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SEPTEMBER 2010

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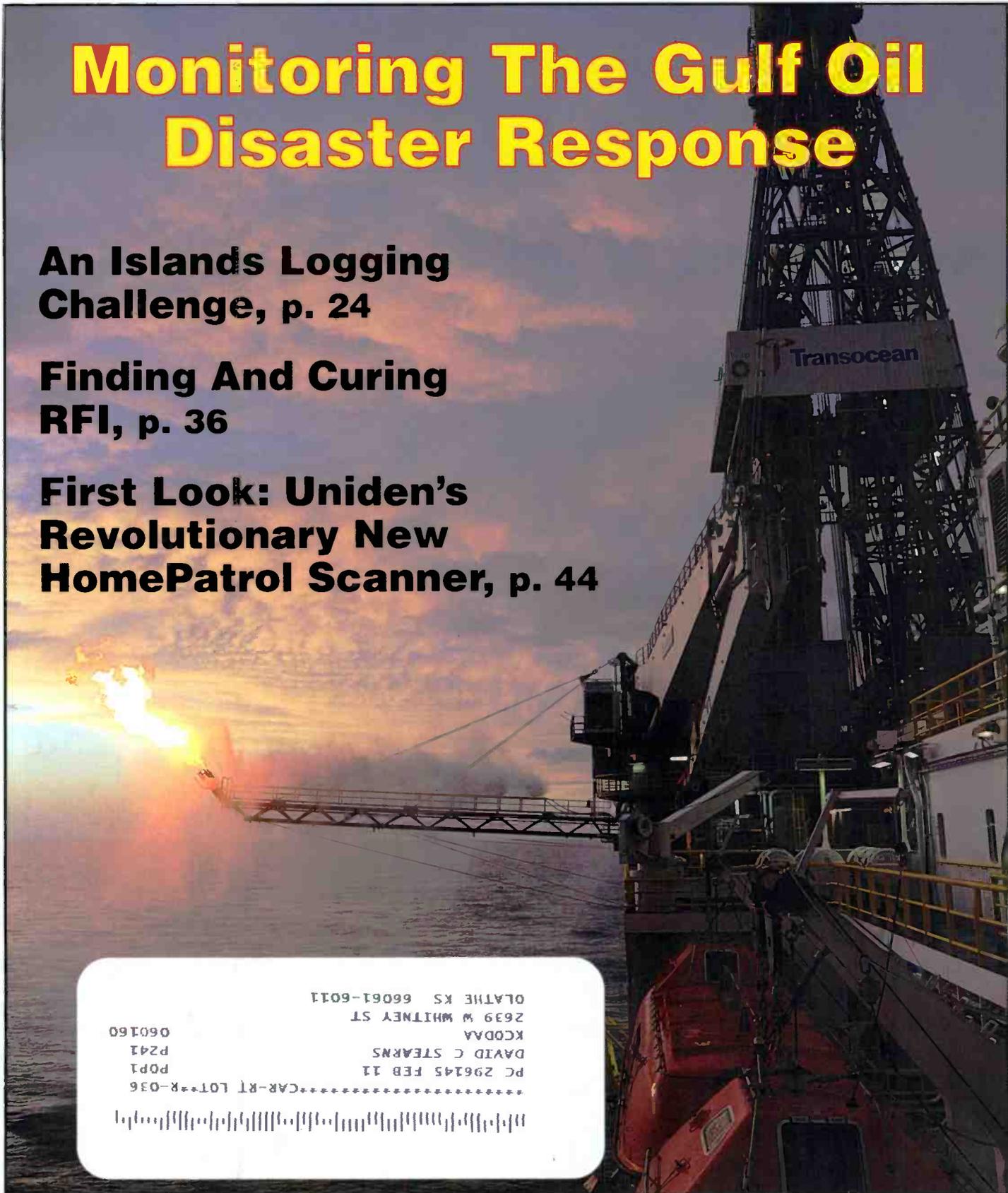
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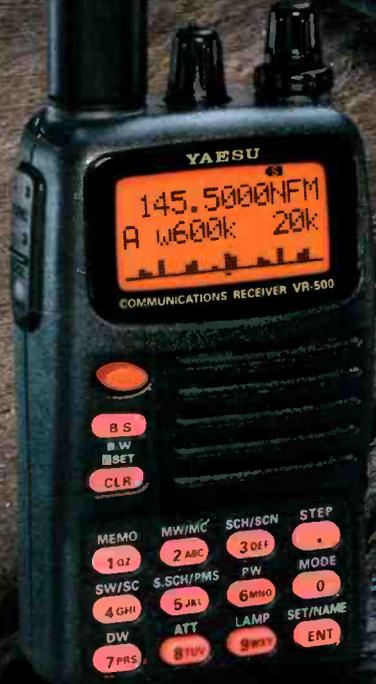
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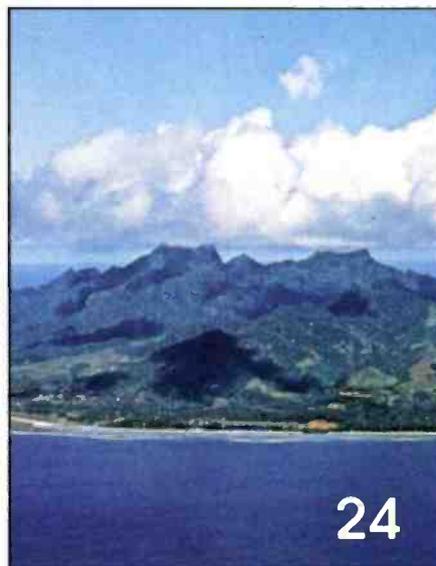
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Gas from the damaged Deepwater Horizon wellhead is burned by the drillship *Discoverer Enterprise* May 16, 2010, in a process known as flaring. Gas and oil from the wellhead are brought to the surface via a tube that was placed inside the damaged pipe. See "Crisis In The Gulf: Monitoring The Oil Spill Response," starting on page 10 for suggested frequencies to monitor within the affected area. (U.S. Coast Guard photo by Petty Officer 3rd Class Patrick Kelley)

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EDITORIAL

Tuning In

The Revolution May Not Be Televised

by Edith Lennon, N2ZRW

editor@popular-communications.com

Asserting that nothing less than “America’s future competitiveness and global technology leadership” depends, in part, upon the availability of additional spectrum for wireless broadband, the White House came out solidly behind the Federal Communications Commission’s ambitious National Broadband Plan with a June 28 Presidential Memorandum, titled “Unleashing the Wireless Broadband Revolution.” The FCC’s initiative called for, among other overhauls, nearly doubling within 10 years the bandwidth available for auction to companies that would use it for wireless broadband data connections for consumers and possibly first-responder networks.

