feed a single antenna on multiple bands.

### Use A Tuner When...

- You want to feed your antenna with 450-ohm ladder line. Ladder line is almost lossless at HF (much better than coax). The problem is, ladder line is *balanced*, while your rig (and your coax) is *unbalanced*. To bridge the gap, you need an antenna tuner with a built-in *balun*, a special *balanced* to *unbalanced* transformer. For a more deluxe experience, acquire or build a tuner that's designed for balanced lines.

- You want to use your antenna on frequencies for which it isn't designed. If you try, for example, to use your 40-meter dipole on 10 meters, the SWR will be very high and poor performance will result. With an antenna tuner in-line, you'll probably be able to create a 1:1 SWR between your transmitter and your antenna tuner, permitting operation. (Some mismatches are too great for every—or any—tuner to handle.)

- Your antenna has a narrow SWR bandwidth on some bands. Some multi-band antennas don't offer low SWR from one end of a band to another. With your antenna tuner, you can operate anywhere in the band and still put out full power from a happy radio.

### Don't Use A Tuner When...

- Your SWR is 1.5:1 or less on the frequencies at which you operate. Most modern rigs will tolerate an SWR of 1.5:1 or less with no difficulty and still put out full power.

- You have a high SWR at VHF or

UHF. Because feed line losses increase rapidly at these frequencies, antenna tuners are generally not useful. The only real remedy is to use a high-quality feed line and a properly matched antenna. No shortcuts here!

- You're interfering with TVs, telephones, or other electronic equipment in the neighborhood. Despite what you may have heard, antenna tuners don't usually do a good job cleaning up these problems. Some designs reduce *harmonic radiation*, but most of the previously mentioned interference is caused by RF overload at the fundamental frequency. Tuners do nothing to reduce this (and may actually make it worse by helping you radiate an even stronger signal!).

### Extras

Useful antenna tuner features include a built-in SWR meter (otherwise you'll have to use an external meter or the one built into your rig); high-quality inductors, roller or tapped (your antenna tuner is not the place to skimp on component quality!); a built-in balun (for using open-wire line); and a built-in antenna switch (your antenna farm will likely grow). Some tuners are totally automatic: just push a button or key your transmitter and you're at 1:1 SWR.

A tuner rated at 300 watts will probably serve your 100-watt (or less) station just fine. At certain frequencies, and when trying to match certain transmission line impedances, RF voltage soars and can even cause sparks or arcing! This can destroy your tuner and/or your rig, so when it comes to buying antenna tuners, the greater the power rating the better! If you're planning to feed a single antenna with ladder and tune it on multiple bands, use the beefiest tuner and balun you can get your hands on.

### Efficiency Counts

A tuner topic that's not frequently addressed is tuner efficiency. Just because a particular tuner can effect a match on a certain frequency with a certain antenna, the losses *inside the tuner* can be less than desirable. The ratio between tuner input power and tuner output power defines its efficiency (its internal losses). Good tuners usually have losses in the 5- to 15-percent range, but losses can soar to 50 percent and even 60 percent in certain models (usually when matching antennas

on 160 meters or other *more extreme* frequencies). That's a lot of heat!

### In Summary

So what tuners do I recommend? I have a couple conventional tuners, a few that I've built myself, a home-brew balanced line tuner (nice), and an auto-tuner that mounts at the antenna feed point. And although each tuner is useful in various applications, I love the speed and performance of putting an auto-tuner at the antenna end of the feed line instead of in the shack. Band changes are instantaneous, feed line losses are essentially zero, and the thing just works like a champ. Yes, it was a bit of a hassle to mount and power, but the benefits far outweigh the hassle factor. If you want to use a single antenna from DC to daylight, there are few solutions that work better—and none that are more convenient.

Remember, your comments, questions, and shack photos are always welcome. Drop me a line at *Popular Communications*, 25 Newbridge Road, Hicksville, NY 11801. See you again next month! ■

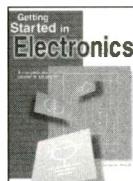
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# Propagation And Shortwave Listening

**H**ave you heard fellow radio hobbyists say, "I don't really need to know what the sun is doing, I just get on the air and try my luck at catching some DX," or, "I like the thrill of the hunt"? I get on the radio, tune around, and just see what I can catch," or similar comments that convey the idea that exploring the science of propagation is a waste of time, or perhaps even unsportsman-like?

I admit that I, too, have fully enjoyed the sheer joy of randomly picking a range of frequencies and patiently tuning around to find new and exotic signals. What a pleasure to discover a radio broadcast from South Africa, or hear a DX pile-up between rabid amateur radio operators in North and South America and the rare European running his 1000-watt studio-quality signal into his five-over-five-over-five (that's three separate five-element beam antennas, one above the other) on a day when barely any other signal can be heard!

I once had just such a memorable experience that was totally unexpected. I awoke one morning, just after the early eastern Montana sun began warming up the springtime air. I had this

strange urge to stop in at my little radio room on the way to the kitchen for a breakfast. I sat down and fired up the Kenwood transceiver and decided to check out the Technician Plus CW-only (Morse code) segment of 15 meters.

As the three tubes warmed up, I tuned from one band-edge to the other. All that could be heard was white noise, just a steady hiss. No signals. No beeps, tones, or voice. It seemed that the band was dead. Propagation was not happening. I figured that if I heard nothing, from band edge to band edge, then signals were being lost in space. I was sure, given the high number of amateurs around the entire world, that someone, somewhere was on 15 meters having a conversation, or at least calling, "CQ, CQ."

After I waited about 10 minutes for the transmitting tubes to fully warm up and settle in, I decided to just try sending a nice seven-word-per-minute CW call for any station. I got comfortable in my chair, adjusted my Navy World War II key (one used actually for signal lamps from ship to ship, and not originally for radio, see it at <http://hfradio.org/graphics/cw-key.gif>), and

## 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 ( $K_p > 5$  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 trans-polar 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  $3700^\circ$  K (compared to  $5700^\circ$  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>.

started sending my “CQ CQ CQ de N7PMS” (that was my previous callsign while living in Montana). I sent this call several times. Then, I waited.

I did not have to wait long. Within seconds, a steady, rather strong signal came out of the speakers—so strong, in fact, that I initially thought it was a station from nearby neighbors, also hams. But the answering callsign did not belong to any of the locals. It was a JA callsign—from Japan!

The QSO (two-way conversation via radio) lasted well over half an hour. It was quite pleasurable. Eventually, the fine gentleman, in his 70th decade, sent me a picture of himself, his operating station, and an attractive QSL (confirmation of the two-way contact via radio) card.

This whole experience was unplanned, and certainly a surprise since I heard no one else before or after that, for a few hours, anywhere on that band. This was a testament to the fact that I did not need to know any propagation science to have a most exciting radio experience.

That's not unlike going fishing on a warm, lazy summer day. Hike up to a favorite fishing spot, sit down on a large sun-warmed rock, and drink in the sounds and sights of nature while waiting for a bite on your bait. It might be fun to just “try your luck” and muck about fishing, enjoying the outdoors. However, if you have limited time and resources and want to *maximize* your experience, at least to catch something for a fulfilling dinner, you might want to know when and where to fish.

## Help Is Right Here!

Many sports enthusiasts want to maximize their investment in time, energy, and expense, and it *is* considered good sportsmanship to acquire the type of equipment that helps the fisherman or the hunter find and secure the hunted. That can include sonar, birdcalls, scents, or anything else that might give you an edge.

Wouldn't it then make sense that the radio hobbyist might want to build better antennas, study space weather, and apply the tools of propagation forecasting to hone operating skills? Sure it would.

I have to say that I was blessed this month with the arrival of two letters from readers of this column. It was refreshing to have received correspondence from these readers since it is a bit rare to hear from folks! (Have *you* written your favorite columnist, lately? If you've thought about it, follow through. Hearing from you not only makes our writing more rewarding, but also helps us shape our columns into more useful resources for you).

One reader wants to know how to determine when good propagation might occur. I'm sure that many readers might want to know that so they can plan for the best time to set aside in a busy family schedule for “hobby time.” If you knew that conditions are likely to be lousy this weekend, but great next weekend, then you might want to plan your spring cleaning for this weekend, and have the next weekend for a mini DXpedition from your favorite campground, where you could put out a beverage antenna and catch some nice foreign signals.

Our first letter comes from Floyd Pfeffer.

I am a beginner to SW listening. I just purchased an ICOM R-75 receiver. At first I just want to listen to as many worldband AM stations as possible. I experience lots of static almost every night. Even

when I get a signal, the static makes it hard to hear the audio. I have checked local noise from TVs, fluorescent lamps, dimmers, etc.

I would just like to know if there is an easy index to check to know when the probability of good propagation will occur. Can I just look at the A index and the SFI? Most of what I want to hear is between 5000 kHz and 20,000 kHz in my evenings, from 00:00 to 04:00 UTC. Any help or advice would be greatly appreciated.

Thank you for writing, Floyd. Welcome to the world of short-wave radio listening (SWL). What a great hobby! I hope that you will find as much joy in pursuing the rare stations and signals as I've experienced. Let's dive right into the first issue, that of noise. You state that you checked local noise. I'm sure that you've used the “turn off the item to see if it makes a difference” method.

I've had to get extreme and shut down the entire *house* by manually tripping all circuit breakers to test water heaters and space heaters, then turning on the other circuits, one by one. Once I found the offending circuit (the one where most of the noise came back when switched back on), I started unplugging all the devices on that circuit. Many devices don't truly turn *off*; they just go into stand-by mode. I've found that computer networking devices, cordless phones, power transformers and power supplies, dimmers, fans, and even water heaters are to blame.

There have also been places where I've lived that, after turning off everything in the house via circuit breakers, I still had noise problems. In those cases, I've found noise coming from the house next door, other apartments nearby, even streetlights at night, or car port lighting that only turns on at night. Using a portable AM radio, I can often track down the streetlight or other source.

When my local area has a complete power outage (and that happens several times a year where I live, out in the woods), the radio spectrum gets much less noisy. Those moments are excellent, since the weakest signals are easier to hear. Any noise remaining at this point is that from a more distant source, and has been propagated either by groundwave or skywave propagation.

Groundwave propagation describes how a radio wave travels away from the generating source, out along the surface of the Earth (in a sense hugging the surface) for great distances. Groundwave propagation is most efficient at *lower* frequencies, especially in the medium frequency (MF), low frequency (LF, or longwave) bands and below.

Skywave propagation describes how a radio signal is reflected or refracted by the ionosphere back toward the Earth, causing a radio wave to reach very distant areas. Think of the reflection of a beam from a flashlight. When you stand off to the side and shine the flashlight at an angle toward a mirror, the beam will be reflected at the same, but opposite angle, toward a distant spot. When shortwave, and sometimes medium frequency, radio waves spread out away from their source and reach the ionosphere, they are reflected back toward the Earth, and might then be bounced back toward the ionosphere by the Earth, repeating this skip several times or more. In this way, skywave propagation allows a signal to reach around the world.

Groundwave tends to lose its energy through the loss it experiences traveling along the surface of the Earth. While skywave can be absorbed at certain frequencies in the lower regions of the ionosphere, skywave experiences much less attenuation because the majority of its journey is through the Earth's atmosphere.

**Optimum Working Frequencies (MHz) - For April 2006 - Flux = 74, Created by NW7US**

UTC TO/FROM US WEST COAST	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CARIBBEAN	22	21	21	20	18	16	15	14	13	12	11	11	10	13	15	17	18	19	20	21	21	22	22	22
NORTHERN SOUTH AMERICA	27	27	27	24	22	20	19	17	16	15	14	14	13	15	18	20	22	24	25	26	26	27	27	27
CENTRAL SOUTH AMERICA	28	25	23	21	19	18	17	16	15	14	13	15	14	17	20	23	25	26	28	28	29	29	29	28
SOUTHERN SOUTH AMERICA	26	23	21	19	18	17	16	15	14	13	13	12	14	14	17	20	22	24	26	27	28	29	29	28
WESTERN EUROPE	14	12	9	9	12	14	10	10	9	9	10	14	16	17	18	18	18	18	18	18	18	17	17	16
EASTERN EUROPE	9	9	8	8	12	14	15	13	9	9	12	14	15	16	17	17	17	17	16	16	15	13	10	9
EASTERN NORTH AMERICA	24	24	23	21	19	17	16	15	14	13	12	12	13	17	20	21	23	24	24	25	25	25	25	25
CENTRAL NORTH AMERICA	14	13	13	12	11	10	9	9	8	7	7	7	6	8	10	11	12	13	13	14	14	14	14	14
WESTERN NORTH AMERICA	7	7	7	7	6	6	5	5	4	4	4	3	3	3	4	5	6	6	7	7	7	7	7	7
SOUTHERN NORTH AMERICA	23	22	22	21	20	18	17	15	14	13	12	12	11	12	15	17	19	20	21	22	22	23	23	23
NORTHERN AFRICA	13	12	11	11	10	9	10	10	9	9	9	14	16	17	18	18	19	19	20	19	18	17	15	14
CENTRAL AFRICA	16	15	14	13	12	13	10	9	9	9	10	14	16	17	18	18	19	19	19	19	20	19	18	17
SOUTH AFRICA	17	16	15	14	14	13	14	13	12	12	11	11	16	19	21	22	23	23	24	24	24	22	20	19
MIDDLE EAST	10	10	9	10	14	15	14	11	9	9	12	14	15	16	17	18	18	18	18	16	14	13	12	11
JAPAN	20	20	20	19	19	18	17	15	12	11	11	10	10	9	9	11	10	10	9	12	15	17	18	19
CENTRAL ASIA	20	20	20	19	19	18	17	15	12	11	11	10	10	9	9	14	16	14	14	13	12	13	16	19
INDIA	16	16	16	16	16	15	14	13	10	9	12	12	9	9	8	8	8	8	10	13	14	15	15	15
THAILAND	17	19	19	19	18	18	17	15	12	11	10	10	9	9	12	15	17	16	15	14	13	12	12	14
AUSTRALIA	26	27	28	29	29	28	27	25	22	21	19	18	16	15	15	14	15	15	14	13	15	19	22	24
CHINA	19	19	19	19	18	18	17	15	13	10	10	9	9	13	12	11	10	10	9	9	14	16	18	18
SOUTH PACIFIC	29	30	30	29	29	28	26	23	21	19	18	16	15	15	14	13	13	12	13	20	24	26	28	29
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	25	24	23	22	20	18	17	15	14	13	13	12	13	16	18	20	21	22	23	24	24	25	25	25
NORTHERN SOUTH AMERICA	25	25	24	22	20	18	17	16	15	14	13	12	12	15	17	19	21	22	23	24	24	25	25	25
CENTRAL SOUTH AMERICA	27	25	23	21	19	18	16	15	15	14	13	14	16	19	21	23	25	26	27	28	29	29	29	28
SOUTHERN SOUTH AMERICA	26	23	21	19	18	17	16	15	14	13	13	12	14	16	19	22	23	25	26	27	28	29	29	28
WESTERN EUROPE	13	10	9	9	10	10	9	9	9	9	13	15	17	18	18	19	19	19	19	18	18	17	16	15
EASTERN EUROPE	9	9	9	8	10	10	10	9	9	9	14	16	17	18	18	18	18	18	17	17	16	15	13	10
EASTERN NORTH AMERICA	18	17	16	15	14	13	12	11	10	9	9	8	11	13	15	16	17	17	18	18	18	18	18	18
CENTRAL NORTH AMERICA	8	8	8	7	6	6	5	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	9	8	8	7	7	6	8	10	11	12	13	13	14	14	14	14	14
SOUTHERN NORTH AMERICA	16	16	15	15	14	12	11	10	10	9	8	8	9	11	13	14	14	15	16	16	16	16	16	16
NORTHERN AFRICA	17	15	14	13	12	11	11	10	10	9	12	15	17	18	19	20	20	20	20	20	20	20	20	18
CENTRAL AFRICA	16	15	14	13	12	11	10	10	9	9	12	15	17	18	19	20	20	20	20	20	20	19	17	
SOUTH AFRICA	17	16	15	14	14	13	13	17	16	15	14	16	20	23	25	27	28	29	26	24	22	20	19	
MIDDLE EAST	11	10	10	9	11	10	10	9	9	9	14	16	17	18	19	19	20	19	18	17	15	14	13	12
JAPAN	20	19	19	18	17	16	13	11	11	10	10	9	9	12	11	11	10	10	9	13	15	17	18	19
CENTRAL ASIA	20	19	19	18	17	15	13	11	10	10	9	9	10	14	16	17	16	15	14	13	12	13	16	19
INDIA	11	13	14	14	15	14	10	9	9	9	12	14	15	15	14	14	13	11	9	8	8	8	8	8
THAILAND	16	18	18	18	17	15	13	10	10	9	9	9	14	16	17	18	18	17	15	14	13	13	12	13
AUSTRALIA	27	28	29	29	28	26	24	22	20	18	17	16	15	14	15	16	15	14	14	13	13	16	20	23
CHINA	18	19	18	17	17	15	13	10	10	9	9	9	14	15	12	11	11	10	10	9	9	14	16	17
SOUTH PACIFIC	30	29	29	29	28	26	24	21	19	17	16	15	14	14	13	13	12	12	16	22	25	27	28	29
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	20	19	18	17	15	14	13	12	11	10	10	10	12	14	15	16	17	18	19	19	20	20	20	20
NORTHERN SOUTH AMERICA	22	22	21	19	17	16	15	14	13	12	11	11	12	15	16	18	19	20	21	21	22	22	22	22
CENTRAL SOUTH AMERICA	27	24	22	20	19	17	16	15	14	14	13	15	18	20	22	24	25	26	27	27	28	28	28	28
SOUTHERN SOUTH AMERICA	25	23	21	19	18	16	15	15	14	13	13	12	16	19	21	23	24	26	27	28	28	28	27	27
WESTERN EUROPE	11	10	10	9	9	8	8	10	9	9	11	14	16	17	18	18	19	19	19	18	18	17	17	16
EASTERN EUROPE	12	9	9	10	11	10	10	9	9	12	15	17	18	18	18	18	18	18	18	17	17	16	15	14
EASTERN NORTH AMERICA	8	8	8	7	6	6	5	5	5	4	4	4	4	6	6	7	8	8	8	9	9	9	9	9
CENTRAL NORTH AMERICA	18	18	17	16	14	13	12	11	10	10	9	9	12	14	15	17	18	18	19	19	19	19	19	19
WESTERN NORTH AMERICA	25	24	23	21	19	18	16	15	14	13	12	12	13	17	20	21	23	24	25	25	25	25	25	25
SOUTHERN NORTH AMERICA	20	19	19	17	16	15	13	12	11	11	10	10	11	13	15	16	17	18	19	19	20	20	20	20
NORTHERN AFRICA	18	16	15	14	13	12	12	13	12	13	17	19	21	23	24	24	25	25	25	24	24	23	21	19
CENTRAL AFRICA	16	15	14	13	12	12	13	13	12	13	17	19	21	23	24	24	25	25	24	24	23	21	19	18
SOUTH AFRICA	17	16	15	14	13	13	13	16	15	14	15	18	21	23	25	26	27	28	28	26	24	22	20	19
MIDDLE EAST	15	14	13	12	12	11	10	10	9	12	15	17	18	19	20	20	21	21	21	21	20	19	17	16
JAPAN	19	18	17	15	12	12	11	10	10	9	9	13	13	12	11	10	9	9	13	16	17	18	19	
CENTRAL ASIA	19	18	17	15	12	11	10	10	9	9	11	15	16	18	18	17	16	15	14	13	12	12	19	
INDIA	9	8	8	8	11	10	10	9	9	11	15	16	17	17	17	16	16	15	14	13	10	9	9	
THAILAND	15	17	15	13	11	10	10	9	9	9	14	16	17	18	19	19	19	17	16	15	14	13	12	

At night, mediumwave and shortwave transmissions travel better by skywave. But, there might still be noise present. In that case, it could be that the noise you are hearing has been propagated from distant sources, such as industrial plants or power transfer stations. In addition to man-made noise, there are atmospheric noise sources, such as electrical storms, winter storms where static electricity is generated, and so on.

## Reducing The Noise

More likely, though, your noise is locally generated within your house or neighborhood. How can you reduce that noise? The choice of antenna and grounding is a key component of your radio system in your fight against noise. For instance, the telescoping antennas found on many handheld shortwave receivers are the most susceptible to noise, from local electrical circuits and devices to signals from around the neighborhood. Dipoles are also notably noisy, as they tend to pick up atmospheric noise and man-made noise more than alternatives like a loop antenna. The *quietest* antenna might well be the closed-loop antenna, horizontally polarized. For a great resource on antennas, check out L. B. Cebik's site at <http://www.cebik.com/>.

How you ground your receiver is also critical. Proper grounding can nearly knock out significant noise problems. Grounding to an electrical ground in your house's electrical circuits does not solve noise problems, and will likely increase them. For the best ground, you will want to run a large-diameter grounding strap to an eight-foot grounding rod driven into moist soil. That run should be as short as possible; anything longer than a dozen feet becomes a compromise.

Not everyone can obtain such an effective radio ground, but, do the best you can with a good earth ground, and use a loop antenna (say, 160 feet of wire running around the perimeter of your property, with the two ends connected to a coax cable that then is run into your radio shack). This should significantly reduce local noise problems.

## When Will Good Propagation Occur?

Now, let's talk about how one can know when good propagation will occur. The overly simplistic general rule of thumb is that when the planetary K index ( $K_p$ ) is below 4, and especially below 3, and the 10.7-centimeter solar radio flux index is higher than 100, the better the *higher* shortwave frequencies will be propagating signals from around the world. When the solar flux is below 80, you will have marginal worldwide signals on the bands above 31 meters. The frequencies below 31 meters will propagate well during the night, though.

When the  $K_p$  rises to 4 or higher, that means that the geomagnetic field around the Earth is becoming disturbed, even stormy. That causes the ionosphere to de-energize, which reduces the ionosphere's ability to refract skywave radio signals. There is another solar weather event that can also shut down shortwave propagation altogether: An X-ray solar flare can cause nearly immediate radio blackouts that can last from mere minutes to an hour or more. Such flares mostly occur during the solar cycle's years of maximum activity.

Taking this into consideration, as well as the fact that we're experiencing much less solar activity as we move toward the cycle minimum, is there much hope for hearing rare and weak shortwave stations during the summer season on the high frequencies? Most of the big-gun international shortwave broad-

casters take the summer anomaly into consideration and adjust power, beam headings, and times to overcome conditions. But what about the lower-powered, rare DX broadcaster? In the upcoming issues, I'll begin digging into some of the propagation tools that are useful in planning your shortwave radio signal hunting.

Knowing the best times to catch a station can make your DX chasing more successful. You need to know when propagation will be best, as well as when a station is transmitting. Using the listings included in *Popular Communications*, as well as other resources such as the various lists on the Internet (see, for instance, my listings at <http://swl.hfradio.org/>), you can determine the windows of time during which you might hunt for a station. Armed with the times and frequencies, the next step is to do some propagation forecasting. The idea is to look for times when propagation is predicted to be good enough for a station's signal to propagate between its transmitter and your listening location.

## More On Longwave Beacons

John Wheaton in Tennessee writes in:

I enjoy your monthly columns on propagation in *Popular Communications* and I was particularly interested when I read your December 2005 column regarding beacons. Prior to that, I had heard one of these around 330 kHz. I had no idea what it was until reading your column. Since then, I have been able to log 35 different beacons and confirmed 30 (so far) via the Internet at the local public library.

My equipment is a Ten-Tec RX350 and a 28-foot "long wire" oriented outdoors northeast/southwest about 10 feet high with the lead-in wire attached to the northeast end. I put "long wire" in quotes because obviously 28 feet isn't anywhere near enough length to deal with waves of a full kilometer or so. I hope to get a longer outdoor antenna (or an indoor loop) in the near future.

Of the 30 beacons I have heard and confirmed, seven are ground-wave signals heard 24 hours a day with the maximum distance covered being about 100 miles. My QTH [location] is about 12 miles south of Murfreesboro TN, near the geographic center of Tennessee. The furthest groundwave beacon I have heard and confirmed is Fort Payne, Alabama. Of the beacons I have logged via night skywave, the furthest are probably West Palm Beach, Florida, and Windsor, Canada. Ninety percent of the beacons I have heard are between 325 kHz and 440 kHz. And for some strange reason, 90 percent have been located on latitudes east of my own. I am located in a broad flat valley with the nearest hills being over a mile away. Therefore, the dearth of signals from the west is likely due to my antenna system (or lack thereof) and not the terrain.

Many of the beacons I have heard register only S1 or S2 on the Ten-Tec 350's signal strength display. They are often registering no more on the strength meter than what the background noise registers.

I have concentrated my listening around days when the moon is full, as I am a believer in the "full moon effect" theory put out by W7DD in the November 2001 issue of *CQ*, page 11. But, unlike W7DD, I have not yet put together any data that tends to prove the theory in any way at any frequency.

Thanks for your excellent columns, which I continue to read with interest, particularly as they apply to the low frequencies.

Thanks, John. I'll dig deeper into these topics again later this year. I'm glad to see that the world of longwave beacon DXing has opened up for you. I bet that if you ran some really long runs of wire around your property, you'll increase your catch. A loop is also a great idea. Keep us posted on how you fare in your hunting of weak signals and what you decide to do for your antenna system.

I'm also interested in finding out how you're grounding your radio system. I'm sure that other readers will find the technical details of your radio experiences quite useful.

## High-Frequency Propagation

As we move into spring in the Northern Hemisphere we experience better DX openings from around the world on HF. This is because the sun is mostly overhead over the equator, creating equal day and night periods in both hemispheres. The Vernal Equinox at the end of March marks the day when the hours of daylight and darkness are about equal around the world. This creates an ionosphere of similar characteristics throughout more of the world than occurs during other times when it is summer in one hemisphere and winter in the other and there are extreme differences in the ionosphere.

This equalization of the ionosphere, which takes place during the equinoctial periods (autumn and spring), is responsible for optimum DX conditions, and starts late in February and lasts through late April. The improvement in propagation is most noticeable on long circuits between the Northern and Southern Hemispheres. During this season conditions are optimum for long-path as well as short-path openings, and during gray line twilight periods associated with sunrise and sunset.

April is one of the hottest months for DX. The seasonal change plays out on HF with activity moving up from 41 meters and down from 11 meters. Propagation on the higher HF frequencies (19 through 11 meters) begins to suffer late in April and into the summer months due to lower MUFs (Maximum Usable Frequencies) in the Northern Hemisphere. MUFs peak very late in the day during summer. Summertime MUFs are lower due to solar heating, which causes the ionosphere to expand. An expanded ionosphere produces lower ion density, resulting in lower MUFs.

Short-path propagation between countries in the Northern Hemisphere will drop out entirely. Higher-frequency propagation peaks in the fall. April and May are fall months in the Southern Hemisphere, making long-path DX possible. Short-path propagation from South America, South Pacific, and other areas south of the equator will be strong and reliable when

open. However, these do not happen every day on the higher frequencies.

From April to June, excellent propagation occurs on both daytime and nighttime paths. The strongest propagation occurs on paths that span areas of both day and night, following the MUF. During April, peaking in May but still in June, 16 meters may offer 24-hour DX to all parts of the world, with both short- and long-path openings occurring, sometimes at the same time! If you hear a lot of echo on a signal, you might be beamed in the wrong direction. Try the opposite azimuth. Thirty-one through 19 meters are more stable as nighttime bands, with propagation following gray line and nighttime paths.

Low-band propagation is still hot on 41 meters, with Europe in the evening and Asia in the mornings. Occasional DX openings will occur on 90 and 75 meters around sunrise.

## VHF Ionospheric Openings

On VHF, many different types of propagation modes can appear once or twice during this month. Combination propagation modes may be possible on VHF this month, making for some exciting openings. An increase in transequatorial (TE) propagation is typical during this month. Sporadic-E (*Es*) will become more common as we move into late spring and summer. There are times when *Es*, TE, and *F*<sub>2</sub>-layer propagation modes will link, providing strong DX openings on VHF between North America and New Zealand, Australia, or other areas. The best time to catch a TE opening across the geomagnetic equator is between 8 and 11 p.m. local daylight time. These TE openings will be north-south paths that cross the geomagnetic equator at an approximate right angle.

Widespread auroral displays can occur during April, bringing with them unusual ionospheric short-skip openings on the VHF bands. Best times for these to occur are during periods of radio storminess on the shortwave bands. Look for days with high planetary K (*Kp*) and A (*Ap*) figures (typically, the *Kp* should be over 5).

Will that occur often this year? Because we are nearly at the end of the current Solar Cycle 23, we are not going to see major solar flares with resultant coronal mass ejections, so we won't see many days where space weather will cause geomagnetic storms. However, I expect a possible

minor geomagnetic storm once or twice this month. This will be caused by increased solar wind speeds and density triggered by coronal holes (we've explored coronal holes in past issues). Geomagnetic storms that ignite auroras occur more often during the months around the equinoxes during early autumn and spring. This seasonal effect has been observed for more than 100 years.

Since we are in the final year of Cycle 23, there will only be occasional moments of minor geomagnetic storminess caused by fast solar winds and the passage of plasma released from the sun's corona. These probably will not be strong enough to cause the level of auroral activity needed to propagate VHF signals.

## Meteor Showers

Meteor showers provide opportunity for observing VHF/UHF meteor scatter (Ms) propagation DX. Most meteor showers are at their best after midnight when you're on the leading edge of the Earth and are meeting the meteors head-on. Before midnight, you're on the trailing edge of the Earth and the meteors have to catch up to you. As a result not only are more meteors seen in the pre-dawn hours, but their impact speeds as they encounter the Earth's atmosphere are much higher and the meteors are generally faster and brighter. This causes greater ionization, which is what you use to refract a radio signal.

Look for TV and FM broadcast "pings" (short bursts of reception) during these events. If you are an amateur radio operator, look for 6- and 2-meter openings off the ionized meteor trails.

The Lyrids, a major meteor shower, should take place from mid to late April. The unpredictability of the shower in any given year always makes the Lyrids worth watching, since we cannot say when the next unusual return may occur. If this year's event is average or better (30 to 60 good-sized meteors entering the atmosphere every hour), Ms openings could occur on the VHF bands.

I have a wealth of links at <http://prop.hfradio.org/> that provide up-to-the-minute aurora information and data. Also, check out *CQ VHF* magazine for details regarding VHF propagation through the spring and summer.

## Current Cycle 23 Progress

The Royal Observatory of Belgium

reports that the monthly mean observed sunspot number for December 2005 is 41.2, a significant spike upward from November's 18.0 and October's 8.5. The lowest daily sunspot value during December, recorded on December 7 and December 9, was 23. The highest daily sunspot count was 60 on December 3. These high and low marks are significantly lower than the spread in November. The 12-month running smoothed sunspot number centered on June 2005 is 47.9. A smoothed sunspot count of 11 is expected in April 2006, give or take about 12 points.

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7-centimeter observed monthly mean solar flux of 90.8 for December 2005, a bit higher than November's 86.3 and October's 76.7. The 12-month smoothed 10.7-centimeter flux centered on June 2005 is 91.9. The predicted smoothed 10.7-centimeter solar flux for April 2006 is about 74, give or take about 16 points.

The observed monthly mean planetary A-Index ( $A_p$ ) for December 2005 is 7, about the same for October and November. The 12-month smoothed  $A_p$  index centered on June 2005 is 13.9, just lower than in May. Expect the overall geomagnetic activity to be quiet to active during most days in April, with some isolated periods of storm level activity, since we are in the Equinoctial season.

## Where's YOUR Letter?

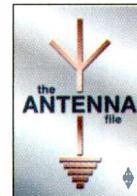
You can join in with others in discussing space weather, propagation, and shortwave or VHF listening at <http://hfradio.org/forums/>. Be sure to check out the latest conditions, as well as the educational resources about propagation, which I have put together for you at <http://prop.hfradio.org/>. I also provide a WAP/WML resource for wireless devices. If you want the latest propagation information like the solar flux,  $A_p$  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 any questions about propagation? I look forward to hearing from you and answering your questions here in "The Propagation Corner"!

Happy signal hunting—see you again next month. ■

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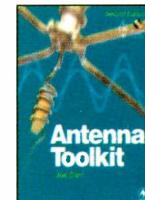
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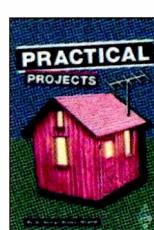
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# Building A CAT Program For Ten-Tec's RX-320

**T**hanks to the availability of inexpensive high-speed personal computers, it's now possible to create virtual electronic components using computer software. This month, we'll continue to outline how you can build virtual radios using Microsoft's new free Visual BASIC and Ten-Tec's RX-320 as the foundation.

As we've been discovering, here's no longer any advantage in building a complete radio out of "real" components today since virtual electronic components will out-perform real components every time because they always deliver 100 percent of their rated value, no matter what conditions they operate within. Plus these digital components cost far less to "manufacture" in their virtual form than real components.

Consider, for instance, that the Ten-Tec RX-320D has 34 selectable IF bandwidth filters ranging from 300 Hz to 8,000 Hz. To build a mechanical device with capacitors, coils, and crystals to reproduce the same filtering capability would be next to impossible from an engineering standpoint, and prohibitively expensive even if you could actually built it.

These two characteristics of virtual electronic components (essentially perfect-state operation all the time plus significantly reduced cost) motivated radio electronics manufacturing companies to create the first generation of DSP radios during the 1980s. The trend really took off when the first "computers-on-a-chip" ICs became available in affordable quantities.

## SDR Radio And The U.S. Military

A good example of the breakthrough in digital radio design was the Harris RF-5000 military radio (**Photo A**). Introduced in 1988, it offered a unique design that featured one of the first DSP IF and internal CPUs on a card for computer control of its functions. That generation of radios was based on crossover technology—a digital radio emulating analog functions—but it was essentially no different in its general operation than the solid-state radios of the 1970s. Engineers of that time, however, foresaw that these radios could be made fully digital, allowing the creation of the first true software-defined radio (SDR) technology, and more importantly, the networking of the radios together via built-in computer technology.

Development intensified when the U.S. military realized the high level of reliability and performance the DSP radios displayed in the field. The confidence that the field troops and commanders displayed in their digital signal processing (DSP)-based radios convinced the U.S. military command, along with most of the military leaders of the developed world, to begin converting their entire communication system over to SDR technology as soon as possible.

This changeover from individual DSP-based radio systems to true SDR technology occurred during the early 1990s when project SPEAKEasy (Phases I and II) was initiated by the U.S. military in order to create a standard for SDR technology that



*Photo A. The Harris RF-5000 series of DSP radios from the late 1980s represented the pioneering era of software-defined radio (SDR). This is the RF-5020, which as you can see was built tough and represented a real departure from earlier military design by incorporating LCD display and push button operation.*

would last well into the 21st Century. The goal of SPEAKEasy Phase I was challenging: the ability to communicate over 10 different types of radios found within all branches of the American armed forces and to do so as a single communications system over a frequency range of 2 MHz to 2 GHz. That phase was fully tested by 1997 and, while many "bugs" existed in the system, the basic concepts of SDR were found to work.

Further refinement took place during Phase II, the goal of which was to design and build a true SDR that would act as the backbone for the entire system. The criteria was that the resulting radio had to be small and portable, use open architecture software (e.g., easily upgraded with software created by third party developers), have full cross-channel connectivity (e.g., multiple modes of communication), and operate between 4 to 400 MHz.

The Phase II project was so successful that the research was fully completed in only 15 months (three years had been allocated) and the resulting radio technology went directly into production. It is currently being distributed by the Joint Tactical Radio System (JTRS) program.

## Hobbyist SDR By Ten-Tec

At the hobbyist level, we began to see the benefits of newly developed "black box" radios during the late 1990s as the first

**Table 1.**

Function	Command Code Variable
Mode	AM, USB, LSB, CW
Frequency	100 kHz to 30 MHz
BFO offset frequency	0–2000 Hz
Audio Filter	300 cycles–8000 cycles
AGC Control	Slow/Medium/Fast
Line-in Level	0–63
Speaker Output Level	0–63

civilian SDR radios began to hit the store shelves. Ten-Tec's first SDR black box, the RX-320, was first offered in 1998 and was recently updated to the RX-320D, which is capable of receiving the new shortwave digital mode, called DRM (Digital Radio Mondiale).

This radio was one of the first SDRs on the market and its design is notable because all digital signal processing takes place in the radio itself through a built-in computer on a chip, rather than having to be processed in an external computer. Furthermore, it has no external controls, other than an on/off power switch, and you have to connect the radio to a PC via a serial cable to operate it using a CAT (computer-assisted tuning) software program.

The RX-320D is an excellent SDR computer to begin with because of Ten-Tec's "open source" philosophy regarding sharing information about the command codes the CAT software needs in order to operate the radio. CAT software sends, and sometimes receives, unique command codes that are used to change the setting of the virtual components within the RX-320D. So if you want to change the frequency, control the audio volume, or set the operating mode, you need to send a command

code to the computer in the radio in order to operate these virtual controls.

The command codes used in the operation of the RX320D are comprised of a set of seven DSP functions that the radio's CPU chip (the ADSP-2101 "computer on a chip" by Analog Devices) uses to perform various tasks (see **Table 1**). The command set also controls two requests for information that the ADSP-2101 can respond to with information that can be displayed on your computer screen. These are:

#### Request Response

Signal Strength 0 – 10,000

Firmware Version VER XXX, where "X" equals a numeric value.

With those command codes as a foundation, you need to design a software program that can convey those command codes into the radio's CPU via the serial cable. Ten-Tec has provided all the required key information on their website (<http://radio.tentec.com/Amateur/Receivers/TT320/Downloads>) and you can download the software programmer's reference manual, which contains all of the command codes and example programming code in BASIC for MS DOS. Our task is then to transfer that information into a new software program based upon Microsoft's new Visual BASIC Express program, available for free at <http://msdn.microsoft.com/vstudio/express/vb/default.aspx>.

Right now let's take a look at getting started with Visual BASIC Express and how to do the necessary preliminary planning before you begin writing code for the RX-320D CAT program.