In an outline that largely mirrors the Commission’s recommendations, the White House directed the National Telecommunications and Information Administration and the FCC to identify a total of 500 MHz of federal and non-federal spectrum during the next 10 years suitable for both mobile and fixed wireless broadband use. Moreover, 300 MHz of high-value spectrum between 225 MHz and 3.7 GHz is to be made available within five years.

Whether “the revolution” of expanded wireless broadband access can deliver on the Memorandum’s promise to “transform Americans’ lives,” its goals are lofty. Among them:

Address the threat of spectrum crunch (some estimates predict that the next five years will see an increase in wireless data of between 20 and 45 times 2009 levels); foster job creation, innovation and growth; invest auction revenues in public safety and infrastructure; reduce the geographic and socioeconomic differences in broadband access and adoption (commonly known as the “digital divide”); reduce the deficit.

Of course, 500 MHz is a huge chunk of radio real estate, and it’s got to come from somewhere. The FCC proposed that about 120 MHz of spectrum come from the television broadcast industry, which will be asked to voluntarily give up or share some of the unused frequencies allocated to it.

National Economic Council Director Lawrence H. Summers said in a speech outlining the plan that television stations could sell at auction some of the frequencies for which they are licensed, possibly netting hundreds of millions of dollars, despite having received their spectrum for free decades ago. That sounds pretty sweet.

While stressing that what the broadcasters are being asked to do is voluntary, the strength and specificity of the administration’s directives put teeth in the FCC’s initiative. The initial reaction of a bitten broadcast industry was low growling.

“We appreciate FCC assurances that further reclamation of broadcast television spectrum will be completely voluntary, and we’re convinced that America can have both the finest broadband and broadcasting system in the world without jeopardizing the future of free and local TV service to tens of millions of viewers,” NAB Executive Vice President Dennis Wharton was quoted as saying in an *Ars Technica* piece posted on Portfolio.com. “We also believe the first priority of Congress ought to be passage of spectrum inventory legislation that identifies fallow spectrum or companies that may be ‘warehousing’ the airwaves.” (Ironically, NAB represents a TV broadcast industry that’s sitting on—“warehousing,” if you will—the largest swaths of unused commercial spectrum in the country.)

The fight has only just begun.

Revolutions always promise much, rarely deliver. But if winning the battle to come may mean increased productivity, more jobs, better and cheaper connections in rural areas, and improved public safety, we say, “bring it.” And we’re actually in accord with NAB on this one and add our voice to its own, reminding the FCC to find that 500 MHz in the “warehouse,” and not in the amateur allocations where it actually is used in the public service.

(See “Washington Beat” and “Broadcast Technology” elsewhere in this issue for more on the topic.)

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The Weirder Side Of Wireless

by Staff

Pipe Down!

For radiophiles this is a plumbing problem you'd pay to have; for unsuspecting residents of Tantramar Marsh near Sackville, New Brunswick, it's gotta be a little creepy. According to a report on the canadaeast.com website, people living in the area are unintentionally intercepting Radio Canada International (RCI) broadcasts from the Canadian Broadcast Corporation's shortwave broadcasting transmitter via their household fixtures and appliances. Tinny, muffled voices will arise from their bathtubs, refrigerators, and washing machines. They will ramble, sing, and chat, in Italian, Chinese, Portuguese, and other world languages.

"The plumbing acts as an antenna," says area artist and burgeoning historian Amanda Christie. "When two pipes cross, the appliance ends up acting as a gramophone speaker. All of a sudden, people will hear the radio coming from their sink, but this happens with other things, too, that have pieces of metal touching at the right point." Other RCI tuners have included toasters, computer speakers, guitar amps, and telephones.

Christie is attempting to record the area's buzzing and undocumented history and is working on an audio/visual art project about it. Through her research, she's heard numerous accounts of waves radiating from inanimate objects like light fixtures and household appliances. Tales from the '40s and '50s (around the time the towers were installed) include stories of folks hearing radio chatter on the wires of their clotheslines, the report on canadaeast.com stated.

The Gang That Couldn't Spy Straight

You almost have to pity the bumbling Boris Badenovs and nonplused Natasha Fatales. Not only did the Russian ring charged with spying on the United States face many of the same maddening issues so many of us deal with, like misconfigured wireless networks and laptop help desk issues that take months to resolve, they apparently just weren't too tech-savvy to begin with. According to an article in *Network World US*, the alleged conspirators used PC-to-PC open wireless networking and digital steganography to hide messages and retrieve them from images on Web sites. But some of the communications federal agents gathered indicate the spies weren't

comfortable with the technology. One message shows a suspected spy trying to figure out how to embed a message in an image, and an audio recording inside one suspect's home picked up a voice saying, "Can we attach two files containing messages or not? Let's say four pictures..." And, in a huge "DON'T" surely covered in Espionage 101, one defendant left a 27-character password written on a scrap of paper that law enforcement officers used to access more than 100 text files containing covert messages. The spy ring had numerous technical problems, including file transfers that hung and wouldn't go through and difficulty replacing laptops when necessary. In one case, an agent was so frustrated by laptop issues that she unwittingly turned it over to an undercover FBI agent, the report said.

The spies also used "radiograms" to communicate—with messages being sent over shortwave frequencies in cipher and then decoded using a key written by hand in a spiral notebook. U.S. officials found during a search of a suspect's home. They probably should have just stuck with the spy number station approach.

And The Music Goes 'Round And 'Round...

Thank goodness we can enjoy radio in the car, the modern way, courtesy of Livio's Carmen, "a portable Internet radio solution for use in the vehicle." Here's how it works, according to a piece on wired.com's Gadget Lab:

First, plug the Carmen into your computer, fire up the companion software, and then choose the from the Internet radio stations available ("more than 42,000 stations"). The Carmen will then record these for you, DVR-style, in real-time. To make that clear, you won't be downloading an hour-long show in seconds like you would with a podcast: you'll be waiting an hour for it.

Once the 2GB stick is loaded up, you take it to the car and plug it into the cigarette-lighter socket. Then you turn on the car's radio. The Carmen works by sending the MP3s via FM (although you can opt for an aux cable). It even comes with a small remote control so you can search on the floor for that instead of squeezing the Carmen's tiny buttons.

To recap: You spend hours recording radio shows only to re-broadcast them to your car stereo. And for this you spend \$60. Alternatively you could just use the radio in your car, or hook up the cellphone or MP3 player you already have to your car stereo. That would cost you nothing.