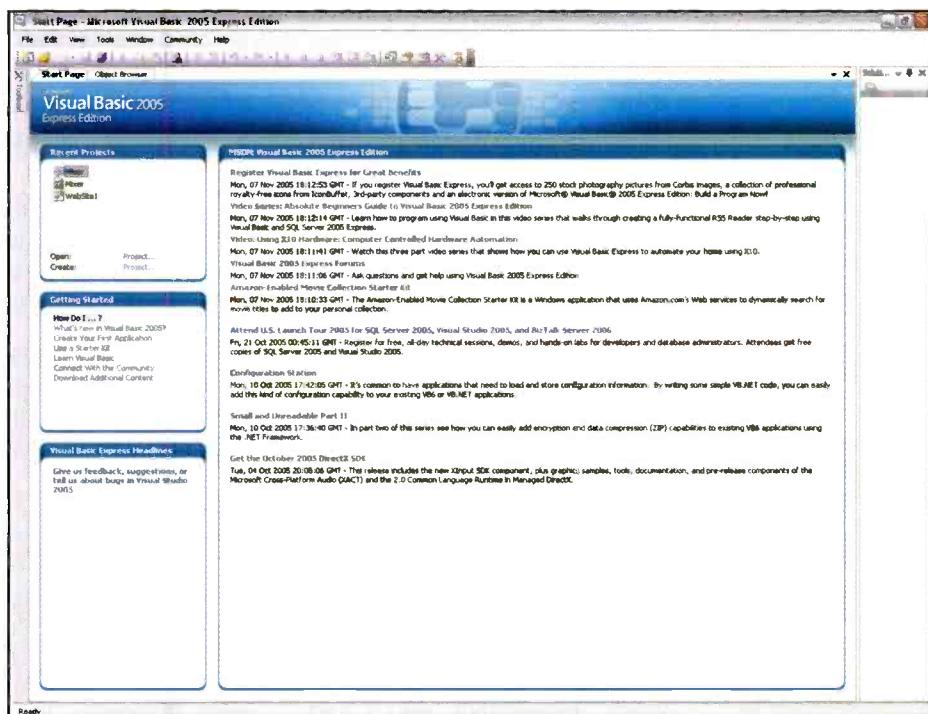
## Getting Started With Visual Basic Express

I've focused on Microsoft Visual BASIC because it is being offered for free, along with an extensive on-line training program, for a one-year period. This offer was made to allow as

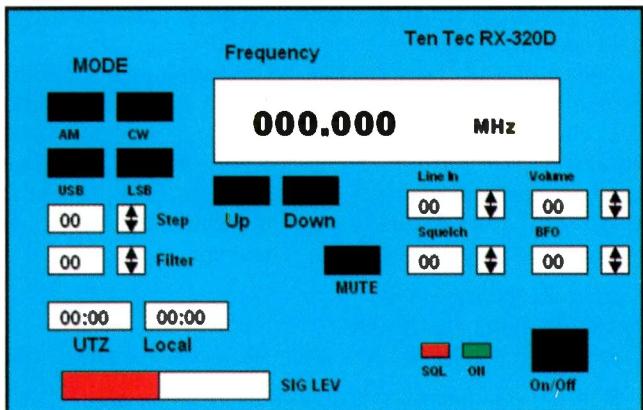
many people as possible to become involved in computer programming at a hobbyist level. While other groups and organizations previously offered free training programs, and even programming software, most of those programs were in non-standard programming languages or were geared toward a higher level, resulting in the industry being dominated by the proverbial "computer geek."

But now, thanks to the availability of cheap, extremely powerful PCs and the Internet, everyone who is "plugged in" has access to a huge library of information about computer programming. Today's computer industry is welcoming more people from more diverse backgrounds, and the biggest problem has become convincing the general public that computers are no longer overly complicated, particularly when it comes to computer programming. This has led to initiatives like Microsoft's Express program that can appeal to anyone who wants to become creative with his or her computer.

The Express software Microsoft is offering is not a toy, but the real thing,



*Photo B. When you begin using Microsoft's Visual Basic 2005 Express version, your starting point is a "Getting Started" tutorial. If you want to be successful in computer programming, just work your way through the exercises and soon you'll be "laying down code."*



*Photo C.* This is the prototype computer user interface that I designed for the RX-320D software project for this column. It was created using Microsoft Word 2000, so you really don't need a fancy graphics program to follow this exercise.

only with some non-essential bells and whistles found in the professional package missing. Given the great learning experience Microsoft is offering at no cost (other than your own computer and time invested in learning), this is a wonderful opportunity to master an increasingly valuable skill set that will directly benefit your radio monitoring hobby (not to mention maybe being the start of a new career if you're so inclined).

### First Steps With Visual BASIC

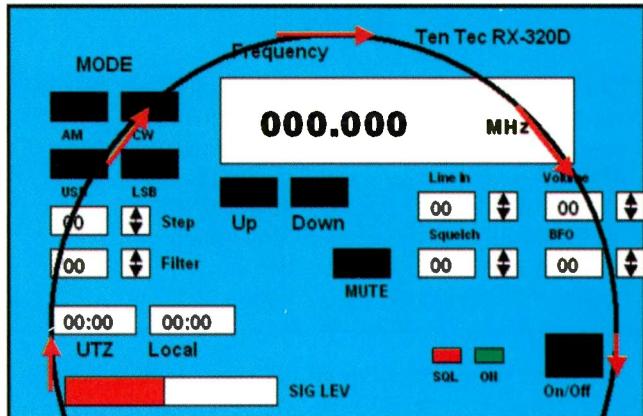
In last month's column I suggested that you download and install Visual BASIC Express if you were sincerely interested in learning how to create a CAT program for the RX-320D. Hopefully, you've done that by now and have availed yourself of the free training provided. Frankly it's practically impossible not to be able to get started with this product given the way it's set up. When you open the program, the first thing displayed is a "Getting Started" screen that provides you with a step-by-step walk-through on using the program.

There are several tutorials (**Photo B**) and pre-built templates with which you can become familiar with the mechanics of using Visual BASIC, and you should create several working software applications using those tutorials before undertaking the project I'll be describing here. While I can't outline everything you should know to successfully program in Visual BASIC, I can point you toward the tools and give you a roadmap on how to increase your chances of success in this project. Remember, as in any human pursuit, there is no guarantee of success, and in the end your level of success is determined by your level of ability and willingness to apply yourself in achieving a goal. However, in the end, the only real failures in life take place when one does not even try to do something out of a fear of failure. So even if you don't achieve 100 percent success, you are still much further ahead than most people are.

Having said all that, let's talk seriously about what you need to do to get started on the CAT software project. In general, there are five main steps involved in creating a software application in Visual BASIC, along with a lot of little steps between them.

These five main steps are,

- Define the main functions to be performed by the completed software application.
- Design and then create the user interface.



*Photo D.* This is the prototype design showing the viewing arch going from left to right. Note the way in which buttons and functions are grouped together to make access to them as easy as possible.

- Customize the look and behavior of the user interface.
- Place the Visual BASIC code into the application.
- Run and test the software application.

As I outlined in detail in last month's column, nobody writes an application program by sitting down and directly typing into a software program without doing some type of preliminary planning.

First download the background information that Ten-Tec provides for software programmers and study it in detail so you know what tasks you need to perform to control the seven main features found in the RX-320D (refer again to **Table 1**). You then need to sit down with a notebook and write out a plan for controlling those features. Next, create some drawings of what you think the applications user interface (UI) should look like. Set a clear goal for the project, and then set out a mission statement, such as:

"To successfully control the seven main features provided for the operation of Ten-Tec's RX-320D and provide a simple and easy-to-understand user interface when doing so."

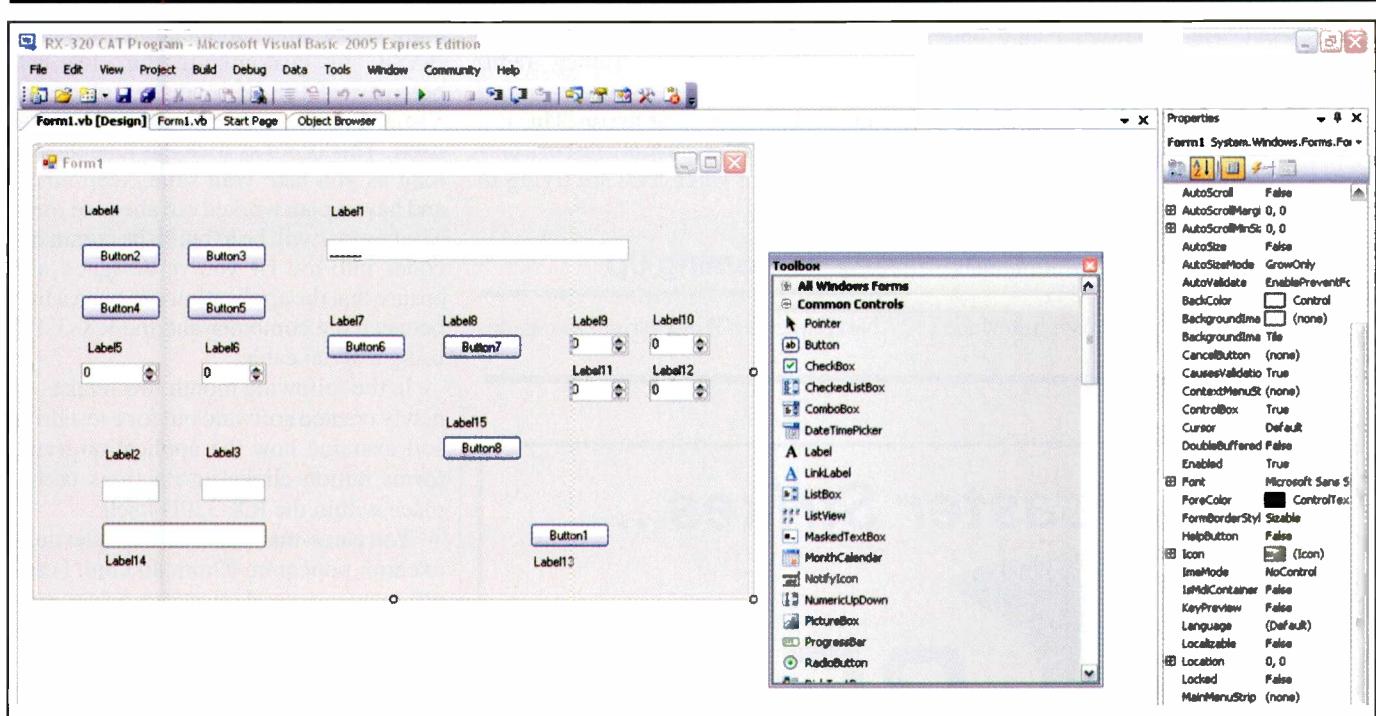
You'll want to list everything because later on you'll need to create a checklist to ensure that everything you want to include in your software design is actually in place. If you don't have such a checklist or set of design notes you're simply setting yourself up for frustration and possible failure.

Once you have all of that preliminary information in place you can begin to actually use Visual BASIC to building your CAT program. Now let's look at the design of the UI; next month we'll put BASIC code into that interface to make it work.

### Creating The CAT User Interface

One of Visual BASIC's strong points for the hobbyist software programmer is that it provides you with a powerful set of graphic design tools so you can easily design the UI for your software application. This is perfect for software programming in the Microsoft Windows environment, which is, of course, graphically oriented—you don't have to waste valuable time writing software code for those graphical elements (**Photo C**).

Before you actually dive into a programming environment, however, you will need to create a prototype design from which to work. There is a whole art and science to computer interface



*Photo E. The ideas developed through the prototype are put in place in the software application with the Visual BASIC toolbar. You may not be able to make a one-for-one representation in the final application of what you created in the prototype, but try to get as close as possible.*

design that's known by a number of different names, such as Human Factors, User Interface Design, and Ergonomics. You need to prototype your design because, very simply, there are as many ways of getting something "wrong" as of getting it "right."

An effective interface is visually apparent and forgiving and instills in the user a sense of control. The layout and design of your interface should allow for a natural flow of activity, with an absolute minimum of searching and selecting. In general there should be a consistency to all the functions shown on the screen. For example, buttons you point and click on should perform "on and off" functions and not something unexpected, like control sound volume. Likewise, you want to cluster frequently used buttons, such as frequency tuning, mode selection, and volume control, into one area (**Photo D**).

Take a look at the prototype of my own design (**Photo E**) and see how I've grouped the buttons and display items in a very deliberate way following one of the basic tenets of Human Factors, which is that frequently used buttons should be placed together and in a specific order. Referring to the analysis diagram I've included, you'll can see that physiological studies of the human eye show that it tracks an object in an arch, starting in the lower left hand corner and going to the right. This means that someone using the

software program will gather information in this order: Signal Strength, Time, Audio, Bandwidth, Tuning Step, Mode, Tuning Frequency, Audio Volume, Line In Level, BFO, Squelch, Status (Power on/off, Squelch on/off).

Notice that Mute and Tuning are in the "neutral" or middle, area of the user interface. This is because they are not "information," but function, and do not need to be scanned. Likewise, the Frequency display is at the top of the viewing arch, which is the neutral point in the arch and the most restful area to look at. Furthermore, while the primary scanning track is done from left to right, the eye can go either way if there is a need to find specific information. The key point is to place the most important tasks, such as tuning, changing modes, or audio volume, so they are easy to see and access; less important tasks should be placed further away as their importance diminishes.

Once you have laid out your design on paper (or with a computer graphics program), you can begin to "translate" that design into the Visual BASIC working area. As you can see from the illustration of the working area you begin with, you're given a blank "form" to build your UI upon. This form will reflect the default shape and display of the application program when you are finished, so literally "what you see is what you get." As you can see, I've begun to place the buttons

and other visual objects that will make up the final UI onto the form. These are drawn using the "toolbox" panel on the left-hand side of the screen, which contains a wide range of items to choose from.

At this point all I am doing is placing selected items onto the form; what I have chosen are "point and click" buttons, text display boxes, numerical display buttons, and text labels. Our task next time will be to customize the look and behavior to customize the look and behavior of the UI and then place the Visual BASIC code into the application.

Take some time to learn more about human factors in computer interface design because it's as important to create good interfaces as it is to write good computer code. Failure to do so can be a waste of your "hidden" design features and extremely frustrating to anyone using your software. There are many sources of information about Human Factors available on the Internet, as well as in many books on the subject.

A good beginning point is the Human Factors and Ergonomics Society ([www.hfes.org/web/Default.aspx](http://www.hfes.org/web/Default.aspx)), a body of professionals who develop "best practices" for many different types of industries. Offering a lighter point of view is the "Bad Human Factors Designs" webpage at [www.baddesigns.com/](http://www.baddesigns.com/). A good checklist for good human factors design can be found at [www.useit.com/papers/](http://www.useit.com/papers/)

heuristic/heuristic\_list.html, which lists 10 usability heuristics (a fancy word for "rule of thumb") that can help you make the best possible decisions on your design. One of the best sources for software design comes from Microsoft's own on-line library for software programs at [http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnanchor/html/anch\\_uidesigndev.asp](http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnanchor/html/anch_uidesigndev.asp).

The key point in any user interface

design is the old KISS factor—Keep It Simple Stupid. But remember, radio monitoring is a hobby, so whatever you create, make it enjoyable to use. This is a recreational activity and not a test of a person's endurance when they are trying to tune in stations.

### Coming Up

Next time, we'll move right along cre-

ating a software application in Visual BASIC by customizing the look and behavior of the UI, and then place the Visual BASIC code into the application itself. This is not as tricky as it sounds as long as you take your time, keep notes, and have a plan worked out ahead of time. The key task will be to build the command codes into the UI you've designed and ensure that the application can open a link between the computer and the RX-320D using a serial cable.

In the following month, we'll take our newly created software out for a test drive and examine how the application transforms button clicks into actions taking place within the RX-320D itself.

You can e-mail me with any questions to [carm\\_popcomm@hotmail.com](mailto:carm_popcomm@hotmail.com). I cannot answer general questions on computers, but will be more than happy to help you with any issues raised in the columns.

Even though we're now moving toward summer (and given what took place last year, Heaven knows what we are facing this year), there are still many people who are still feeling the effects of natural disasters such as Hurricane Katrina. I would like to suggest that you continue to send donations to the American Red Cross ([www.redcross.org/donate/donate.html](http://www.redcross.org/donate/donate.html)) to help your fellow Americans in this time of trouble. There are many other good (and ethical) organizations you can contribute to, so please use them if you wish but don't give into "charity fatigue." If you have a job, a family around you, and are living in a stable neighborhood, then show your thanks for that wonderful good luck by sharing it with someone less fortunate, and do so on a regular basis.

Our troops overseas continue to need our visible support, particularly as we head toward another hot summer. Please refer to the U.S. Department of Defense's official webpage, "Defend America." They have a specific section found at [www.defendamerica.mil/support\\_troops.html](http://www.defendamerica.mil/support_troops.html) which has an amazingly wide range of practical and useful ways that you can directly help.

Again, if you are fortunate to live in the United States of America, have a safe and secure home, a paying job and your loved ones around you when so many don't, please remember to give thanks for your personal blessings by remembering to pass on those blessings to others through regular acts of selfless sharing.

See you again next month! ■

## *When Disaster Strikes...*



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# Long (er) Range Police And Medical Radio Tags

**L**ooking for better range yet still effective electronic tags? Here's the latest news: FCC rules, Part 95, Subpart G, authorize 60 25-kHz-spaced channels in the low-power radio service for law enforcement and health care radio tracking pulsed tags. The rule states,

## 5.1009 PERMISSIBLE COMMUNICATIONS

- (b) Health care related communication for the ill
- (c) Law enforcement tracking signal, for homing or interrogation, including the tracking of persons or stolen goods, under authority or agreement with a law enforcement agency, federal, state, or local, having jurisdiction in the area where the transmitters are placed.

The longer range Part 95 radio pulse tags offer a 50-dB advantage over ultra-low-power proximity tags, as you see in the accompanying table. The 1/2-watt proximity transmitters were featured as pet locators in my August 2005 *Popular Communications* column. The article generated considerable response from search and rescue personnel, but almost everyone asked for a tiny transmitter with significantly longer-range power output.

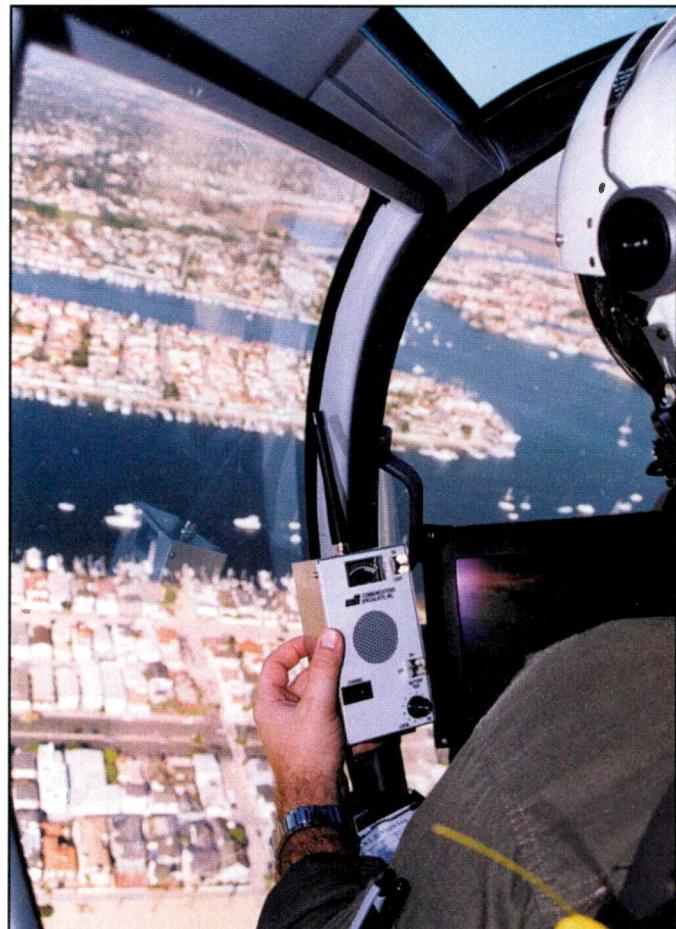
## Helped After Katrina

FCC rules prohibit a Part 15 "intentional radiator" from being modified for longer range by either adding an external antenna or jacking up power output. Yet FCC rules, 47 C.F.R. Part 95, specifically allow for long-range pulse transmissions that may easily meet the rules for search and rescue personnel. "After Katrina, bodies under rubble or found floating were initially tagged by both ultra-low-power proximity radio tags, as well as the longer range Part 95, 100 milliwatt tags," said Ron Olsen, a search and rescue responder who came in with 20 each low-power and high-power Communications Specialists radio tags, each sealed in a water-tight bag to protect it from water intrusion.

"The ultra-low-power tags could be picked up in our motor boat up to 800 feet away most of the time," Olsen continued. "We found the higher output tags, specifically authorized by the local law enforcement jurisdiction, provided a solid one-mile range to our skiff, and up to five miles range when we circled the area by helicopter."

Specially trained, surgically masked coroner teams, assisted by the search and rescue radio operators, could rapidly re-enter the secured area and quickly home in on each activated transmitter on its individual channel frequency. "While there was extensive use of Global Positioning System position fixes, the individual radio tag signals could get us back to an inch of the activated transmitter, as opposed to a GPS fatality fix within the radius of a 15-foot circle. That's a potential error of 30 feet, and valuable time could be lost when re-searching an area," added Olsen.

Several Katrina animal rescue units tagged recovered pets with the ultra-low-power transmitters, and a local trauma unit was reported to have used the higher-power tags to mark indi-



Helicopter long-range radio tests.

viduals requiring "immediate" evacuation. Of course, keeping a detailed log of radio tag channels and what type of incident they were tagging was a requirement for each search and rescue radio team deploying the small transmitters.

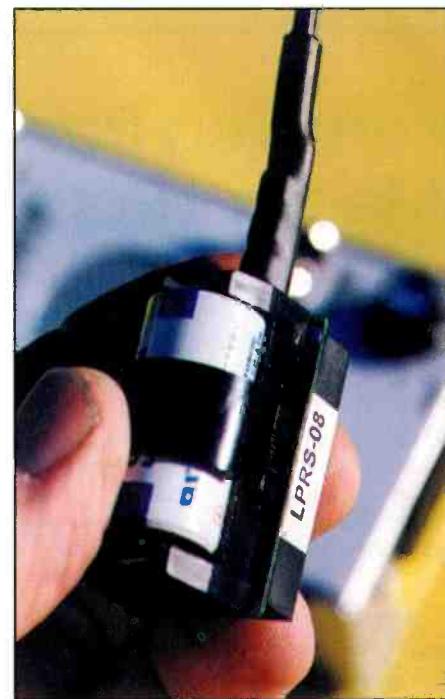
At \$50 for each transmitter, and less than \$200 for each synthesized receiver, the accidental loss of a single tag was not a horribly expensive write-off. And since the radio tags would continuously transmit for up to 30 days, and some up to 60 days, gave ample opportunity for aircraft and ground units to pinpoint the source of the transmissions.

## Some Additional Testing

I decided to do some testing of my own here in Southern California to document the airborne range of both 1/2-mW, 218-MHz "proximity range" tags and the 50-dB improvement of 100-mW law enforcement tags. I encountered some surprising results...and failures.



A search dog gets a low-power proximity radio tag in the Mississippi disaster area.



Here's a long range 100-mW radio tag with 60-day battery.

Getting reception inside the cockpit of a helicopter or airplane with a portable receiver to detect the 1/2-mW tags was nearly impossible, except when we were nearly overhead. The problem was not the low signal strength of the 1/2-mW pulse, but rather the onboard broadband noise created by the aircraft's instrumentation. When I switched over from my BNC rubber antenna to a spare airframe-approved whip on the belly of the aircraft, the ultra-low-power proximity tags could be received up to a mile away, aloft at 800 feet!

Most amazing was the helicopter range with the external antenna to the law enforcement 100-mW tags, hidden under a vehicle with rare earth magnets. At 800 feet with the external antenna, range was city wide, and I easily detected one transmitter pulsing on Channel 5 over 10 miles away. When I switched over to the 218-MHz rubber antenna inside the aircraft, reception of the law enforcement, 100-mW transmitters was indeed reduced, but still well above the high noise floor found in the cockpit, allowing city-wide detection.

### It's More Powerful Than You Think!

The Part 95 law enforcement transmitter, rated at 100-mW output, is *actually* more powerful than you might suspect. The 100-mW limit is averaged over 1 second, so at 16-ms pulses, the

pulse itself more than likely is stronger—a lot stronger!

I worked with a convalescent hospital, which was going to run the Part 95 permissible medical tag use, and I was able to ground track their clients in a wheelchair up to a mile away at street level with an outside vehicle magnetic-mount antenna.

There are plenty of uses for these amazing tags. For instance, with 60-day transmit time with a lithium CR123A battery, you could hang a tag on every belt loop of any scout with any type of medical condition when you next head for the hills or valleys on a campout. You could also check with the local forest ranger whose jurisdiction you are hiking in and secure their

permission to tag *everyone* going out into the wilderness. Think of the thousands of dollars of airborne asset cost savings if someone were to go missing from the campgrounds—you could easily track them down with your little \$200 receiver and included Moxon directional antenna system. Get on top of a hill, do a quick sweep, and you'll find that a two- to five-mile range would not be out of the ordinary for the Part 95, 100-mW tag transmitters, each ordered on its own channel and with you using a log book to track which hiker is on which channel.

Or, for law enforcement, a covert 100-mW transmitter could ping for a week using a common inexpensive CR-2032

### Tag Comparison Table

	Proximity Tag	Law Enforcement/ Medical Tag
License Requirement	None, Part 15 compliant	None, Part 95 compliant
Frequency Range	218 MHz	216 MHz
Power Output	.5 mW	100 mW
Pulse Duration	16 ms	16 ms
Pulse Repetition Rate	1 sec	1 sec
TCXO	2 ppm	1 ppm
Typical Range	2 blocks min.	1-10 miles
Transmit Battery Life	30 days	60 days; seven days coin cell
Antenna	Built-in	Short flex whip
Number Channels	30	60
Receiver Requirement:	Nearly identical portable receiver requirements, with both portable receivers dual-conversion, -150 dBm, 8-pole crystal filter, PLL frequency synthesis, CW mode with variable attenuation.	



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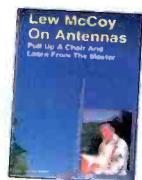
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CH #	FREQ (MHz)										
01	216.0125	11	216.2625	21	216.5125	31	216.7625	41	216.0250	51	216.5250
02	216.0375	12	216.2875	22	216.5375	32	216.7875	42	216.0750	52	216.5750
03	216.0625	13	216.3125	23	216.5625	33	216.8125	43	216.1250	53	216.6250
04	216.0875	14	216.3375	24	216.5875	34	216.8375	44	216.1750	54	216.6750
05	216.1125	15	216.3625	25	216.6125	35	216.8625	45	216.2250	55	216.7250
06	216.1375	16	216.3875	26	216.6375	36	216.8875	46	216.2750	56	216.7750
07	216.1625	17	216.4125	27	216.6625	37	216.9125	47	216.3250	57	216.8250
08	216.1875	18	216.4375	28	216.6875	38	216.9375	48	216.3750	58	216.8750
09	216.2125	19	216.4625	29	216.7125	39	216.9625	49	216.4250	59	216.9250
10	216.2375	20	216.4875	30	216.7375	40	216.9875	50	216.4750	60	216.9750

Here's the complete long-range, 100-mW, low-power radio service frequency list.

	10-19	20-29	30-39
10	218.025	20	218.275
11	218.050	21	218.300
12	218.075	22	218.325
13	218.100	23	218.350
14	218.125	24	218.375
15	218.150	25	218.400
16	218.175	26	218.425
17	218.200	27	218.450
18	218.225	28	218.475
19	218.250	29	218.500

Here are the short-range proximity tag frequencies.



A rescue tag led rescuers to a lost climbing party victim.

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battery, the same battery that plays for a month in the 1/2-mW proximity transmitters (which, by the way, work well up to 800 feet).

### More Range?

Search and rescue teams can certainly benefit from using the higher power 100-mW transmitters for more range—with the permission of a local law enforcement officer covering your jurisdiction. They're also ideal for tagging ANYONE with nearly any type of medical condition!

And, finally, if you are concerned that someone in the middle of the night might make off with your ski boat at the dock, your set of golf clubs from the locker, or your new exotic four-wheeler out at the sand dunes, just ask your local law enforcement permission to track it with a radio tag, and they will no doubt give

you the nod. With your companion receiver you're ready to monitor your expensive asset.

### Tag, You're It

I can see your brain in high gear now considering the higher power tag opportunities, so log onto [www.com-spec.com](http://www.com-spec.com) to look over how inexpensive the equipment is. You'll also find a list of uses for the higher-power transmitters, which are legal as soon as you get the nod from your peace officer or OK if your use falls under the medical device rules in Part 95 low-power radio service.

And please don't forget to let me know if these tags worked for you. You can always contact me at *Popular Communications*, 25 Newbridge Road, Hicksville, New York, 11801 or directly via e-mail at [WB6NOA@arrl.net](mailto:WB6NOA@arrl.net).

# Early AC Receivers—A Majestic Challenge! Restoring A Majestic 90

**S**everal weeks ago, while picking up a few end tables my better half had refinished at a local furniture repair shop, I noticed that they were also refinishing a radio cabinet for another customer. In the typical style of the era, the cabinet was large, gothic and ornate, and sported an equally impressive radio chassis.

It was a very early Majestic 90 console, one of the earliest AC line operated radios and dating back to 1929—that's almost 80 years ago! As I said, the cabinet was large and somewhat gothic in styling, something that normally doesn't interest me as a collector since it would clash with my home's décor. I'm not sure exactly what transpired next (I vaguely remember my better half volunteering the fact that I restored vintage radios) and I soon found myself embroiled in a very challenging restoration!

We'll be dealing with the restoration of the radio chassis in the next column, and hopefully by then I'll have some photos of the cabinet to share as well. For now we'll be dealing with the power supply section, which is housed in a separate metal enclosure inside the radio cabinet.

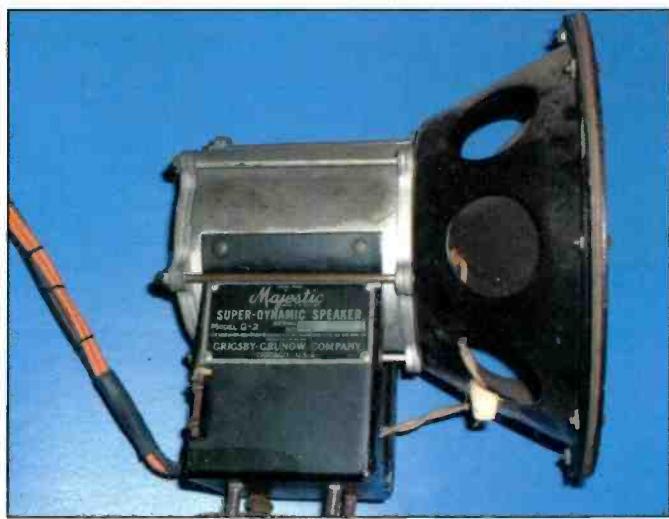
In fact, the Majestic receiver contains several subsections. First, there's the Majestic model 9P6 AC power pack (**Photo A**), an AC line-voltage ballast regulator (this plugs into a small metal sub-chassis that mounts on the cabinet sidewall shown in **Photo B**), a massive electrodynamic speaker (**Photo C**), and the main receiver chassis (**Photo D**), which houses all of the RF and audio stages. All assemblies are mounted inside of the console cabinet.

This will be a rather technically intense restoration, and by necessity I'll need to move along at a good clip. If anyone wants more information, drop me a line and I'll do my best to answer your questions in a future column. Fair enough?

The power supply work is boring, messy, and sometimes tedious, so we'll get it out of the way this month before delving into the more interesting portions of the restoration.



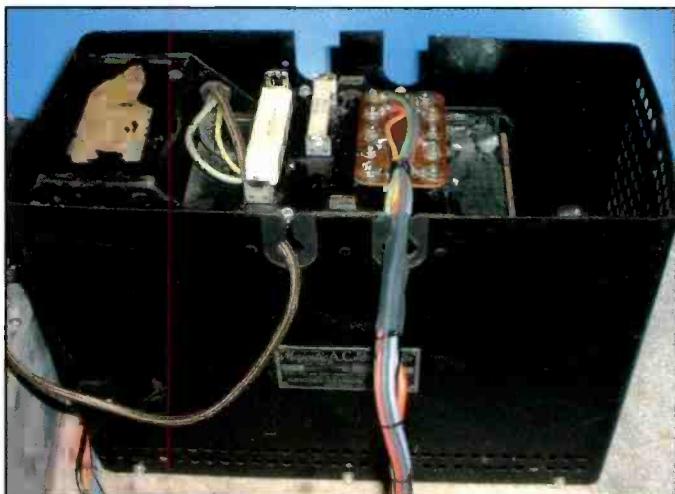
*Photo B. Majestic included the 9P6 ballast regulator to accommodate a wide range of AC line voltages between 100 and 130 VAC, as might have been encountered during the 1920s.*



*Photo C. The massive Majestic G-2 speaker also denotes the battleship-like construction Majestic was noted for! Majestic owners were noted for their intense brand loyalty, in a time when weight and size were equated with quality.*



*Photo D. The heart of the Majestic 90 is this seven-tube TRF radio receiver. The operating voltages were supplied by the outboard 9P6 power pack shown in Photo A.*



*Photo A. Restoring a 9P6 power supply from an early 1929 vintage Majestic 90 radio receiver is the subject of this month's column.*

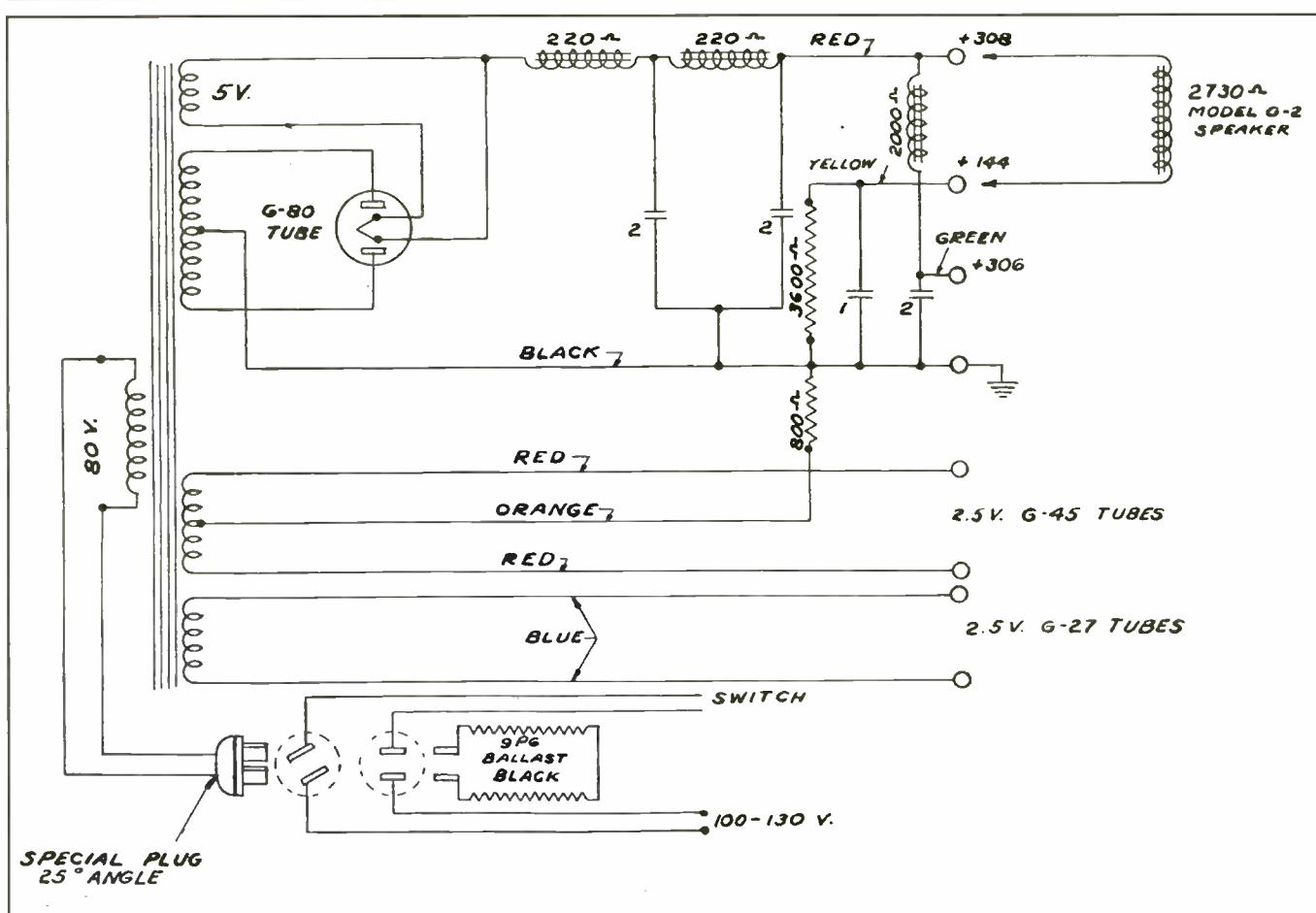


Figure 1. Schematic for the power supply.

## The 9P6 Power Pack

Let's begin by looking the schematic for the power supply used on the Majestic 90 (Figure 1). Many other early Majestic models used similar power packs, so this restoration discussion will be closely applicable to those as well.

Note that the AC transformer has a unique 80-volt primary

winding. The radio must be used with the special 9P6 line ballast regulator; these devices attempt to regulate the AC line voltage to 80 volts over line voltage excursions between 100 and 130 volts. Early AC line voltages were poorly regulated, and often varied widely across a neighborhood or throughout the day. If good, the ballast will read about 7 ohms "cold" resistance on an ohmmeter.



Photo E. A special 25-degree socket was used for the AC plug on the power cable going to the 9P6 power pack. It allowed the 9P6 to be easily removed for servicing, and also prevented the 9P6 from being directly plugged into a power outlet.