News, Trends, And Short Takes

by D. Prabakaran

1929 Broadcast Featuring Thomas Edison Recovered

A 1929 radio broadcast of Thomas Edison has been recovered from a recording made of it on a machine that no longer exists. Audio experts had to recreate the early sound recording device, known as a "pallphotophone," based only on old photos and descriptions of the machine, which General Electric developed in 1922. The pallphotophone, which means "shaking light sound" in Greek, recorded onto movie film light emissions made from sound. To unlock the sound, modern motors and computer controls were cobbled together in a machine dubbed a Gizmotron, which used a photo transistor in place of a photoelectric cell that read the recordings originally.

Writing for the *Times Union* (Albany, New York), Paul Grondahl said "Listening to the elderly Edison lose his place, become confused and nearly weep over the depth of his admiration for Ford more than 80 years after he spoke those heartfelt words to a live audience has the power to cause a lump to rise in one's throat."

The recording is one of the world's oldest surviving radio broadcasts.

(Source: Times Union)

World's Radio Stations On A USB Thumb Drive

RadioTime, Inc., a developer of technology for finding and listening to radio online, announced it provides its Internet radio guide to the Dension Webradio, a small USB dongle that can bring the world's radio stations and programs to any USB-capable home entertainment system or car radio. Developed by Dension Audio Systems, based in Budapest, Hungary, the Dension Webradio enables anyone with a free RadioTime.com account to load their RadioTime Presets, pair the device with a 3G-enabled mobile phone, and plug it directly into a radio's USB port. Each station will appear on the car or home system as an MP3 file, enabling the user to browse, select and listen to the stations by name, and view that information on the radio's display. According to RadioTime, RadioTime.com gives users access to 30,000 AM/FM and Internet-only radio stations and 100,000 music, news, talk, sports and entertainment programs.

The Dension Webradio is available in the US, with a suggested MSRP of \$120 USD.

(Source: RadioTime)

Tougher Action Against Dutch Pirate Radio Stations

The Radiocommunications Agency (AT) Netherlands is stepping up action to prevent illegal radio broadcasts. The agency will not only close down stations that are on the air without permit, but will also target aerial towers "obviously intended for illegal broadcasts." AT inspectors will pay warning visits to land and homeowners on whose premises suspicious constructions are spotted. "If these are used illegally, they will be fined 2,500 euros plus a conditional fine of 2,250." The total fine that illegal broadcasters risk "can total up to 33,750 euros," according to AT spokesman Gernant Deekens. "Pirate radios are causing a lot of trouble in the north and east of the Netherlands," said AT Chief Inspector Peter Spijkerman. "Their illegal broadcasts are interfering with legal radio stations here and in neighboring Germany. Air traffic communication, too, is disrupted by illegal transmissions. This can lead to dangerous situations. We primarily want to take preventive action, but if people break the law, we'll give the pirates tit for tat."

(Source: RNW News)

Finland Makes Broadband A "Legal Right"

Finland has become the first country in the world to make broadband a legal right for every citizen. As of July 1, 2010, every Finn has the right to access to a 1Mbps broadband connection. Finland has vowed to connect everyone to a 100Mbps connection by 2015. Speaking to the BBC, Finland's communication minister Suvi Linden said, "We considered the role of the Internet in Finns' everyday life. Internet services are no longer just for entertainment. Finland has worked hard to develop an information society and a couple of years ago we realized not everyone had access." It is believed up to 96 percent of the population are already online and that only about 4,000 homes still need connecting to comply with the law.

(Source: BBC)

Capitol Hill And FCC Actions Affecting Communications

by Richard Fisher, K16SN

Obama Administration Endorses FCC Wireless Broadband Initiative

In a sweeping endorsement of the Federal Communications Commission's initiative to expand wireless broadband, the Obama Administration in late June called for the release of 500 MHz of spectrum and set in motion a plan for cross-government collaboration to make it happen. The President pledged to conduct the spectrum expansion over the next decade, supporting an FCC plan to earmark for commercial high-speed wireless carriers frequencies now assigned for use by broadcasters and government entities, including the National Oceanic and Atmospheric Administration and Department of Defense. Spectrum allocations would be determined through auctions whose proceeds would go in part to development of a wireless network for emergency first responders, according to National Economic Council Director Lawrence Summers. The Administration's announcement is important because it puts "momentum behind actions that the FCC does not have the authority to take on its own," according to a report in the *New York Times*. "Specifically, the presidential memorandum will direct the National Telecommunications and Information Administration (NTIA) to identify federally controlled communications bands that can be made available within five years for exclusive or shared use by commercial companies." In a June 28 memorandum to the heads of executive departments and governmental agencies President Obama called for a plan and timetable to be completed by October 1, 2010, "for identifying and making available 500 MHz of spectrum" and set expectations for collaboration, citing a wide range of entities including the FCC, NTIA, NASA, FAA and the secretaries of Defense, Transportation, State, Interior, Agriculture, Energy and Homeland Security.

FCC Proposes Massive Overhaul of Part 95

The FCC in early June released a 92-page Notice of Proposed Rule Making aimed at stream-

lining and reorganizing the rules for the personal radio services covered under Part 95 of the Commission's rules. These services include CB, GMRS (General Mobile Radio Service), FRS (Family Radio Service), MURS (Multi-Use Radio Service) and others. Highlights of the proposal include a recommendation to eliminate individual station licenses for GMRS, allow transmission of GPS location information on GMRS channels and ban the inclusion of FRS capability on radios intended for use in public safety services. The NPRM also asks for comments on whether the widely ignored distance restriction on CB contacts is still necessary and whether the rules should specifically permit the use of hands-free microphones for CB transceivers. The complete NPRM may be found on the FCC's website. It is WT Docket 10-119.

FCC Conducts Assessment of 1675-1710 MHz Band Use

In an effort to more fully understand the use of the 1675 to 1710 MHz band by non-governmental organizations, while viewing its potential use for broadband, the FCC issued a Public Notice in early June asking the public for input and insight. The 1675-1710 MHz band is allocated for federal and non-federal use for the Meteorological Aids Service and the Meteorological Satellite Service (Space-to-Earth). The spectrum is home to downlinks from some weather satellites and weather balloons administered by the National Oceanographic and Atmospheric Administration. The services provide weather forecasting, hurricane and other storm tracking, prediction of flooding and droughts and warning against other hazards to life and property.

The FCC also sought public comment on the extent to which non-federal users directly access transmissions from radiosondes. It may be feasible for radiosondes to operate using substantially less bandwidth than they currently do, freeing spectrum for other uses, or for them to use an alternative technology or relocate to other spectrum, according to a recent ARRL statement.