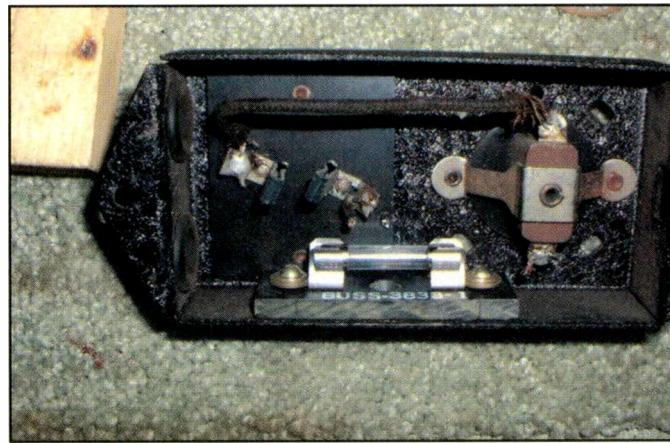


Photo F. The AC line should be fused at 2 amps. The fuse and holder can be mounted inside of the 9P6 enclosure, or there is also ample room to mount the fuse assembly inside of the ballast regulator sub chassis.

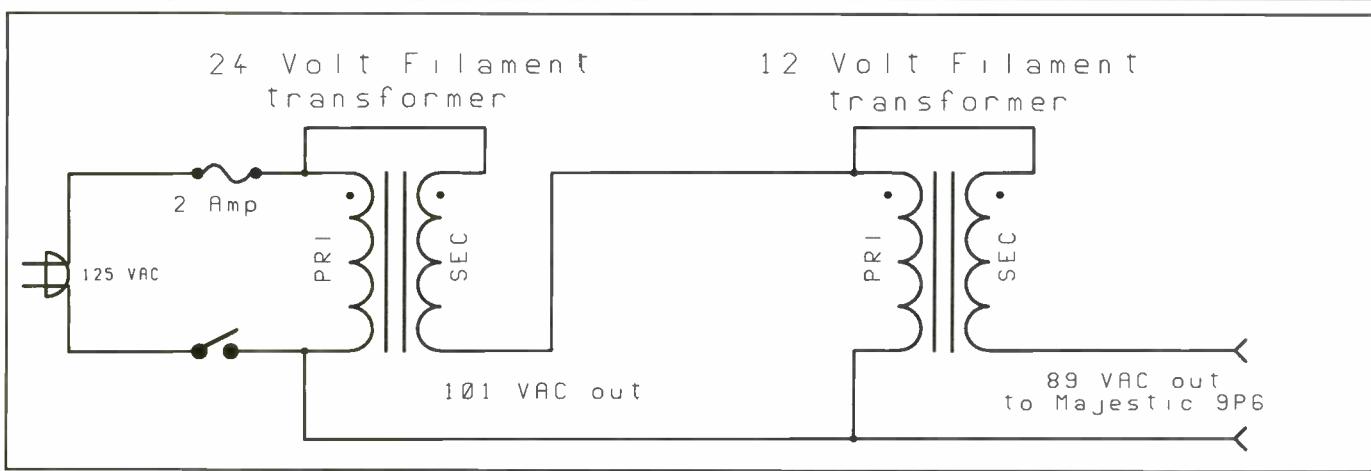


Figure 2. Transformer secondary windings must be rated for at least two amps.

The ballast uses a resistance wire, similar to the elements in a toaster, wound on an open-air form inside a ventilated metal tubular heat shield assembly. As the AC voltage (and, therefore, the current) increases, the resistance wire gets hotter, its resistance increases, and it drops more voltage. This device generates 40 or 50 watts of heat energy; in other words, it gets darned hot while in operation! This is a concern for me. If the radio is missing the rear cover—and most are—this part is exposed to prying fingers, or worse yet, flammable objects like flimsy curtains. These sets were made and sold before more stringent UL requirements were in place, so *please* never leave one of these sets running unattended, and keep kids out of the backs of them! Be aware of the high voltages and other risks associated with these vintage appliances.

If the ballast is defective, a replacement will have to be found, and they are hard to come by!<sup>1</sup> Or, some other method of dropping the AC voltage will be needed. One possibility is using a 12-volt and a 24-volt filament transformer, each wired so they are “phased” as “voltage bucking” autotransformers to drop the AC voltage going to the 9P6 transformer by 36 volts. The transformer secondary windings need to be rated for at least 2 amps! **Figure 2** shows how to do this. The regulation offered by the ballast tube will be lost, but this shouldn’t be a problem with

our modern power grids. The advantage is ridding the set of the hot metal ballast assembly.

The power pack has a special AC plug with the blades set at a 25-degree offset angle to prevent plugging the 9P6 power pack directly into a wall socket, bypassing the ballast regulator (see **Photo E**). If the plug is missing or damaged, simply hardwire the AC cord directly to the ballast chassis assembly.

The 9P6 draws about 1.5 amps when the receiver is in operation. I suggest adding either a 2-amp fuse inside the 9P6 power pack, or an inline fuse and holder on an inside wall of the ballast tube chassis as I did (**Photo F**).

## Rubber Wiring

Unfortunately, the entire Majestic 90 receiver suffers deteriorating rubber coated wire insulation. Rubber insulated wiring was used throughout the set, including the wiring inside the receiver chassis and the 9P6 power pack, and, more problematically, for all of the interconnecting cable assemblies including the AC power cords! Even if the woven outer cloth cable sheath looks good, the rubber insulation on the wire bundles will crack and turn to dust if the cables are bent or twisted, even with careful handling. I’ve been told this problem existed by the



Photo G. Removing the outer metal case on the 9P6 reveals a rat's nest of rotted rubber insulation.

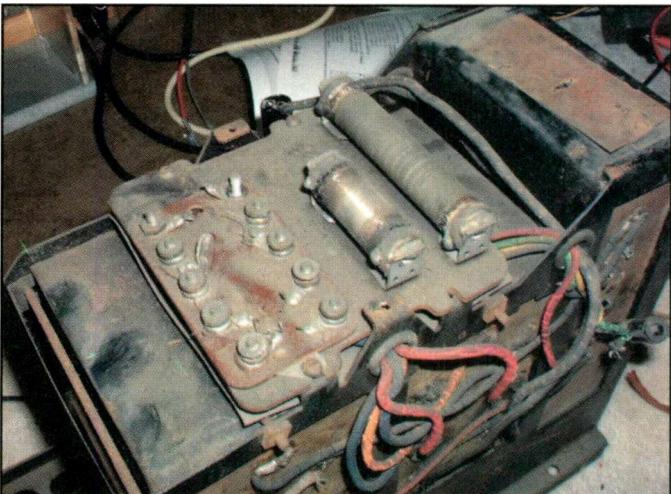
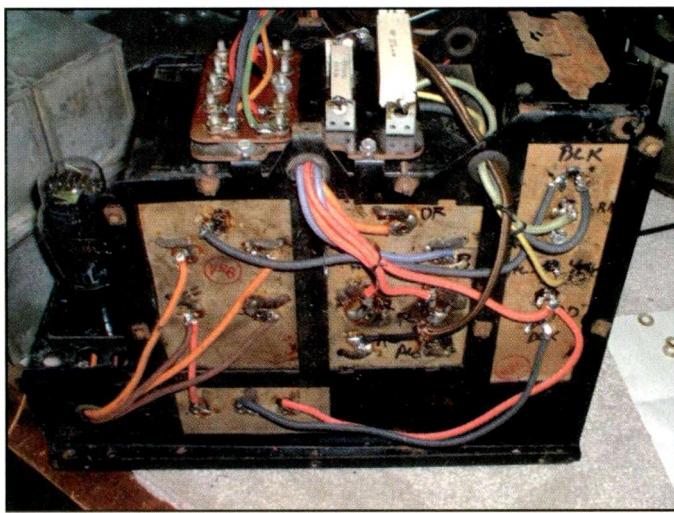


Photo H. The wire-wound power resistors suffered from loose resistance wire windings, and one was also open.

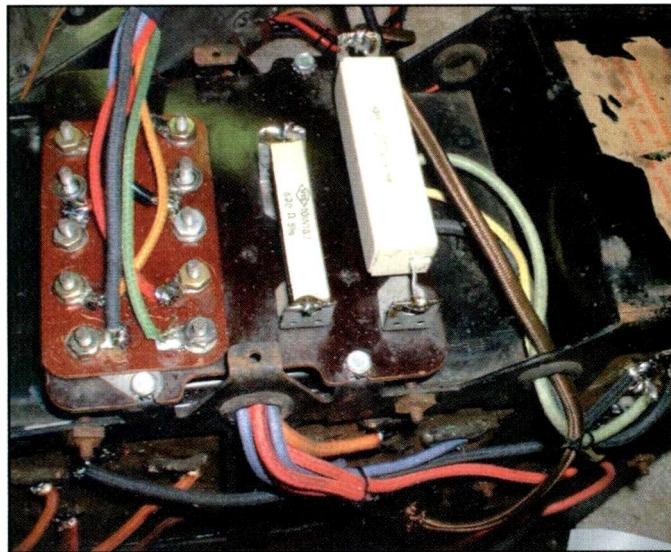


*Photo I.* The wiring was replaced with 600-volt-rated insulated cloth wire from Radio Daze. The heavy amperage 2.5 filament leads going to the terminal board on top were wired using a heavy gauge plastic insulated wire intended for mobile radio power connections.

time these sets were starting to need servicing in the early 1930s.

All of the cables should be discarded and new ones made and installed. I've had a few folks tell me they've simply powered these old vintage sets up and used them as found, but that's something I'd never advise doing, even on a short-term basis. For the heck of it, I did fire the power pack up, using a Heath SP-5220 variable AC supply. After the Majestic power pack was operating for 20 minutes, one of the remaining original wax paper filter condensers shorted and blew the fuse.

**Photos G and H** show the insides of the 9P6 power pack before I worked on it; the outside metal case has been removed. All the rubber wiring is cracked and needs to be replaced. I suggest using stranded 600-volt rated 18-gauge cloth hookup wire that's available from RadioDaze<sup>2</sup>. The two power resistors shown in **Photo I** are also replacements; the original 3600-ohm and 800-ohm wire wound resistors were either open or had problems with loose resistance wire windings. The 800-ohm resis-



*Photo J.* The 3600-ohm and 800-ohm resistors were replaced with NTE wire-wound power resistors.

tor must be replaced with a 10-watt or larger power resistor and the 3600-ohm resistor should have at least a 25-watt rating. The voltage drop across the 800-ohm resistor develops the -50-volt bias for the #245 audio tubes. **Photos I and J** are views of the same 9P6 after the restoration and repair work was completed.

The 2730-ohm field coil resistance of the electrodynamic speaker is in series with the 3600-ohm power resistor. This accomplishes two things: first, it provides a stiff DC load on the power supply, which helps to limit the DC surge voltage that occurs when the #280 rectifier warms up before the rest of the tubes in the receiver; second, it also provides a voltage divider that produces around 144 volts for the four #227 TRF RF amplifier tube stages.

Never run the supply without the speaker field coil connected, otherwise the B+ will soar to over 600 volts on initial power-on, possibly damaging the filter capacitors. Also, without the proper load current on the ballast, the AC primary voltage on the transformer will be higher than it is rated for! I did most of the initial testing using my Heath SP-5220 metered variable AC supply set for 80-VAC output. The ballast wasn't used until the set was ready for final testing just before delivery back to the customer.

## Filament Wiring

The 9P6 has two separate 2.5-volt filament windings: one provides the filament voltage for the five #227 triode tubes; each filament requires a whooping 1.75 amps (almost 9 amps total!); the second winding for the #245 push-pull triode audio stage accounts for another three amps of filament voltage. The filament wiring inside the 9P6, between the transformer terminals and the terminal board for the interconnecting cable to the receiver, must be large enough to handle these currents.

I suggest using 12- or 14-gauge stranded wire for the cable assembly. The red-black power leads used for commercial two-way radio power hookups is ideal. It's a good idea to measure the filament voltages directly at the tube sockets when the restoration is completed! Two separate 2.5 filament windings were needed for a couple of reasons. The 245 audio tubes use directly heated cathodes, and that filament winding on the transformer is center-tapped for the cathode return and grid biasing; the filaments are -50 volts above ground.

## Filter Capacitor Assembly

Let's look at **Photo G** again. The power transformer pretty much takes up the upper center section of the power supply. The assembly below the transformer is a metal box, which contains the two 220-ohm filter chokes; these are encapsulated in tar and are usually good as found. To the right is another metal box that houses the four paper filter capacitors (2  $\mu$ fd, 2  $\mu$ fd, 1  $\mu$ fd and 2  $\mu$ fd) and also a 2000-ohm filter choke (around 200 Henries of inductance!). The power pack had been serviced before; the 2000-ohm choke had been replaced with a 2000-ohm wire wound resistor, and two of the filter cap sections were disconnected with replacement parts externally wired. Some penciled service notes on the chassis indicated that this radio was working at least into the early 1950s!

Here's where it gets messy. You can either rebuild the capacitor pack, or discard it and replace it with terminal strips or some other arrangement. While electrolytic filter caps are available in these values, I advise using modern Mylar capacitors to



**Photo K.** The filter capacitor bank is housed in a rectangular metal can and encapsulated in soft tar. Heating the assembly with a heat gun softens the tar to allow removing the internal components.

replace the three 2- $\mu$ F capacitors and the 1- $\mu$ F capacitor paper filter capacitors in the 9P6. These are available from Hosfelt Electronics<sup>3</sup>. The Mylar capacitors have a much lower ESR (equivalent series resistance) than an electrolytic, and they'll have an almost unlimited operating life compared to an electrolytic-type capacitor.

**Photo K** shows the tarred assembly removed from the metal box after heating it with a heat gun and using two screwdrivers to gently pry the tarred assembly free of the metal enclosure. If the 2000-ohm is salvageable, I'd suggest heating the tar outdoors until the choke assembly can be freed from the rest of the components.

**Photo L** shows how the replacement Mylar capacitors were installed behind the terminal board from the filter bank assembly. Once the replacement parts were in place, the filter bank assembly was repacked and rewired into the chassis.

I probably could have salvaged the 200 Henry choke, but I didn't note any problems using a 2000-ohm power resistor as a substitute, as was done by the earlier service technician many



**Photo L.** The encapsulated block of paper filter capacitors was replaced with these tiny Mylar equivalents. Mylar capacitors will provide a much longer service life compared to electrolytic filter capacitors. Note that the original 2000-ohm filter choke (part of the encapsulated package) was replaced with a 2000-ohm resistor 10-watt wire wound resistor.

years ago. The 2000-ohm wire-wound resistor should be mounted so it's supported and kept away from other components because it will get warm in operation.

## More To Come

That's it for now. Next month we'll deal with the radio chassis restoration. Until then, keep those soldering irons warm! ■

### References

- Playthings of the Past did have JFD-5100 ballasts replacements listed for the 9P6 ballast on their online catalog. These items are scarce and subject to availability. Contact Play Things of Past, Gary B. Schneider, 2329 Fawn Haven Drive, Medina, Ohio 44256; Website: [www.oldradioparts.com](http://www.oldradioparts.com); E-mail: [gbsptop@aol.com](mailto:gbsptop@aol.com); Phone: (330) 558-0247.  
\$20 minimum order applies. Before ordering please follow the explicit directions given on the webpage regarding orders
- 600-VDC rated cloth insulated hook up wire is now available from Radio Daze at Radio Daze, LLC, 7620 Omnitel Place, Victor, New York 14564; Website: [www.radiodaze.com](http://www.radiodaze.com); E-mail: [Info@radiodaze.com](mailto:Info@radiodaze.com); Phone: (585) 742-2020; Fax: (800) 456-6494  
\$10 minimum order applies
- High value Mylar capacitors are available from Hosfelt Electronics, Inc., 2700 Sunset Boulevard, Steubenville, Ohio 43952-1158; Website: [www.hosfelt.com](http://www.hosfelt.com); E-mail: [Tonia@hosfelt.com](mailto:Tonia@hosfelt.com); Phone: (888) 264-6464; Fax (800) 524-5414  
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# New Shortwave Life For Albania And Bhutan!

If your salary was suddenly cut by nearly 50 percent it's likely you would be forced to make some cutbacks, perhaps even some lifestyle changes. That's just what happened to Albanian Radio TV. Radio Tirana briefly ceased its foreign service on shortwave back in early December. The culprit was a 47-percent cut in its budget. Rescued somehow, it is back on the air and operating according to its regular schedule.

We're sorry to report the passing of one of shortwave's most widely recognized names. Joe Adamov passed away last December at the age of 85. He joined the old Radio Moscow in 1942 and remained with the station through the end of Soviet communism and beyond, later admitting to his audience that he had not been able to tell things as they really were. A number of U.S. DXers got to meet him some years ago when he attended an Association of North American Radio Clubs (ANARC) convention.

Thank you, New Delhi! We've learned that India has funded a modernization at the Bhutan Broadcasting Service, including a new 100-kW shortwave transmitter! We've all had a world of difficulty hearing its 50 kW on 6035, so perhaps this doubling of wattage will help. The new transmitter was due to go on the air in February.

Bye, bye Bangalore! The Indian city formerly known by that name is now officially Bengaluru. So, assuming we remember (!), all future All India Radio logs appearing in these pages will show the new name when that transmitter site is involved.

Radio Imperio in Chiclayo, Peru, on 4386 has been renamed Radio Vision and now relays religious programming at times. Also in Peru is a new one, Radio Bella, in Tingo Maria on 4300, a frequency that has been used by a number of other Peruvian stations at one time or another.

## Prague Relayed From Canada And More...

Radio Prague can now be heard on 9660 via Sackville, Canada, with Spanish to the Caribbean region from 2330 to 2400 on 9660.

Zimbabwe's Central Intelligence Organization raided the studios of the Voice of Peace back in mid-December, searched the place, and confiscated several tapes and files and attempted to locate its transmitter, which is not even in-country. The station, which opposes the government of Robert Mugabe, was set up by former staff members of the Zimbabwe Broadcasting Corporation and is described by the government as a "pirate radio station operating in the interest of Europe" and its backers as a "criminal and terrorist group." Radio VOP is scheduled from 1700 to 1800 on 11705 via Radio Nederland's Madagascar site. Frequency 7120 has been used during the "A" broadcast season (April to October).

A fairly recent addition to the list of groups that don't have their own transmitters but produce shortwave programming (now about as long as our tax code) is TNT Hit Radio, based in Belgium and putting out "hit" music via Julich, Germany. It's

radioquito  
radioquito@ecuadorradio.com  
11/16/2005 02:21 PM

Please respond to <radioquito@ecuadorradio.com>

To: <rdangelo@gpu.com>  
cc:  
Subject: FW Reception Report Radio Quito

Gracias por escucharnos, le devolvemos lo mejor

Radio Quito

-----Original Message-----  
From: rdangelo@gpu.com [mailto:rdangelo@gpu.com]  
Sent: Martes, 15 de Noviembre de 2005 17:41  
To: radioquito@ecuadorradio.com  
Cc: Rdangelo3@aol.com  
Subject: Reception Report: Radio Quito

Informe de Recepción

Richard A. D'Angelo  
2216 Burkley Drive  
Wyomissing, PA 19610  
EE. UU. de A. (U.S.A.)  
Rdangelo3@aol.com  
Rdangelo@gpu.com

15 de Noviembre de 2005

Radio Quito  
Casilla 17-21-1971  
Quito  
Ecuador  
radioquito@ecuadorradio.com

Estimado Señor:

Es con sumo placer que escribo para decirle que he escuchado su transmisor. Radio Quito. Me sorprendió escuchar su radioemisora recientemente y creía que le gustaría ser informado de mi recepción. Favor de aceptar esta relación de mi recepción de su radioemisora. Espero que le sea de interés.

Escuché su transmisor, Radio Quito, el 14 de Noviembre de 2005 de 02:51 a 0340 UTC o el 13 de Noviembre de 2005 de 21:51 a 22:40 de su hora local en una frecuencia de 4,919 kHz.

*Radio Quito on 4919 sent this e-mail letter QSL to Rich D'Angelo. Pretty slick, provided you have a color printer!*

scheduled in Flemish on Saturdays from 1000 to 1600 on 5910. The address is Molenstraase 67, 9900 Eeklo, Belgium.

Hmong Lao Radio is now being transmitted Saturdays and Sundays from 1400 to 1500 over WHRI on 11785. It's also carried via Taiwan on Wednesdays and Fridays from 0100 to 0200 on 15260.

Christian Voice continues to expand its coverage. It's now on via Wertachtal, Germany, beaming to Nigeria from 0500 to 0700 on 9430, 0700 to 0900 on 15640, 1500 to 1800 on 15680, 1800 to 2000 on 9765, and 2000 to 2100 on 7285.

## Reader Logs

Time to do a bit of housekeeping. The term "clandestine" has come to mean less and less in recent years as more and more

## Help Wanted

We believe the "Global Information Guide" consistently presents more shortwave broadcast loggings than any other monthly SW publication! (This month we processed **551 loggings!**) Why not join your fellow SWLs and let us know what you're hearing and also become eligible for our monthly shortwave book prize as well! Send your logs to "Global Information Guide," *Popular Communications*, 25 Newbridge Rd., Hicksville NY 11801-2953. Or e-mail them or to your "GIG" editor at [gdex@genevaonline.com](mailto:gdex@genevaonline.com) or to Editor Harold Ort at [popularcom@aol.com](mailto:popularcom@aol.com). Our deadline is the 25th of each month. Please see the column text for basic formatting tips. We look forward to hearing from you!

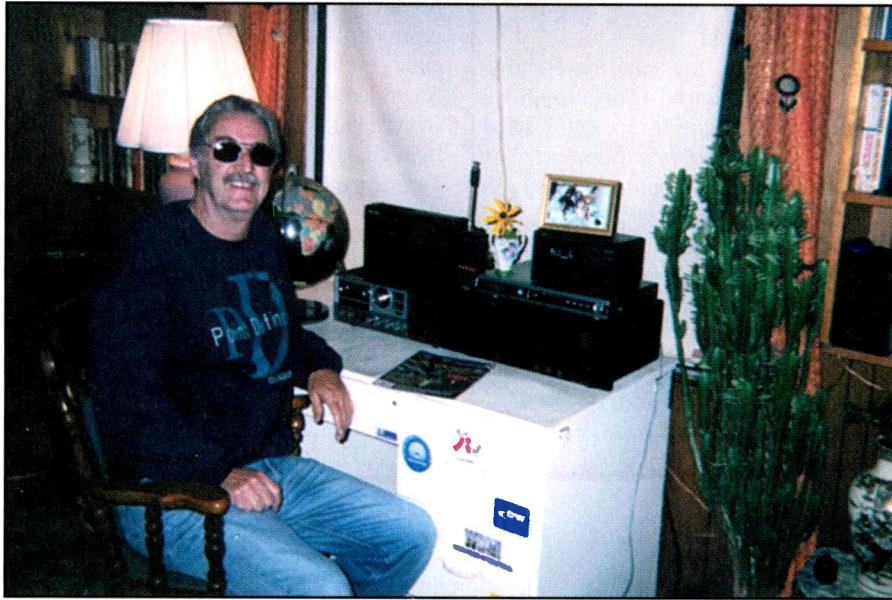
*\*Not all logs get used; there are usually a few which are obviously inaccurate, unclear, or lack a time or frequency.*

private groups have put ever more programs on shortwave attempting to influence or change a particular government. So, as a result, we've decided to retire the word "clandestine" and use "opposition" instead. Beginning with this issue of *Popular Communications*, you'll find all the Voice of Whomevers and the Radio Free Whatsits listed under "Opposition."

Remember, your shortwave broadcast station logs are always welcome. But please be sure to double or even triple space items, list them country name first and include your last name and state

## Abbreviations Used In This Month's Column

*	— before or after a time (time the station came on or left the air)	LSB	— lower sideband
(l)	— after a frequency (lower sideband)	LV	— La Voz, La Voix
(p)	— presumed	NBC	— National Broadcasting Corporation (Papua New Guinea)
(t)	— tentative	ORTB	— Office de Radiodiffusion et Television du Benin
(u)	— after a frequency (upper sideband)	PBS	— People's Broadcasting Station
v	— variable	PP	— Portuguese
//	— in parallel	PSA	— public service announcement
AA	— Arabic	QQ	— Quechua
ABC	— Australian Broadcasting Corporation	RCI	— Radio Canada International
AFN	— Armed Forces Network	Rdf.	— Radiodifusora, Radiodiffusion
AFRTS	— Armed Forces Radio TV Service	REE	— Radio Exterior de Espana
AIR	— All India Radio	RFA	— Radio Free Asia
Anmt(s)	— announcement(s)	RFE/RL	— Radio Free Europe/Radio Liberty
Anncr	— announcer	RNZI	— Radio New Zealand International
AWR	— Adventist World Radio	RR	— Russian
BSKSA	— Broadcasting Service of Kingdom of Saudi Arabia	RRI	— Radio Republik Indonesia
CC	— Chinese	RTBF	— RTV Belge de la Communauté Française
Co-chan	— co-channel (same frequency)	Relay	— transmitter site owned/operated by the broadcaster or privately operated for that broadcaster
Comm(s)	— commercial(s)	relay	— transmitter site not owned by the broadcaster
CP	— Bolivia, Bolivian	SCI	— Song of the Coconut Islands (transition melody used by Indonesian stations)
CRI	— China Radio International	s/off	— sign off
DD	— Dutch	s/on	— sign on
DJ	— disc jockey	SIBC	— Solomon Is. Broadcasting Corp.
DW	— Deutsche Welle/Voice of Germany	Sked	— schedule
EE	— English	SLBC	— Sri Lanka Broadcasting Corporation
ECNA	— East Coast of North America	SS	— Spanish
f/by	— followed by	TC	— time check
FEBA	— Far East Broadcasting Association	TOH	— top of the hour
FEBC	— Far East Broadcasting Company	TT	— Turkish
FF	— French	TWR	— Trans World Radio
GBC	— Ghana Broadcasting Corp	Unid	— unidentified
GG	— German	USB	— upper sideband
GMT	— Greenwich Mean Time	UTC	— Coordinated Universal Time (as GMT)
HH	— Hebrew, Hungarian, Hindi	UTE, ute	— utility station
HOA	— Horn of Africa	Vern	— vernacular (local) language
ID	— station identification	(via)	— same as "relay"
II	— Italian, Indonesian	VOAS	— Voice of America
Int	— international	VOIRI	— Voice of Islamic Republic of Iran
IRRS	— Italian Radio Relay Service	WCNA	— West Coast of North America
IS	— interval signal	ZBC	— Zimbabwe Broadcasting Corporation
JJ	— Japanese		
KK	— Korean		



Holy Moley! Another shack photo! Here's Michael Clapshaw in his listening post in Port Angeles, Washington. Now, who's next?

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 where's that photo 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). Now let's play ball!

**ANGOLA**—Radio Nacional, 4950 in PP heard at 0306. (Brossell, WI) 0401 with news in PP. (D'Angelo, FCDX-PA) 0509. (DeGennaro, NY)

**ARGENTINA**—Radio Nacional, 15345 in SS at 2228. (Charlton, ON) La Red, 11133 lsb at 0150 with ID, vocals, long talk, 5 + 1 time pips at 0200 and more talk. (D'Angelo PA) 0150 with SS talk, phone talk, ads, jingles and ID. (Alexander, PA) (*irregular operation—gld*) Radio Continental, 11133 lsb at 0920 with SS talk, IDs. (Alexander, PA) (*also irregular—gld*) Radio Armonia, 6214 at 2337 with SS talks, romantic vocals and announcements including phone numbers at 0001. (D'Angelo, FCDX-PA)

**ARMENIA**—Voice of Armenia, 9965 at 1915 with comments, ID, address, anthem, another ID and into GG. (Burrow-WA) At 1926 still announcing their old sked of 1825 on 9775. News, weather, classical music. Mailbag at 1935 and off monitored at 1944. (Alexander, PA)

**ASCENSION IS.**—BBC Relay, 7160 in EE to Africa at 0405. (DeGennaro, NY) 15400 at 2000, 17830 at 2006 and 17885 in unid lan-

guage at 1951. (Jeffery, NY) 15400 at 1836. (Brossell, WI) 17830 heard at 1320. (Northrup, MO)

**AUSTRALIA**—Radio Australia, 5995//6080//9475//9710 at 1640 with Handel's Messiah, ID and into news. (Burrow, WA) 6020 with news at 1315. (Northrup, MO) Closing at 1400 and switching to 7240. (Barton, AZ) 6020 at 1030 and 9580//9590 at 1000. (Linonis, PA) 6020 at 1104, 9475 at 1241, 9560 to East Asia and Pacific at 1135, 9580 to Pacific at 1041, 9590 to Pacific at 1038, 9710 in Pidgin at 1050 and 11660 in CC at 1321. (DeGennaro, NY) 9560 at 1135, 9590 at 0900 and 15415 at 0930. (Maxant, WV) 13630 at 2101. (Wood, TN) ABC Northern Territories Service, Alice Springs, 2310 with pop vocals, man anncr at 1136. (D'Angelo, FCDX-PA)

**AUSTRIA**—Radio Austria Int., 6155 in GG to Europe at 0535 and 13730 also in GG to Europe at 1138. (DeGennaro, NY) 13765 via Canada heard at 1600. (Maxant, WV)

**BELGIUM**—RTBF Int., 9970 in Flemish to Europe heard at 1104. (DeGennaro, NY)

**BOLIVIA**—Radio Mosoj Chaski, Cochabamba, 3310 at 0944 with rustic vocal, man with ID, talks in QQ. (D'Angelo, FCDX-PA) Radio Estambul, Guayaramerin, 4498 at 0957 with music and anmmts. (DeGennaro, NY) 0958 with TC and SS talk, local vocals. (D'Angelo, FCDX-PA) Radio San Miguel,

Riberalta, 4904 with SS man and woman talk, local news at 0956 tune. (DeGennaro, NY) 1028 with SS talk, ID, TC. (D'Angelo, FCDX-PA) Radio Municipal, Caranavi, 4845 at 0952 with news in QQ. (DeGennaro, NY) Radio Mallku, Uyuni, 4976.5 at 0925 with nice flute music, multiple IDs, vocals hosted by man anncr. (D'Angelo, FCDX-PA) 0947 with music and talk. (DeGennaro, NY) Radio Yura, Yura, 4716.8 at 1002 with rustic songs, man with SS anmmts, ID and frequency. (D'Angelo, FCDX-PA) Radio Pio XII, 5952.5 at 0952 with religious talk in QQ, ID at 0954 mentioning upcoming newscast and upcoming programs in SS. Still going strong at 1028 recheck with some WYFR splatter. (D'Angelo, FCDX-PA) 1000 with SS talk, ID, ads, jingles, and folk music. Poor due to WYFR splatter. (Alexander, PA)

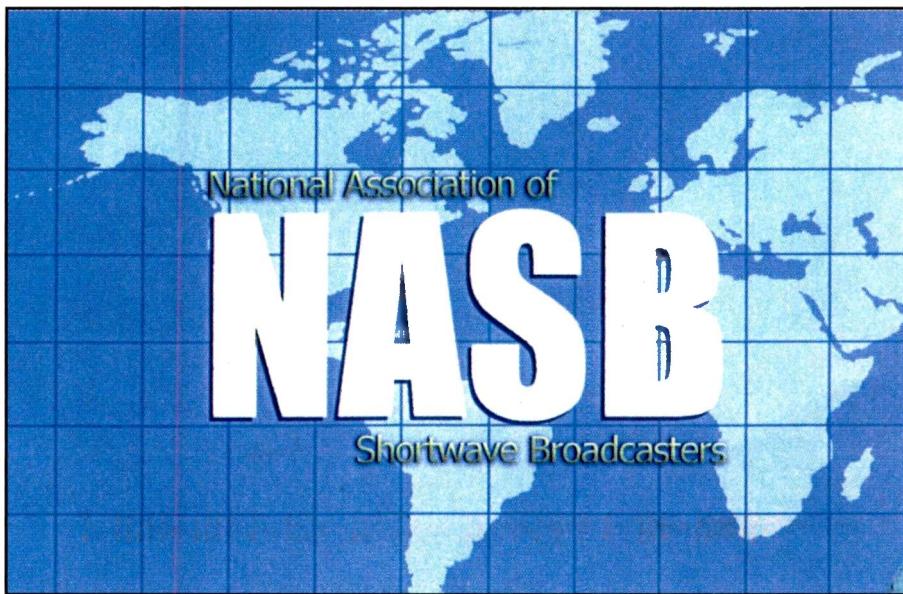
**BOTSWANA**—VOA Relay, 4930 at 0311 and 12080 in African language at 1815. (Brossell, WI) 9775 at 0423. (MacKenzie, CA) 12080 closing at 2059. (Charlton, ON) 13710 at 2138 to 2201 close. (Wood, TN)

**BRAZIL**—(all in PP) Radio Cultural, Araraquara, 3365.1 at 2352 with m/w talk, male vocal, ID at 2358, old hits. (D'Angelo, FCDX-PA) Radio Nacional, Macapa, 4915 at 0240. (Brossell, WI) 0300. (DeGennaro, NY) 0354. (Yohnicki, ON) Radio Difusora Roraima, Boa Vista, 4875 at 1023 with woman talking, religious message. (DeGennaro, NY) Radio Clube do Para, Belem, 4885 with music and talk at 0145. (Barton, NM) 0304 with music and talk. (DeGennaro, NY) 0510 with Brazilian dance club music, occasional man anncr. (Wood, TN) Radio Rio Mar, Manaus, 9695 with news at 1033. (DeGennaro, NY) Radio Educacao Rural, Campo Grande, 4754 with personal messages at 0310. (DeGennaro, NY) Radio Brazil Central, Goiania, 4985 at 0032. (Jeffery, NY; DeGennaro, NY) 0145. (Clapshaw, WA) Radio Guaruja Paulista, Presidente Prudente, 5045 with talks and music at 0303. (DeGennaro, NY) Radio Aparecida, Aparecida, 5035 with woman anncr and phone-ins at 0037. (DeGennaro, NY) 6135 at 0125. (Charlton, ON) Radio Culturas Ondas Tropicais, Manaus, 4825.2 with program notes, commls at 1010. (DeGennaro, NY) Radio Alvorada, Londrina, at 0240 with religious talks, "amen's" and choir. (D'Angelo, FCDX-PA) At 1100 with man anncr, time checks. (DeGennaro, NY) Radio Difusora, Taubate, 4924.5 with local news and commls at 1005. (DeGennaro, NY) Radio Nacional, Brasilia, 6180 with news and music at 0006. (DeGennaro, NY) Radio

### In Times Past...

And now for a bit of fun. We'll give you a blast from the past here each month; perhaps a logging or station tidbit from the *Pop'Comm* shortwave history book. Here's one for the memory books...

**COLOMBIA**—Emisora Atlantico, HJAG, Baranquilla, 4905 at 0548 on February 26, 1955. Good in SS with moderate QRN. 1 kW. (Dexter-IA)



*This attractive QSL was for reception of the Voice of the NASB, via WRMI. NASB is the National (U.S.) Association of Shortwave Broadcasters. (Thanks to Rich D'Angelo)*

Educadora, Guajara Mirim, 3375 with music and anmts at 0948. (DeGennaro, NY) Radio Difusora Acreana, Rio Branco, 4885 with talks at 0236. (Brossell, WI) 1032 with music and talk. (DeGennaro, NY) Radio Educadora Rural, Tefe, 4925 at 1059 with music and commls. (DeGennaro, NY) Radio Trans Mundial, Santa Maria, 11735 with music and local news at 1054. (DeGennaro, NY) Radio Nacional Amazonas, Brasilia, 11780 at 1113. (DeGennaro, NY) 2219. (Charlton, ON) Radio Brazil Central, Goiania, 11815 at 1106 with ID, music. (DeGennaro, NY) Radio Anhanguera, Goiania, 11830 at 1109 with TCs, commls, local notices. (DeGennaro, NY) Radio Anhanguera, Araguaina, 4915 at 0958 with public notices, commls, time and weather. (DeGennaro, NY) Radio Cancao Nova, Cachoeira Paulista, 4825 with religious message at 1019. Also 9675 with prayers at 0134. (DeGennaro, NY) 6105 with possible religious service at 1040. (Linonis, PA) 9675 at 0430. (MacKenzie, CA) Radio Caiari, Porto Velho, 4785 with music and talk at 1013. (DeGennaro, NY) Radio Bandeirantes, Sao Paulo, 9645 at 0415 with ballads, pops, anmts. //11925 very weak. (Alexander, PA) Radio Record, Sao Paulo, 6150 at 2207 with talks, vocal. Fair, and //9505 was weak. (D'Angelo, FCDX-PA) Radio Senado, Brasilia, 5990 at 1014 with call-ins. (DeGennaro, NY) Radio Difusora, Londrina, 4815 at 0024 with man and group vocals. Program change at 0030. (D'Angelo, FCDX-PA) Radio Difusora do Amazonas, Manaus, 4805 with music at 1006. (DeGennaro, NY) Radio Rural, Santarem, 4765 with music at 1001. (DeGennaro, NY)

**BULGARIA**—Radio Bulgaria, 5800 in BB at 0520, 7400 at 0329, 7500 in SS at 0234, 9700 in BB at 0130, 11600 in RR at 1143 and 11700 in GG at 1154. (DeGennaro, NY) 7500 at 1828. (Wood, TN) 9400 at 0100. (Linnis,

PA) 9700 at 0220 and 11500 at 1736. (Brossell, WI)

**CANADA**—CHU time station, 3330 at 0227. (Yohnicki, ON) CFRX, 6070 at 2015 relaying local CFRB. (Maxant, WV) CBC Northern Service, 9625 at 1723 with "Quirks and Quarks." (Wood, TN) Radio Canada Int., 9770 with "Business Sense" at 2100. (Wood, TN) 9880 via Kunming, China at 0000. (Clapham, WA) 13665 at 1640. (Charlton, ON) 17765 at 2020 in PP to Brazil. (DeGennaro, NY)

**CHILE**—Voz Cristiana, 9780 in SS at 1030 and 11890 in PP at 1047. (DeGennaro, NY) 17680 in SS at 1615. (Northrup, MO) 1846 in SS. (Charlton, ON) 1938 in SS. (Jeffery, NY) 2040 in SS. (Wood, TN)