Communications Devices And Health

by Rob de Santos
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“As aficionados of all kinds of communications, we are in an unusual position from which to evaluate the risks and lead the way in which society responds.”

I bet most readers of this magazine own a mobile phone. I'll also bet that most of us have read about the debates over whether “radiation” from the devices is damaging to our health, and in particular to our brains. In previous columns, I've mentioned the emergence of 3D television. With many networks now engaging in trial broadcasts of 3D TV and every major manufacturer selling 3D televisions, it's often in the news. What you may have missed, however, is the debate about whether 3D TV causes health problems. A decade or two ago, when handheld remotes became standard, there were concerns about repetitive motion injuries caused by overuse of the devices. Surely no one has missed the debate about when it's safe to use mobile phones in cars. That issue has directly affected hams in some states.

What do all these have in common? All are examples of health consequences, real or perceived, stemming from the use of communications devices. While our examples may not require the immediate attention that a major health risk calls for, for many users of technology, particularly technology they do not fully understand, these are real issues. As I write this, two U.S. cities just passed laws requiring the labeling of mobile phones with health warnings. This was done despite the lack of substantial scientific evidence of risk. Is there a risk? Possibly, since we can *never prove there isn't one*, but at this stage, in the absence of conclusive evidence, most experts say no.

What does this mean for the future of communications? Perhaps most of the health worries will fade just as the aches in sore arms do after days of reading *War and Peace*. Some will prove to be real concerns and have implications for how we use technology now and in the future. As aficionados of all kinds of communications, we are in an unusual position from which to evaluate the risks and lead the way in which society responds. If your friends consider you the “radio lady,” the “computer expert,” or “the guy who talks to people around the world,” they'll probably be taking cues from you about which risks are real and which are not.

Going back to 3D TV for the moment, that technology does provide us an object lesson. A recent magazine review suggested that while concerns about health risks are real, the hard data on just what those risks are is sparse to non-existent. This really isn't much of a revelation. Since the technology is so new and double blind studies of risk aren't generally required before a new electronic device is introduced to the market, health data has not yet been acquired. (Now if a manufacturer wants to give me a 3D TV so it can find out if I get sick from it, I am ready to volunteer!)

How are we to sort out the real risks from the perceived but non-existent ones? I'd suggest that common sense is our best guide where hard scientific data is missing. I'd also suggest that your fellow radio fans, hams, SWLs, and scanner hobbyists are your best sounding board on new and emerging technology. Every month when I get my issue of *Popular Communications*, I know that my fellow writers will fill the pages with some great material. The articles will teach me something I don't already know about the hobby.

No technology or human activity is completely devoid of risk, and it would be crazy to suggest communications doesn't have its own associated risks. Anyone who's been near a “hot” transmitter or touched a live circuit and received an unexpected shock knows that. I doubt that hams die at a higher rate than any other hobbyists do, but careless hams and SWLs are just as likely to get into trouble as any other type of fool. Fear of the unknown is human and the law of unintended consequences insures that every communications invention may pose a risk we did not anticipate.

If you've been reading these columns, you probably can guess that I am generally optimistic about the future of communications. I'm also optimistic that these advances will mostly be safe and beneficial. Use your “noggin,” depend on known facts, and you'll probably avoid most risks—and avoid slipping into needless paranoia.

Do you have health concerns about the communications devices you use? How do you address those concerns? Send me your thoughts via the “safe” methods you prefer. Until next month, be safe!

Crisis In The Gulf: Monitoring The Oil Spill Response

Its Final Impact On A Vast Region Unknown, The Greatest Environmental Disaster In U.S. History Is Still Unfolding—And Spreading

by Ken Reiss. Radioken@earthlink.net

Ships and drilling rigs surround the *Discoverer Enterprise* as it recovers oil from the Deepwater Horizon drill site. (U.S. Coast Guard photo by Chief Petty Officer Bob Laura)

You may remember that some time back in the pages of the “ScanTech” column we talked about doing some what-if planning to organize your scanner and computer files in the event of a disaster or major emergency occurring in your area. One scenario we didn’t even think of including in that list of “what ifs” was a major oil spill occurring deep under water off our own shores. That simply wouldn’t, couldn’t happen.

But when the Deepwater Horizon drilling rig exploded 50 miles off the coast of Louisiana on April 20, killing 11 workers and unleashing a manmade environmental catastrophe, our assumptions were proved tragically wrong. And because of the tremendous volume of oil gushing forth over a painfully long period, the extent of the effect on lives, livelihoods, communities, wildlife, and the greater environment throughout the Gulf region is staggering. As the wind, waves, ocean currents, and events still unknown continue to spread the oil, more communities in more states may be impacted.

Monitoring: What, Where, And When

It’s rare that we get to cover a disaster in progress, given the magazine lead times and production schedule. Unfortunately, this one looks like it’s going to be around for a long time to

Ken Reiss is *Pop’Comm*’s “ScanTech” columnist.

“Since this is such a large-scale disaster, involving the federal government, multiple states, innumerable agencies and businesses, both large and small, as well as local commercial interests and volunteers, communications traffic will be heavy.”

come, so we’re able to offer suggested frequencies for many agencies that are likely to be involved.

Many of these suggestions are necessarily drawn from speculation and educated guesses on my part since I’m not close enough to hear any of the action. If you are near the scene—and given the extent of the spill, a lot of our readers will be—perhaps you can let me know how close I am or what I’ve missed and we can follow up in the future.

Since this is such a large-scale disaster, involving the federal government, multiple states, innumerable agencies and businesses, both large and small, as well as local commercial interests and volunteers, communications traffic will be heavy. Much of it will not be monitorable, unfortunately. Top level communications no doubt are taking place on cell phones and in face-to-face meetings and other traffic will be encrypted. But this is

an event of historic proportions, and if you're nearby, you owe it to yourself to try to catch what you can.