**CHINA**—China Radio Int., 7190 in JJ at 1103, 9440-Kunming in Chaozou at 1150, 9570 via Albania in CC at 0348, 9590 via Cuba in SS at 0115, 9790 via Cuba at 0324, 11700-Kunming in Indonesian at 1053 and 13665 via Albania at 1126. (DeGennaro, NY) 9790 via Cuba at 0300. (MacKenzie, CA) 9795-Urumqi in RR at 1820. (Brossell, WI) 13740 via Cuba at 1550 and 17880 via Mali in FF at 1656. (Charlton, ON) 17735 in CC at 1600. (Northrup, MO) China National Radio/CPBS, 7345-Beijing in CC at 1030, 7620-Beijing in CC to Taiwan at 1128 and 9500-Shijiazhuang in CC at 1035. (DeGennaro, NY) 17595-Shijiazhuang in CC at 0328. (Foes, Philippines) Xizang PBS, Lhasa (Tibet) 4820 in CC at 2233, //4800-Geermu relaying CNR. Also 4905 in TT at 2240 and //4920. (D'Angelo, FCDX-PA) 4905 in possible CC at 1125. (DeGennaro, NY) China Huayi Broadcasting Co., 4830-Beijing at 2301 with man/woman talk, anmts in CC. (D'Angelo, FCDX-PA) China Music Jammer, 11700 covering Radio Free Asia-No. Marianas heard at 1803. (Brossell, WI)

**COLOMBIA**—La Voz del Guaviare, San Jose Guaviare, 6035 at 1040 with ads, jingles, SS talk. NA at 1100. (Alexander, PA) 1109 with local music & anmts. (DeGennaro, NY) 0103 with SS talk, mentions of "Colombiana," TCs, jingle IDs rhumbas and phone calls. (D'Angelo, PA) La Voz de tu Conciencia, Puerto Lleras, 6010 in SS at 1021. (DeGennaro, NY) Marfil Estereo, 5910 at 0405 with romantic ballads, SS anmts, IDs. Co-channel with Radio Ukraine Int. (Alexander, PA) Radio Lider, Santa Fe de Bogota, 6139.8 in SS heard at 0237. (DeGennaro, NY)

**COSTA RICA**—Faro del Caribe, 5054.5 in SS at 1131. (DeGennaro, NY) 0543 with inspirational music and talks. Also at 0617. (Wood, TN) University Network, 6150 with ragtime music and phone numbers for reservations to attend the late Dr. Scott's church in Los Angeles. Also 13750 at 1914 with woman in religious talk. //KAIJ-13815 and WWCR-13845. (Wood, TN)

**CROATIA**—Voice of Croatia, 6165 with EE from 1905. Back to Croatian at 1914. (D'Angelo, FCDX-PA) 7285 via Germany in Croatian to the Americas at 0317. Also 9830 in Croatian to Europe at 1117. (DeGennaro, NY) 7285 with ID at 0255 and more EE programming at the top of the hour. (Barton, AZ)

**CUBA**—Radio Havana Cuba, 6000 at 0120. (Wood, TN) 0200. (Linnis, PA) 11760 at 2117. (Wood, TN) 2043. Also 11800 in SS at 2030. (Charlton, ON) 11805 in SS at 1059. (DeGennaro, NY) Radio Rebelde, 5025 in SS at 0220. (Yohnicki, ON) 1052. Also 9505 in SS at 1053. (DeGennaro, NY)

**CYPRUS**—BBC Relay, 15180 in FF at 1828. (Brossell, WI)

**CZECH REPUBLIC**—Radio Prague Int., 5930 with news items at 2111. Also 6200 at 0412 on barge travel in the Czech Republic. (Wood, TN) 5930 at 2230. (Maxant, WV) 7345 at 0205 on economy and finance. Also 9880 in GG at 1113 and 11640 at 1149. (DeGennaro, NY) 11665 via Ascension in SS at 0012. (MacKenzie, CA) 21745 at 1403. (Charlton, ON)

**DIEGO GARCIA**—AFN/AFRTS, 4319u at 0110 with live play-by-play sports. (D'Angelo, PA)

**ECUADOR**—HCJB, 9745 in SS at 0319, 11690 in SS at 1108, 11960 in SS at 1119. (DeGennaro, NY) 9780 in SS at 1015. (Linnis, PA) 12005 at 1120. (Maxant, WV) Radio Chaskis, Otavalo, 4909.2 (p) with long SS talk at 1121, mentions of "onda corta" and "la radio" but no ID. Then talks by various men, brief repetitions by a group, almost KJES-like. (D'Angelo, FCDX-PA) La Voz del Napo, Tena, 3279 in QQ and SS at 0944. (DeGennaro, NY) Radio Quito, 4919 at 1026 with SS anncr and hits from the 1920s to 40s. ID at 1029, "La Voz de la Capital." (DeGennaro, NY)

**EGYPT**—Radio Cairo/Egyptian Radio, 7260 in AA at 0323. (Brossell, WI) 7270 in EE at 0314. (DeGennaro, NY) 9990 at 2120 and 12050 in AA at 1652. (Wood, TN) 2231



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Sentech, the company that operates the Meyerton, South Africa, transmitting site and also relays other broadcasters, confirmed Rich D'Angelo's reception of Radio Okapi over their facility on 11690.

in AA. Also 11665 in AA monitored at 2216. (Charlton, ON)

**ENGLAND**—BBC, 5975 at 2310 and 7285 at 2040. (Maxant, WV) 9510 at 1141 to 1144 close. 11820 via Cyprus in AA at 1202 and 15400 via Ascension at 2043. Also 11855 via French Guiana at 1153 (DeGennaro, NY) 9605 via Japan at 1232. (Brossell, WI) 12095 at 1909, 15400 via Ascension at 1526 and 21470 at 1707. (Charlton, ON) 15390 via French Guiana at 2109. (Wood, TN)

**EQUATORIAL GUINEA**—Radio Nacional, Bata, 5005 in SS with music and talk at 0515. (DeGennaro, NY)

**ETHIOPIA**—Radio Ethiopia, 7165.1//9559.6 heard at 1604 with weak narrative, blues/rock at 1614 until 1630 when their trademark slow bells announces the half-hour and then into presumed news. (Burrow, WA)

**FRANCE**—Radio France Int., 4890 via Gabon in FF at 0505. Also 6175 in FF at 1120, 11670 in FF at 1105 and 11845 in FF at 1204. (DeGennaro, NY) 11890 via Japan in FF at 2324. (MacKenzie, CA) 11960 in FF at 2132, 11995 in FF at 1905 and 15160 with language lessons at 1640. (Charlton, ON) 12025 in unid Asian language at 1254. (Brossell, WI) 17670 in FF at 1500. (Northrup, MO)

**FRENCH GUIANA**—Radio France Int. Relay, 5995 with soccer in FF at 0152. (Clapham, WA) 17630 in FF at 1320 and 17860 in FF at 1325. (Northrup, MO) 17635 at 2125 to sudden close at 2130. (Barton, AZ)

**GABON**—Africa No. One, 9580 in FF at 2210. (Clapham, WA) 2230. (Barton, AZ) RTV Gabonaise, Libreville, 4777 with FF talk, Afro-pops at 0615. (Alexander, PA)

**GERMANY**—Deutsche Welle, 5905 via Bonaire in GG at 1020. (Jackson, PA) ID and news at 1100. Also 6145 in GG at 0252, 7400 in GG at 1117 and 9545 in GG at 1045. (DeGennaro, NY) 11865 via Portugal in AA at 1929, 15205 in GG at 1924 and 15275 via Sri Lanka in GG at 1928. (Charlton, ON) 17710 via Portugal in GG at 1330. (Northrup, MO) 15455 via Singapore at 0454. (Foss, Philippines) IBC Tamil, 7110 via Wertachtal at 0026 with non-stop talk by man in Tamil. Off at 0100. (D'Angelo, PA)

**GHANA**—Ghana Broadcasting Corp., 4915 heard at 2106 ending news and into a

program about the music of Ghana. (D'Angelo, FCDX-PA)

**GREECE**—Voice of Greece, 5865 at 0309, 7475 at 0332, 9420 at 0128, 9775 via Delano at 1252 and 15485 via Delano at 2047. (DeGennaro, NY) 9375 at 0100. (Jackson, PA) 9420 at 2105. (Jeffery, NY) 12105 at 1815. (Brossell, WI). (*All in Greek—gld*) Radio Makedonias, 9935 in Greek at 1107. (DeGennaro, NY) Voice of America Relay, 15615 at 1128. (Jeffery, NY)

**GUAM**—Adventist World Radio, 11655 with hymns at 2243. (MacKenzie, CA) 11680 with EE IDs and into unid language at 1600. (Burrow, WA)

**GUATEMALA**—Radio Verdad, Chiquimula, 4052.5 in SS with hymns at 0456. (Wood, TN) Radio Buenas Nuevas, San Sebastian, 4800 in SS at 1133. (Brossell, WI) Radio Cultural Coatan, San Sebastian, 4780 in SS with music bridges at 0115. (Barton, AZ) 0223 to 0231 close. (D'Angelo, PA) 1118. (DeGennaro, NY) 1130. (Brossell, WI)

**GUYANA**—Voice of Guyana, 3291 with music, news heard at 0900. (Maxant, WV) 0945 with religious message. (DeGennaro, NY) 0455 with BBC programming. (Strawman, IA)

**HONDURAS**—Radio Misiones Int., 3340 at 0545 with SS religious pgms. Sign off anmts with ID at 0602. The audio was slightly distorted. (Alexander, PA) Radio Luz y Vida, 3250 with SS talks at 0205. (Brossell, WI) La Voz Evangelica, 4819 with man in SS at 0350. (Yohnicki, ON) 1010 with ID, religious message. (DeGennaro, NY) 1129. (Brossell, WI)

**HUNGARY**—Radio Budapest, 6025 at 2015. (Maxant, WV) 9775 with ID, news at 0330. Also 0870 in HH heard at 0113. (DeGennaro, NY)

**INDIA**—All India Radio, 4830-Jammu (p) at 0024 with instl music, woman in HH, flute and sitar music to 0030 ID, fanfare and brief news. 4840-Mumbai, with man in HH at 0210. Time pips at 0230 f/by ID. Poor and fading fast. Surprisingly late reception. 4860-Delhi at 1226 with man in Hindi, time pips at 1230, EE ID and news by man. 4895-Kuresong (p) at 1154 with Hindi music, fanfare at 1200 and man in HH. 4960-Ranchi (p)

at 1145 with Hindi talks and music, several anmts breaks preceded by a doorbell chime, time pips and ID at 1230. 4970-Shillong (p) at 1144 with man in Hindi, Hindi vocal, woman anner and more Hindi vocals. 5010-Thiruvananthapuram at 0121 with man in HH, f/by 5+1 time pips, another ID, flute and news in HH. Also at 1226 in Hindi to time pips at 1220, ID and news in EE. (D'Angelo, FCDX-PA) 7275-Chennai in Hindi at 0112, 9470-Aligarh in Hindi at 1154, 9820-Panaji (Goa) in Sinhala at 1306, 11585-Delhi at 1311 in Sindhi to Pakistan, 11620-Delhi in Hindi at 1048 and 13710-Bangaluru in Tamil at 1133. (DeGennaro, NY) 9445-Bangaluru at 2110 with Indian classical music. (Jeffery, NY) 9445//11620 at 2045. (Maxant, WV) 10330-Bangaluru in Hindi at 1237. (Brossell, WI) 11620-Bangaluru with sub-continental music at 1703. (Wood, TN) 17800-Bangaluru in HH at 1325. (Northrup, MO)

**INDONESIA**—Radio Republik Indonesia, 4605-Serui (Papua) at 1154 with woman in II, SCI at 1159 and into news. (D'Angelo, PA) RRI-Jambi (p) 4925 with man in II, SCI at 2158, Djakarta news at 2200. Very poor under the Brazilian. (D'Angelo, FCDX-PA) Voice of Indonesia, 9525 at 2005 on the energy crunch and high costs. Sudden loss of signal around 2015. (Maxant, WV)

**IRAN**—VOIRI, 6120 with “Voice of Justice” segment at 0139 and man/woman with news. Nearly unreadable. (Wood, TN) 9935 with Koran at 0233 and 11730 in unid language at 1243. (Brossell, WI)

**ISRAEL**—Kol Israel, 7545 in HH heard at 0337. (DeGennaro, NY) 9345 in presumed HH with talks on Gaza. (Jackson, PA) 11590 at 2015 with prime minister denying speculation Israel would attack Iran’s nuclear facility. (Maxant, WV) 15640 in FF at 2123. (Charlton, ON)

**ITALY**—RAI Int., 6110 via Ascension in II at 0229 closing with ID and sked. Also 9760 in Swedish at 2020 and 9840 in PP to Brazil at 0118. (DeGennaro, NY) 17780 in II at 1842. (Brossell, WI)

**JAPAN**—Radio Japan/NHK, 6120 via Canada with JJ/EE lesson at 1130. (Maxant, WV) 9530 via French Guiana in PP at 1049. Also 9660 via French Guiana in JJ at 0343 and

11710 via UK in RR at 1157. (DeGennaro, NY) 11655 in JJ at 2250. //11895, 11910, 15220, 17825. 17605-via Bonaire with sign on at 2300. (MacKenzie, CA) 11740 via Singapore in JJ at 1244 and 15355 via Gabon in African language at 1832. (Brossell, WI) 15355 via Gabon in EE at 1714. (Charlton, ON) 17810 via Singapore in JJ at 0505. (Foss, Philippines) Radio Nikkei, 9595 in JJ at 0435. (MacKenzie, CA)

**JORDAN**—Radio Jordan, 11690 with EE pops at 1522. (Charlton, ON) 1600 with news, “Radio Jordan 96.3 FM.” ID at 1604. (Burrow, WA) 1610 with rap and EE anmts. (Maxant, WV) 11810 at 1412 with male vocal, time pips at 1415, ID and AA news. (D’Angelo, PA)

**KUWAIT**—Voice of America Relay, 6235 in Special EE at 2155, into news in Pashto at 2200. (D’Angelo, PA) Radio Kuwait, 17885 in AA heard at 1320. (Northrup, MO)

**LATVIA**—European Music Radio, 9290 via Ulbroka at 1440 with EE pops. Faded before 1500. (Strawman, IA)

**LIBYA**—Radio Jamahiriya, 7320 via France in AA heard at 0117. (DeGennaro, NY) 2225 with “Voice of Africa” segment. (Maxant, WV)

**LIBERIA**—ELWA, 4760 at 2212 with EE religious talk ending at 2225 mentioning Old Time Bible program from Portland, Oregon. ID by man at 2229, choir vocals and start of another program. Off at 2303. (D’Angelo, FCDX-PA) Radio Veritas, 5470 at 2243 with continuous romantic vocals to 2255 when a there was a benediction, then more music, ID and Lord’s Prayer. Off at 2301. (D’Angelo, FCDX-PA)

**LITHUANIA**—Radio Vilnius, 9875 opening music and EE ID at 0030. (Alexander, PA)

**MADAGASCAR**—Radio Nederland Relay, 9895 in SS at 0248, //6165. (MacKenzie, CA)

**MAURITANIA**—Radio Mauritanie, 4845 in AA at 0011. (DeGennaro, NY)

**MEXICO**—Radio Educacion, 6185 in SS at 0239 with ranchera music, IDs in SS and EE at top of the hour. Sitar music at 0300 and later what sounded like themes from spaghetti westerns. (Wood, TN) 0249 with ID, music. (DeGennaro, NY) 0400. (Yohnicki, ON) 0415 and 0940. (Maxant, WV) Radio Mil, 6010 at 0955 with SS ballads. (Linonis, PA) 1134 with siow ballads. (Brossell, WI) Radio Candela FM (t) 6105 at 0815. In the clear but weak. Soft dialog by man in SS. (Clapshaw, WA)

**MOLDOVA**—Voice of Russia via Moldova, 7125 at 0257 and 7180 at 0305. (DeGennaro, NY)

**MOROCCO**—RTV Marocaine, 5980 in AA at 0320 and 15345 in AA at 2039. (DeGennaro, NY) 1830 with Koran recitations. (Brossell, WI) 2210 in AA. (Chandler, ON) Radio Medi-Un, 9575 in AA at 0215. (Brossell, WI) 2210. (Clapshaw, WA) VOA Relay, 13640 in special EE at 1906. (Wood, TN) 15220 in FF at 2013 and 15240 with “Nightline Africa” at 2018. (Jeffery, NY)

**MYANMAR**—Defense Forces Broadcasting, 5770 in Burmese with pop-rock at 0810 and woman doing interview at 0810. (Foss, Philippines)

**NETHERLANDS**—Radio Nederland, 9795 via Singapore in Indonesian at 1123 and 9895 in SS at 0109. (DeGennaro, NY) 11655 with news items at 2038 (Charlton, ON)

**NETHERLANDS ANTILLES**—Radio Nederland Bonaire Relay, 6165 to 0158 close. 15315 at 2042 with discussion on energy costs. Also 17810 at 2035 (Wood, TN) 15315 at 2015. (Maxant, WV) 15525 at 2051. (DeGennaro, NY) 17810 at 1944. (Jeffery, NY)

**NEW ZEALAND**—Radio New Zealand Int., 6095 with news at 1300. (Brossell, WI) 9870 at 1631. (Burrow, WA) 1303 and 9885 at 1025. (DeGennaro, NY) 9885 at 0845. (Maxant, WV) 1020. (Linonis, PA) 15720 at 0434. (Foss, Philippines) 2126. (Charlton, ON) 17675 at 2310 with splash from Chile on 17680. (Barton, NM)

**NIGERIA**—Voice of Nigeria, 7255 at 0654 with opening theme and IDs. Into regular EE program at 0701. News at 0715. Very strong but their usual muddy audio. (Alexander, PA)

**NORTH KOREA**—Voice of Korea, 7570 at 1340 with music and various features. Closedown at 1357 with schedule, IS at 1400 alternating with various language IDs and into FF, //9335. (D’Angelo, FCDX-PA) 9335 with EE ID at 1300 sign on. (Brossell, WI) Korean Central Broadcasting Station, 11680 in KK at 0005. (MacKenzie, CA)



11710 (t) at 1702 sign on with orchestral music, woman in unid lang. (Wood, TN)

**NORTHERN MARIANAS**—KFBS, 11580 in CC heard at 1257. (Brossell, WI)

**OMAN**—Radio Sultanate of Oman, 15140 in AA at 1458. (DeGennaro, NY)

**OPPOSITION**—Radio Marti, 5980 in SS at 1030. Bubble jamming from Cuba. (Linonis, PA) Voice of Mesopotamia, 11530 at 1235 in Kuridsh. (Brossell, WI) Voice of the Tigray Revolution, 5500 at 0431 with HOA vocals and talks in Tigrinya. Off or lost at 0501. (D’Angelo, PA) Radio Free Asia, 17525 via Dushanbe in CC at 0341. Also 17880 via Saipan in CC at 0312. (Foss, Philippines) Radio Solh, 15265 via UK at 1424 with Afghani music and man in Dari with ID and other anmts. Off abruptly at 1500. (D’Angelo, PA) Sudan Radio Service, 7120 via Wooferton at 0309 with news in EE ending at 0313 and into AA after ID. (D’Angelo, PA) 11705 from 1700 sign on to 1800 close. Also 15575 at 1459 sign on with IDs, sked, Nairobi contact info, news in EE at 1505. (Alexander, PA) Radio Free Southern Cameroon, 12130 at 1825 tune with EE talk about freedom in Southern Cameroon. Off at 1900. (Alexander, PA) Radio Rhino Int., 17870 via Germany from 1500 sign on with EE news about Uganda at 1505, local music, talks about Ugandan politics. Wed/Fri. only. Off at 1530. (Alexander, PA)

**PAPUA NEW GUINEA**—Radio West New Britain, Kimbe (New Britain Is.) 3235 heard at 1141 with EE talk, island music. (D’Angelo, FCDX-PA)

**PAKISTAN**—Radio Pakistan, (t) 11570 at 1609 in presumed EE with weak talk ending abruptly heard at 1515. (Burrow, WA)

**PERU**—Radio del Pacifico, Lima, 4974.8 at 2314 with woman in SS, ID by man, discussion, anmts at 2325. (D’Angelo, FCDX-PA) Radio Sicuani, Sicuani, 4826 in QQ at 1014. (DeGennaro, NY) Radio Cultural Amuata, Huanta, 4955 in QQ at 1049. (DeGennaro, NY) Radio Santa Monica, Cusco, 4965 at 0944 with long SS talk, music, ID, anmts. (D’Angelo, FCDX-PA) 1010 in QQ (DeGennaro, NY) Radio San Andres, Cutervo, 5544.7 at 0031 with rustic OA music and man in SS. IDs and mentions of Santa Rosa and Lima. (D’Angelo, PA) 0205 to past 0300 with OA folk music, SS anmts. (Alexander, PA) Radio Horizonte, Chachapoyas, 5020 in SS at 1044 with local commls. (DeGennaro, NY) Radio Tarma, Tarma, 4775 at 1007 with SS talk, ID, music, and anmts. (DeGennaro, NY) Radio Altura, Cerro de Pasco, 5014 with music and commls at 1017. (DeGennaro, NY) 1059 with ad string, canned ID at 1100 and into OA vocals. (D’Angelo, FCDX-PA) Radio Haunta 2000, Huanta, 4746 with music and SS talks at 0942. (DeGennaro, NY) Radio Victoria, Lima, 9720 with religious program at 2315. (Barton, NM) Radio La Hora, Cusco, 4885.6 at 1027 in QQ with woman talk and short music segments. (DeGennaro, NY) 1105 with woman in SS. (D’Angelo, FCDX-PA) Radio Maranon, Jaen,



The late Joe Adamov of the Voice of Russia.