At this stage, listening to the situation is probably going to involve mostly cleanup operations and logistics commu-

nications. Getting workers to and from both maritime sites and on shore cleanup sites, controlling traffic and managing supplies and personnel requires a lot of coordination and you may be able to catch some of it on your scanner, depending on



Steve Henne communicates with personnel on the bridge as the crew aboard the motor vessel *Poppa John* train to deploy fire-resistant, oil-containment boom off the coast of Venice, Louisiana. The crew was being trained to deploy the boom for possible controlled burns. (U.S. Coast Guard photo by Petty Officer 3rd Class Patrick Kelley)



Cullan Pugh, ordinary seaman aboard the tug *Resolute*, uses a high-pressure fire hose to wash oil from the hull of a fishing vessel as part of a decontamination process about 15 miles south of Dauphin Island, Alabama. Vessel decontamination is required for all oiled vessels before they are permitted to enter Mobile Bay and various ports throughout the Gulf of Mexico. (US Coast Guard photo by Petty Officer 1st Class Tasha Tully)

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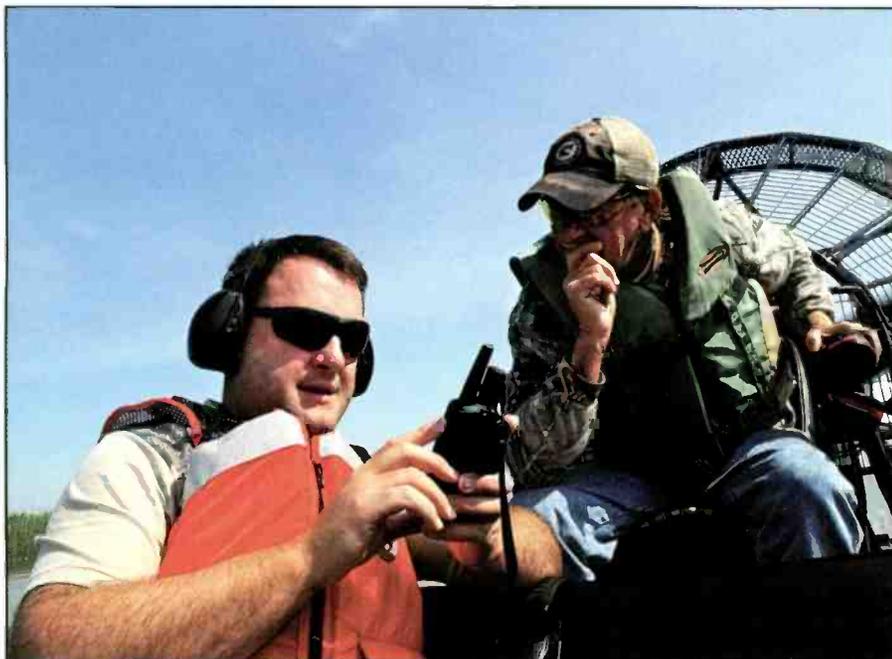
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Jason Duke, a geographic information systems coordinator with the U.S. Fish and Wildlife Service discusses communication methods with Charles LeBlanc, an airboat contractor, in South Pass, Louisiana. The U.S. Fish and Wildlife Service is providing on-the-ground intelligence on oil sightings and clean up methods to the Unified Area Command located in Robert, Louisiana. (U.S. Coast Guard photo by Petty Officer 3rd Class Stephen Lehmann)

how close you are to one of the literally hundreds of cleanup sites.

Closer to the ports, you should find ships coming and going, and possibly some operational chit chat as they do. If you're close to the beaches and marshes that are being affected by the oil spill, listen for radio traffic involving the coordination of supply and personnel transport.

Don't forget to check some of the business channels, too. All sorts of local contractors are being used to help keep the operations moving, from food and supplies to toilet facilities. The cleanup operation is a big logistical event all on its own. You might also want to check the FRS frequencies if you're close enough to the coast, as there might be some business or casual use of those radios as well.

BP

As the owner of the gushing well, British Petroleum is, of course, the primary company involved in the disaster, and has primary responsibility for the response and cleanup. BP has a few licensed business channels which may be



Workers, contracted by BP, clean up oil on the beaches in Port Fourchon, Louisiana, during night operations. Night operations allow workers to clean up while the tide is out. (U.S. Coast Guard photo by Petty Officer 3rd Class Ann Marie Gorden)

Frequency Suggestions For Gulf Disaster Monitoring

BP	87	157.375	Marine Telephone
	88	157.425	Commercial

BP has a few licenses that show up in an FCC search. The listings for the Louisiana area are follows:

BP America, Inc.	153.47000
BP America, Inc.	153.47000
BP America, Inc.	153.62750
BP America, Inc.	153.62750
BP America, Inc.	153.62750
BP America, Inc.	158.25000
BP America, Inc.	158.25000
BP America, Inc.	159.98250
BP America, Inc.	159.98250
BP America, Inc.	464.46250
BP America, Inc.	469.46250
BP Oil Pipeline Company	49.24000

Marine Frequencies for the U.S.

6	156.300	Inter-ship Safety
7	156.350	Commercial
8	156.400	Commercial
9	156.450	Commercial
10	156.500	Commercial
11	156.550	Commercial
12	156.600	Port Operations
13	156.650	Navigational
14	156.700	Port Operations
15	156.750	Environmental
16	156.800	Distress-Calling
17	156.850	State Control
18	156.900	Commercial
19	156.950	Commercial
20	157.000	Port Operations
21	157.050	Coast Guard
22	157.100	Coast Guard
23	157.150	Coast Guard
24	157.200	Marine Telephone
25	157.250	Marine Telephone
26	157.300	Marine Telephone
27	157.350	Marine Telephone
28	157.400	Marine Telephone
65	156.275	Port Operations
66	156.325	Port Operations
67	156.375	Commercial
68	156.425	Non-Commercial
69	156.475	Non-Commercial
70	156.525	Non-Commercial
71	156.575	Non-Commercial
72	156.625	Non-Commercial
73	156.675	Port Operations
74	156.725	Port Operations
75	156.775	
76	156.825	
77	156.875	Oil Tankers
78	156.925	Non-Commercial
79	156.975	Commercial
80	157.025	Commercial
81	157.075	Coast Guard
82	157.125	Coast Guard
83	157.175	Coast Guard
84	157.225	Marine Telephone
85	157.275	Marine Telephone
86	157.325	Marine Telephone

Family Radio Service

1	462.5625
2	462.5875
3	462.6125
4	462.6375
5	462.6625
6	462.6875
7	462.7125
8	467.5625
9	467.5875
10	467.6125
11	467.6375
12	467.6625
13	467.6875
14	467.7125

Coast Guard

Air Operations

345.0	Operations Primary	AM Mode
237.9	Operations Secondary	AM Mode
326.15	Air-to-Ground Primary	AM Mode
379.05	Air-to-Ground Secondary	AM Mode

Marine Channels Reserved for Coast Guard use only

157.050	CH 21A
157.100	CH 22A
157.150	CH 23A
157.075	CH 81A
157.125	CH 82A
157.175	CH 83A

Other Coast Guard Frequencies:

139.9750, 140.4750, 140.7250, 141.6125, 150.7250, 141.5500, 150.3000, 162.0500, 162.1250, 162.2500, 162.3250, 163.0500*, 163.1375, 164.3000, 164.3125, 164.5500, 164.5625, 164.9000, 164.9125, 165.2625, 165.3125, 165.3250, 165.3375, 166.1875, 167.9000, 168.8625, 171.2375, 172.3125

* May be dedicated to use in the New Orleans area

MMS/BOE

The much-maligned Minerals Management Service, since renamed the Bureau of Ocean Energy Management, Regulation and Enforcement—or Bureau of Ocean Energy (BOE) for short, was the federal agency with direct supervision of offshore drilling. While BOE does not appear to be involved in direct cleanup operations, it will no doubt be tracking the progress. Like all federal radio after 9/11, these are likely to be DES encrypted, so there may not be much to listen to even if you hear a signal.

Frequency	Description
166.37500	Helicopters

States

Louisiana

New Orleans Port Authority
866.3875 866.8375 867.11250c 868.35 868.725

The state of Louisiana has established a new 700-MHz trunked system for the use of statewide law enforcement as well as other agencies. Below are the frequencies and location information for this APCO-25 digital system.

Name	Freqs									
Pan Am - N.O.	769.16875c	769.41875a	769.56875	770.00625	770.33125	770.60625	770.85625	771.20625		
	771.60625	772.13125	772.38125	772.63125	772.95625	773.20625	773.45625	774.03125a	774.78125	
Bridge City	769.50625	769.70625c	769.95625a	770.10625	770.53125	770.78125	771.10625	771.35625	771.65625	
	771.93125	772.28125	772.58125	772.88125	773.08125a	773.38125	773.53125a	774.28125	774.53125	
Slidell	769.09375	770.20625c	770.45625a	772.75625	773.05625a	773.30625	773.55625	774.23125	774.48125	
La Place	769.65625c									
Buras	764.16875a	764.41875a	769.15625c							
St Rosalie										
[DORMANT]	764.20625a	764.45625c	764.70625a	764.95625a	765.45625					
Abita Springs	770.16875c	770.41875a								
Sheridan	771.33125	771.85625	772.18125	772.53125	772.93125	773.09375a	773.34375c	774.09375	774.40625	
Baton Rouge	764.16875	764.41875	764.66875a	764.91875	765.16875a	766.95625	769.19375c	773.85625	774.20625	
	774.95625									
Geismar	764.21875	764.46875a	764.71875	764.96875	765.21875	765.46875	765.71875	769.21875c	770.50625	
	771.13125	771.43125	771.68125	771.98125	772.30625					
St. James	769.15625c	769.40625a								
Larose	769.35625	769.68125c	770.25625	771.18125	771.50625	771.75625	772.00625	774.09375		
Chef Menteur										
[DORMANT]	765.18125c									
LSU - BR	769.16875c	770.41875a	770.66875a							
Hammond	769.20625c									
Gray	769.18125c	769.78125	770.03125	770.30625	770.69375	770.94375	771.29375	771.70625	771.95625	
	772.23175	772.48125								
Wilmer	769.08125	769.69375c	769.94375a	770.35625	770.83125	771.15625	771.40625	771.80625	772.10625	
Reggio										
[DORMANT]	764.21875	764.46875	764.71875	764.96875c	765.21875c					
Abbeville	769.15625c	769.40625a								
Berwick	764.20625	764.45625	764.95625	765.84375	769.30625	769.66875c	770.55625	770.71875	770.96875	
	774.70625									
Lafayette	769.18125c	774.30625a								
Jennings	769.65625c	769.90625a								
Jeanerette	769.20625c									
Lake Charles	769.20625c	769.78125	770.05625	770.45625a	770.68125	770.90625	771.35625	771.65625	772.15625	
	772.40625	773.31875	773.53125	773.81875	774.05625	774.31875				
Hackberry	769.18125c	769.43125a								
Rockefeller	764.16875c	764.66875	765.16875							
Vinton	769.15625c	769.40625a	769.70625	769.95625	770.16875	770.96975				
Baywood	770.18125c	773.55625	773.80625							
Parks	769.69375c	769.94375a								
Ramah	765.96875	770.16875c	775.08125a							
West Baton Rouge	769.68125c	769.93125a								
Sage Hill	764.20625c	764.45625a	765.19375	769.70625a	770.30625	775.58125				
Parker Rd.	770.68125c									
Iberville	769.71875c	774.59375	774.83125a							
Livingston	770.21875c	770.46875a								
Dry Creek	769.69375c	769.94375a								
Ville Platte	770.09375a	770.33125	771.08125	771.43125	771.70625	774.09375c				
Opelousas	769.66875c	769.91875a								
Jackson	770.71875c									
Greensburg	770.69375c	770.94375a								
Rosepine	769.16875c	769.41875a	770.70625	770.95625	774.06875	774.34375				
Vermilion	769.68125c									
DeQuincy	769.66875c	769.91875a								
Acadia	769.21875c	769.46875a	769.61875	769.95625	770.53125	771.83125	772.09375	772.43125		
Oak Grove										
Leesville	769.21875c									
Scott	770.19375c	770.76875a								
Sulphur	769.35625	769.45625a	769.65625a	771.03165	773.06875	773.34375	773.58125a	773.93125	774.40625	
	774.65625	774.78125	774.84375c							
Pointe Coupee	770.20625a	770.45625c	773.84375a							
Theriot	769.25625	770.16875c	770.66875	770.91875	773.33125	866.15	866.7	868.8875		
Merryville	769.71875c	769.96875a								
Arsene LeBleu	769.45620c	773.04375a	773.29375	773.55625	773.79375	774.03125	774.29375	774.53125	774.65625	
	774.78125	774.84375a								
Assumption	769.84375	770.44375	771.86875	772.14375	773.83125a	774.58125c				
Trailer 96	769.14375c									