4855.5 at 1020 with SS talk, ID, ads, jingles, OA music. (Alexander, PA) 1042 with OA vocals, woman anncr, man with ID. (D'Angelo, FCDX-PA) 1059 with woman anncr, commls. (DeGennaro, NY)

**PHILIPPINES**—FEBC Radio Int., 9430 in CC at 1143. (DeGennaro, NY) 1303. (Brossell, WI) Radio Veritas Asia, 11820 in II at 2310. (MacKenzie, CA) VOA Relay, 6110 heard at 1454. (Strawman, IA)

**PIRATES**—WMPR, 6955 at 2235 with rock and ID. (Gay, KY) Northwoods Radio, 6930u at 2228 with country songs and ID. (Gay, KY) 6YCAT, Voice of the Cat, 6925u at 1813 with long musical promo for the now defunct A\*C\*E Newsletter (Gay, KY) Take It Easy Radio, 6925u at 0357 with music, ID, talk about the French. (D'Angelo, PA) Mystery Radio (Euro) 6220 at 0139 with usual menu of techno pops and jingle IDs. Several full IDs at 0159. (D'Angelo, FCDX-PA) 6220.1 at 0640 with pops and canned ID. (Alexander, PA) Radio Spaceman (Euro), 4070 at 2230 with pops, ID, frequent anmmts. (Alexander, PA) Alpha Lima Int. 15073.6 at 1615 with rap and pops, ID anmmts. (Alexander, PA) Voice of the Inky Pen, 6925u at 1825 with man laughing and saying "that's right" over and over. (Gay, KY) Grasscutter Radio, 6925u at 1717 with ID and relay of a 1996 "Voice of the Runaway Maharishi" broadcast, several IDs and letters from noted pirate DXers. (Wood, TN) Undercover Radio, 6925u at 2215 with story-telling and ID. (Gay, KY) Possum Huntin' Radio, 6925u monitored at 0014 with mostly novelty songs and parodies. (Gay, KY)

**POLAND**—Radio Polonia, 9525 at 1259 sign on with IS alternating with ID to 1300 opening of EE program with ID, sign on anmmts and news. //11850. (D'Angelo, PA)

**PORTUGAL**—RDP Int., 9715 in PP at 0125, 9815 in PP at 1038, 15540 in PP at 2055 and 15555 in PP at 2059. (DeGennaro, NY) 15540 in PP at 1928 with ID, anthem. (Charlton, ON)

**ROMANIA**—Radio Romania Int., 9765 in SS at 0310 and 9700 in SS heard at 0317 "not matching" with 9700. (MacKenzie, CA)

**RUSSIA**—Voice of Russia, 7150-

Armavir at 0301 in RR, 7240-Ukraine at 0310 in RR, 7250-Armenia in EE at 0251, 7350 via Vatican City in EE at 0323, 7390-Samara in SS at 0155, 9800-Armavir in Urdu at 1256 and 11655-Armavir in Dari at 1315. (DeGennaro, NY) 9860 via Vatican at 0231. (Brossell, WI) 9840 in EE at 0410. //7180, 7350, 12010 and 15425. (MacKenzie, CA)

**RWANDA**—Radio Rwanda, 6055 at 2026 with two men in FF, highlife and pop vocals and closedown anmmts, more group singing and carrier cut at 2101. (D'Angelo, FCDX-PA) Deutsche Welle Relay, 9665 in GG at 0137, 13780 in AA at 2117 and 15205 in AA at 1948. (DeGennaro, NY) 9875 in GG at 0255. (MacKenzie, CA) 11965 in an African dialect at 1810. (Brossell, WI)

**SAO TOME**—VOA Relay, 7290 at 0327. (Brossell, WI)

**SAUDI ARABIA**—BSKSA, 9870 in AA at 1823. (Brossell, WI) AA to Europe at 1959. (DeGennaro, NY) 2215. (Clapshaw, WA)

**SEYCHELLES**—BBC Relay, 9610 at 0300 with "This is the BBC for Africa" and into an African language. (Brossell, WI) 11860 at 1657. (Wood, TN)

**SINGAPORE**—BBC Relay, 9740 at 1010. (Linonis, PA) Radio Singapore Int., 6185 with talks in CC at 1247. (Brossell, WI)

**SOLOMON ISLANDS**—SIBC (t) 5019.9 at 1644 with Radio Australia simulcast. Off or faded by 1659. (Burrow, WA)

**SVKAKIA**—Radio Slovakia Int., 7230 in EE at 0106 and 9440 ending EE at 0127. (DeGennaro, NY) 9440 in FF at 0210. (Brossell, WI)

**SOUTH AFRICA**—Channel Africa, 7390 at 0327 in EE. (DeGennaro, NY) In EE at 0350. Off abruptly at 0355, then back with ID and into FF at 0356 with birdcall IS. (Burrow, WA) 17770 with news at 1540. (Charlton, ON) Radio Sondergrense, 3320 with music and call-ins at 0232. (DeGennaro, NY) Pops and talks in Afrikaans at 0253. (Brossell, WI) BBC, 3255 via Meyerton with news at 0300. (Brossell, WI)

**SOUTH KOREA**—KBS World Radio, 15360 in RR heard at 1834. (Brossell, WI)

**SPAIN**—Radio Exterior de Espana, 6055 at 0045. (Barton, NM) 0043. Also 9535 in SS at 0145, 9620 in SS at 0139, 9680 in EE at

2024 and 17850 via Costa Rica relay with live sports at 2013. (DeGennaro, NY) 15125 (*Costa Rica—gld*) in SS at 1922 and 17850 (Costa Rica) with soccer in SS at 1655. (Charlton, ON) 17755 in SS at 1605. (Northrup, MO)

**SRI LANKA**—Deutsche Welle Relay, 9885 in RR at 1825. (Brossell, WI) SLBC, 15745 at 0345 with country-western songs, ID at 0400. (Foss, Philippines)

**SUDAN**—Republic of Sudan Radio, 7200 in AA with group vocals heard at 0320. (Brossell, WI)

**SURINAME**—Radio Apinte, 4990 in DD at 0253. (DeGennaro, NY) 0404 with continuous mix of pop/rock. Jingle ID at 0421. (D'Angelo, PA)

**SWAZILAND**—Trans world Radio, 3240 heard at 0256 with bells IS and ID. (Brossell, WI)

**SWEDEN**—Radio Sweden, 7420 in Swedish at 1121, 9490 via Canada in Swedish at 0124 and 11610 in Swedish at 1146. (DeGennaro, NY) 15240 via Canada heard at 1528 in Swedish. (Charlton, ON)

**TAIWAN**—Radio Taiwan Int., 9335 at 2321 on human rights violations in Asia. Also 11665 in German at 2109. (Charlton, ON)

**THAILAND**—Radio Thailand, 5890 (*via Delano, U.S.—gld*) at 0355 with "This is HSK9 broadcasting to the west coast of North America from the monarchy of Thailand." (Maxant, WV) 0312 with news. Also 6040 in Burmese at 1156, 7285 in TT at 1042 and 9810 in EE at 1255. (DeGennaro, NY) BBC Relay, 11945 with "BBC Learning English" at 1250. (Brossell, WI)

**TURKEY**—Voice of Turkey, 7270 at 0345. "This is Ankara" and into Turkish music. (Maxant, WV) 7300 in TT to Europe and North America at 0055. (DeGennaro, NY)

**UGANDA**—Radio Uganda, 4976 at 0303 with ID, drums, group vocals. (Brossell, WI) News at 0405, ID at 0417. Very weak. (D'Angelo, PA)

**UKRAINE**—Radio Ukraine Int., 5910 at 0135 with Ukrainian rock, EE anncr between. (Wood, TN)

**UNITED STATES**—AFN/AFRTS, Key West, 5446u at 0558 with talk on oral hygiene, into "Sports Overnight America" call-in show at 0500. Also 1213u at 1648. (Wood, TN)

## 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](mailto:popularcom@aol.com). The e-mail's subject line should indicate that it's for the "Global Information Guide" column. So come on, send your contribution in today!

This month's book winner is **Jack Linonis** of Hermitage, Pennsylvania, who receives a copy of *Joe Carr's Receiving Antenna Handbook* from our friends at Universal Radio, 6830 Americana Parkway in Reynoldsburg, Ohio 43068. That's just one of the dozens of books on radio you'll find in Universal's great catalog. You can get a free copy by sending an e-mail to [dx@universal-radio.com](mailto:dx@universal-radio.com), calling them at 614-866-4267, or dropping a note to them at the above address.

7811u at 1139 with songs from the 80s. (DeGennaro, NY) WWCR-Spurs noted on 4915 and 5225 at 1045. Also noted after 2300. (Alexander, PA) (*Give it a listen, then e-mail them at wwww@wwcr.com and suggest they clean up their act.—gld*)

**UZBEKISTAN**—Radio Tashkent Int., 7190 at 1200 sign on and into EE news. (D'Angelo, PA; Alexander, PA) 11905 in Uzbek at 2106. (Charlton, ON) Trans World Radio via Uzbekistan, 9445 in unid Asian language heard at 1304. (Brossell, WI)

**VATICAN CITY**—Vatican Radio, 5885 in GG at 0524 and 7305 in FF at 0244. (DeGennaro, NY) 7305 in EE at 0355 and 13765 in EE at 1530. (Maxant, WV) 11625 in FF at 2203. (Charlton, ON)

**VENEZUELA**—Radio Amazonas, Puerto Ayacucho, 4939.7 in SS at 1053 with commls, coming events, music. (DeGennaro, NY) 0121 with man hosting Latin vocals, IDs, ads, time checks. (D'Angelo, PA) 0245 to close at 0258. (Alexander, PA) Radio Nacional, 11760 via Cuba in SS at 2325. (Charlton, ON)

**VIETNAM**—Voice of Vietnam, 7245 with rock monitored at 1125. (DeGennaro, NY) 7280/9730 in VV at 1817. (Burrow, WA) 12020-Son Toy heard at 2347. (Foss, Philippines)

**ZAMBIA**—ZNBC/Radio Zambia, in unid language at 0254. (DeGennaro, NY) 0313. (Brossell, WI) The Voice-Africa, 4965 with music and EE talk at 0028. (DeGennaro, NY) 0250 with Christian pops. (Brossell, WI)

**ZANZIBAR**—Radio Tanzania-Zanzibar, 11735 at 1745 with songs and anmts to 1800 when “The time is nine o'clock in Zanzibar. Now the news.” (Brossell, WI) 1759 with local drums and mentions of “Spice FM” EE news. Into Swahili at 1809. (Alexander, PA) 2029 in Swahili. (Charlton, ON) 1803 with news and IDs mentioning Spice FM. Into AA news at 1809. (D'Angelo, PA)

And once again, order is restored! A big thank you to the following who did the good thing this time: Charles Maxant, Hinton, WV; Joe Wood, Greenback, TB; Marty Foss, Guinayangan, Philippines; Robert Brossell, Pewaukee, WI; Dave Jeffery, Niagara Falls, NY; Stewart MacKenzie, Huntington Beach, CA; Chris Gay, Lexington, KY; Bruce Burrow, Snoqualmie, WA; Rick Barton, Phoenix, AZ and camping in NM; Michael Clapshaw, Port Angeles, WA; Michael Yohnicki, London, ON; Rich D'Angelo, Wyomissing, PA and French Creek DXpedition; Jerry Strawman, Des Moines, IA; Mark Northrup, Gladstone, MO; Brian Alexander, Mechanicsburg, PA; Jack Linonis, Hermitage, PA; Joe Jackson, Sharon, PA and Ciro DeGennaro, Feura Bush, NY. Thanks to each one of you. And, until next month—good listening! ■

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# A Failure To Communicate

I like to think that all of my readers are a lot like I am. What a horrible thought—all of you old and overweight and with a few of your lug nuts loose. I hope, though, that many of you share some of my lunacy, and to find out, it might be good to admit to some of that lunacy here, now that the statute of limitations has probably run out on all the things I've done. If not, then I didn't really do them. Neither did Norm.

Even though Norm and I have been hams for years (both of us qualify for QCWA but I'm one of those people who never fills out the forms) we have always had CB radios in our cars, because they serve a purpose there—and they're also fun. You meet a lot of fun people on the Citizen's Band, but as with so many other groups, it seems—well, there's always one jerk.

I'll be the first to admit that everyone has an equal right to the frequencies, to the channels, to own a microphone, an antenna, and to be annoying. I'm always happy that most people don't exercise their right to be annoying, but Norm and I came across this one...

Often, the radio part would involve turning on the CB and just listening to the local banter. There was always plenty, and those of you who listen regularly to a "local channel" know just how crazy some of the antics can get.

We will call our "jerk" Harry, for lack of a better name. There's no way I want to make him someone you could identify. I don't worry too much about him reading this page and coming after Norm and me with a vengeance, because I don't think he has a vengeance (last we saw, he drove an Oldsmobile). Besides, we don't think he can read.

Harry had an apartment and could not put up an antenna, so his solution was to use a mobile CB and go outside and sit for hours on end talking on the radio. Harry was unemployed, but I bet you already guessed that. He had an opinion on everything, particularly the technical ins and outs of CB radio. He knew it far better than some RF engineers we knew. We know this because he told us. Often. Very often.

Harry often caused the CB version of what's now called "flame wars" on the Internet. At any one time there was always someone cursing him out, yelling at him, keying an unmodulated carrier over him whenever he would try to speak, and threatening to find him and do him bodily harm.

Norm and I never wanted to do him bodily harm. Well, not that we'd admit, but there were times when we thought it would be fun to watch someone else do him bodily harm. In fact, we tried to sign him up for some grudge matches with the professional wrestlers when they came to town, but that never panned out either; he had to sign a waiver and we didn't know his last name.

But years of ham radio skill paid off and Norm and I did spend a few lunch hours to track him down using some 10-meter directional ham antennas to get us in the ball park. Then we drove up and down the streets of the neighborhood he spoke about until, sure enough, we found him sitting in his big blue Oldsmobile, talking up a storm on whatever the local channel was back then.

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***"...so his solution was to use a mobile CB and go outside and sit for hours on end talking on the radio."***

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We drove right on by, never once acknowledging that we knew who he was, or letting on that we even had a CB in the car. For weeks, Norm and I plotted dastardly deeds, but always ruled them out because they involved "the dark side." They also involved the possibility of dealing with the police, who we were always taught were our friends. We did not want to get on the wrong side of the law.

The buttons were up. Yes, he never locked his car. Maybe he had lost the key to the door. Maybe he simply trusted everyone, or maybe he had an elaborate alarm system. But every time we drove past, the door-lock buttons were always in the "up" position.

Now, the only time I've ever opened a person's car door was to turn off their headlights when they were left on in a parking lot, and even that made me a little nervous, but with Norm there to give me increased intestinal fortitude, I walked down the sidewalk and looked right in the window to see what kind of CB he had. I can't remember the make and model now, but it was a pretty common one, because it's the same kind that Norm had about three of in his junk box.

That night, the idea hit me.

The next day at lunch I took my trusty Dremel rotary tool with its ever-so-useful cutoff wheel, and cut the shaft-sleeve off the back of the channel selector knob from one of Norm's CBs (that same model that Harry had). Norm kept asking what I was doing and it was so much fun to keep him in suspense as he watched. As I rotated the knob 1/40th of a turn and carefully "welded" the shaft back onto the knob using a soldering iron (glue just wouldn't handle the torque), Norm knew exactly what I was doing. Then I took the next knob and cut it, too, turning it 1/40th of a turn in the other direction. Norm developed the biggest grin and said, "Why you sneaky son of a ——" and just then a big truck went by and I didn't hear the rest of it.

Of course I had to be the one to open the car door, reach in, and swap knobs. Talk about a tense moment. The next day was wonderful. He had his rig so overdriven that you could always hear him "splashing" when he was on an adjacent channel, and he was ALWAYS on an adjacent channel. We would tune up and hear him swearing at people, demanding to know where they all were, and why did they change channels without telling him, and how come even the truckers had moved?

Of course, Norm and I would go onto the channel where he was babbling on, and we'd tell him that he was doing just fine, and he was on whatever channel he thought he was on. He was really nice to us. We were the only ones who would talk to him. We told him we didn't know why all those other people moved to another channel. We never did need to use the second knob, but it was nice to know we had it in reserve, just in case. ■

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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 25 MHz 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



P25-8600  
APCO25 Decoder

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.)



TVA-1 External  
NTSC TV Converter

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.

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 **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.



TV5000A NTSC  
TV Internal  
Converter

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.



TV2000 External  
NTSC Video Decoder



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