Trailer 98	770.16875c								
Trailer 99	769.14375c								
Trailer 100	775.10000c	775.60000a							
N. Simulcast									
N.O. Metro	765.28125a	765.55625	766.73125	774.13125	774.65625	775.15625	854.6125	858.6125	866.1625
	866.2125	866.4625	866.5625	866.6875	866.9875	867.0375	867.3625	867.575	867.7375
	867.8	868.1375	868.1625	868.275	868.47500a	868.6	868.675	868.75	868.85000a
	868.90000c								
S. Simulcast									
N.O. Metro	766.28125	766.60625	773.15625	773.70625	774.20625	774.70625a	866.1	866.4875	867.475
	867.8375	868.0625	868.2	868.56250a	868.63750a	868.80000c			
Kenner	764.30625	765.83125a	766.98125	773.03125	774.38125	775.48125	867.77500a	868.52500c	
Airport - MSY	774.95625	775.40625	775.65625a	775.90625c	868.87500a				
Buras	764.50625	764.75625	773.53125	868.325	868.975				
Lafitte	764.77500a	851.80000a	856.2375	857.2375	858.2375	859.23750c	860.46250a		
Leeville	773.98125	774.45625	775.20625a	775.70625a	866.58750a	867.63750c			
Bayou Gauche	770.05625c	771.41875	771.81875	772.33125	772.50625a	772.71875			
Hahnville	770.36875	771.30625	771.55625c	772.20625a	772.83125	773.24375			
Monroe	774.83125c								
Winnfield N.	770.18125c								
Delhi	770.30625	771.08125	771.50625	771.83125	773.06875c	774.31875a			
Chopin	770.68125c								
Hagewood	769.70625c								
Hicks	770.21875c								
Farmerville	769.68125c								
Minden	770.19375c								
Site 3-011	769.20625c								
Bastrop	770.40625c								
Greenwood	769.94375c								
Ruston	770.16875c								
Hineston	769.19375c	769.40625a							
Newellton	769.85625	770.33125	771.28125	771.53125	771.78125a	773.84375c			
Transylvania	773.34375c								
Alexandria	769.15625c	769.16875a	769.75625	770.03125	770.75625	771.00625	771.25625	771.65625	771.93125
Avoyelles	769.20625c	770.25625a							
Bellevue	768.65625c	769.18125c	769.83125	770.10625	770.35625	770.60625			
Bernice	769.16250c								
Calhoun	769.19375c								
Columbia	769.66875c								
Ferriday	770.19375c	770.44375a	770.78125	771.03125	771.68125	772.28125			
Homer	769.20625c								
Jena	769.21875c	769.43125a	769.60625	769.78125a	771.45625	771.75625	772.05625		
Jonesboro	769.18125c								
Mansfield	769.19375c								
Many	769.18125c								
Marion	769.28125	769.50625	769.66250c	769.80625	770.08125	770.58125	770.60625	770.85625	
	771.03125	771.10625	771.15625	771.20625	771.60625	771.78125	771.90625	772.55625	772.81875
	774.8875								
Oak Grove	769.20625c								
Oakdale	769.44375c								
Plain Dealing	769.21875c								
Ringgold	769.08125a	769.65625c							
Sentell	774.84375c								
Tallulah	769.35625	769.5125	769.56875	770.00625	770.21875c	770.33125	770.46875a	770.60625	770.85625
	771.20625	771.28125	771.43125	771.53125	771.60625	771.78125	771.88125		
	772.08125	772.13125	772.20625	772.25625	772.38125	772.40625	772.56875	772.63125	772.95625
	773.20625	773.45625	773.65625	773.90625					
Wheeling	769.59375	769.68125c	770.03125	770.08125	771.00625	771.23125	771.55625	771.71875	771.83125
	772.30625								
Shreveport	769.15625c	769.40625a							

Mississippi

Emergency Management

45.92000	Mississippi Emergency Management Agency
45.96000	Mississippi Emergency Management Agency
46.00000	Mississippi Emergency Management Agency
46.04000	Mississippi Emergency Management Agency
453.56250	MEMA Emergency communications system
453.66250	MEMA Emergency communications system
453.76250	MEMA Emergency communications system

AR-ALPHA

Professional Grade Communications Receiver



- Multi-mode unit capable of receiving AM (synchronous), ISB, RZ-SSB, USB, LSB, CW, WFM including FM stereo, NFM, APCO-25 digital, and TV in both NTSC and PAL formats
- Up to 1MHz of bandwidth can be recorded for later playback and review
- 6-inch TFT color panel can display received video signals or depict spectrum activity over a wide choice of bandwidths including a

With New I/Q Control Software!

AOR proudly presents the AR-ALPHA, the first in a new class of professional monitoring receivers! Designed to cover 10KHz to 3.3GHz continuous, with no interruptions*, this receiver features sophisticated I/Q control software that enables it to perform unattended datalogging for extended periods. It boasts a 6-inch color TFT display, five VFOs, 2000 alphanumeric memories that can be computer programmed as 40 banks of 50 channels, 40 search banks, a "select memory" bank of 100 frequencies, and a user designated priority channel. It also includes APCO-25 digital capability and a DVR with six channels that can record up to a total of 52 minutes of audio. Monitoring professionals will appreciate the world class engineering and attention to detail that makes the AR-ALPHA such an amazing instrument.

"waterfall" function to show signal activity over a specified time period

- Composite video output on the rear panel of the unit
- Selectable IF bandwidths: 200 Hz, 500 Hz, 1 KHz, 3 KHz, 6 KHz, 15 KHz, 30 KHz, 100 KHz, 200 KHz and 300 KHz along with the ability to shift the IF
- CTCSS and DCS selectable squelch functions; DTMF tone decode
- Built-in voice-inversion descrambling**
- CW pitch control, AGC, AFC
- Auto-notch feature
- User selectable spectrum display function from 250 KHz through 10 MHz in 1 KHz increments. Above 10 MHz bandwidth, it can display 20 MHz, 50 MHz, 100 MHz or 1 GHz, but above 20 MHz bandwidth, no audio will be available
- Resolution bandwidth is also user-selectable in increments of 1 KHz, 4 KHz, 32 KHz, 64 KHz, and 128 KHz
- Fast Fourier Transform (FFT)
- Rear panel connections include 12 VDC power, RS-232C, USB 2.0, I/Q output with 1 MHz bandwidth, two antenna ports (one SO-239 and one Type N) and up to four antennas may be selected through the receiver's controls with the optional AS5000 antenna relay selector
- Use desktop or with 19" rack mount

The AR-ALPHA redefines excellence in professional monitoring receivers. No wonder so many monitoring professionals including government, newsrooms, laboratories, military users and more, rely on AOR.



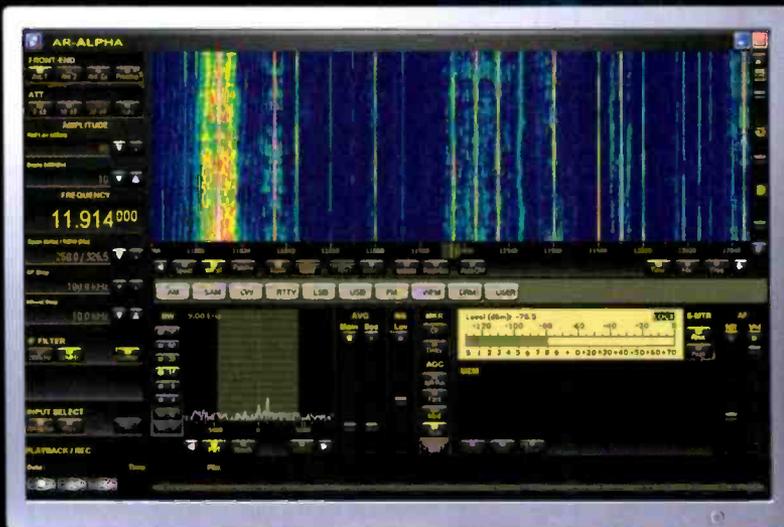
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Specifications subject to change without notice or obligation.
*Documentation required for qualified purchasers in the USA.
**Not available on US consumer version.

Advanced AR-IQ Software Allows High Speed I/Q Recording Up to 1MHz Bandwidth!



Signal searching is easy with playback capabilities through a PC



PC screen displays waterfall function to capture signal bursts

- Up to 1MHz bandwidth can be recorded for later evaluation
- High recovered audio quality with no deterioration of recorded data
- Can be used to perform unattended datalogging
- Spectrum display, full color waterfall and averaging functions support signal evaluation and analysis
- Easy to use. No training required.

AOR has brought a new level of receiver control to the AR-ALPHA with the addition of AR-IQ software. This free software enables the AR-ALPHA to store and playback a full 1MHz of bandwidth activity without any loss of quality. Raw data can be easily transferred from the AR-ALPHA to the hard drive of almost any computer*** for later analysis and review. It is even possible to listen to a frequency off-line by recording

data and storing it on a PC. Operators can also create loops to cover a particular time frame so that no signal is missed. Signal bursts are easily seen with the full color waterfall display function.

Using the control panel of the AR-ALPHA through a PC monitor, operators are able to enjoy added capabilities. You can perform unattended datalogging for extended periods of time depending on storage capacity. So, for hours, days or even weeks, you can capture up to 1MHz bandwidth between 10kHz and 3.3 GHz for later playback and analysis. You

can even listen repeatedly to a loop in time to decode a transmission received in difficult conditions.

AR-IQ software can be uploaded to multiple PCs so that you can transfer data from a PC connected to the AR-ALPHA over to another PC for playback and review.

The AR-ALPHA with AR-IQ software sets a new standard for professional grade multimode monitoring receivers!
To order, contact your AOR dealer today.

***AR-IQ software can be used with any dual core class PC operating Windows® XP or Vista with 2 GHz CPU and 1GB RAM.

Dept of Wildlife, Fisheries and Parks	151.07750		Big Lagoon State Pk (Escambia Cnty)
44.96000 Dept. of Wildlife, Fisheries, & Parks State Parks	44.76000 CSQ		Blackwater River State Pk (Santa Rosa Cnty)
45.00000 Dept. of Wildlife, Fisheries, & Parks Game Warden	158.78250		Dr. Julian G. Bruce St. George Island State Pk (Franklin)
F&W Temporary Repeaters	44.76000 CSQ		Falling Waters State Pk (Washington Cnty)
This system of temporary repeaters will be used in the event of a major emergency as a backup, or secondary system to the F&W Sat Net	44.76000 CSQ		Florida Caverns State Pk (Jackson Cnty)
	155.52750		Fred Gannon Rocky Bayou State Pk (Okaloosa Cnty)
151.24250 F&W Temporary Repeaters	159.09750		Grayton Beach State Pk (Santa Rosa Beach)
151.25750 F&W Temporary Repeaters	44.76000 CSQ		Grayton Beach State Pk (Wallton Cnty)
151.27250 F&W Temporary Repeaters	155.06250 103.5 PL		Henderson Beach State Pk (Okaloosa Cnty)
151.28750 F&W Temporary Repeaters	44.76000 CSQ		Maclay Gardens State Pk (Leon Cnty)
151.33250 F&W Temporary Repeaters	155.00250		Ochlockonee River State Pk (Franklin Cnty)
151.42250 F&W Temporary Repeaters	151.01750		Ochlockonee River State Pk (Wakulla Cnty)
151.43750 F&W Temporary Repeaters	44.76000 CSQ		St. Andrews State Pk (Bay Cnty)
151.45250 F&W Temporary Repeaters	159.09750		St. Joseph Bay State Buffer Preserve (Franklin Cnty)
151.46750 F&W Temporary Repeaters	159.15750		St. Joseph Bay State Buffer Preserve (Gulf Cnty)
159.23250 F&W Temporary Repeaters	155.07750		T.H. Stone Memorial St. Joseph Peninsula State Pk (Gulf Cnty)
159.27750 F&W Temporary Repeaters	44.76000 CSQ		Three Rivers State Pk (Jackson Cnty)
159.29250 F&W Temporary Repeaters	453.65000		Topsail Hill Preserve State Pk (Wallton Cnty)
159.30750 F&W Temporary Repeaters	155.61000		Torreya State Pk (Liberty Cnty)
159.33750 F&W Temporary Repeaters			
159.39750 F&W Temporary Repeaters			
159.42750 F&W Temporary Repeaters			
159.44250 F&W Temporary Repeaters			

Alabama

Emergency Management Agency

Frequency	Tone	Description
453.72500	127.3 PL	Birmingham (Jefferson Cnty)
453.65000	151.4 PL	Cullman (Cullman Cnty)
453.72500	151.4 PL	Dothan (Houston Cnty)
453.40000	151.4 PL	Dozier (Crenshaw Cnty)
453.40000	146.2 PL	Florence (Lauderdale Cnty)
453.42500	146.2 PL	Grove Hill (Clarke Cnty)
453.42500	173.8 PL	Huntsville (Madison Cnty)
453.72500	173.8 PL	Linden (Marengo Cnty)
453.72500	173.8 PL	Livingston (Sumter Cnty)
453.65000	173.8 PL	Lottie (Baldwin Cnty)
453.40000	127.3 PL	Mt. Cheaha (Cleburne Cnty)
453.40000	146.2 PL	Salem (Lee Cnty)
453.40000	173.8 PL	Spanish Fort (Baldwin Cnty)
453.65000	146.2 PL	Tuscaloosa (Tuscaloosa Cnty)
453.65000	127.3 PL	Wetumpka (Elmore Cnty)
453.40000	CSQ	S-1
453.42500	CSQ	S-2
453.65000	CSQ	S-3
453.72500	CSQ	S-4

Dept of Conservation and Natural Resources

Statewide Channel Plan

Frequency	Description
159.46500	Repeater
159.46500	Car-to-Car
155.01000	State Net

Division of Wildlife and Freshwater Fisheries

Frequency	Tone	Description
151.25000		Cherokee Cnty
159.46500		Calhoun, Cherokee Counties
159.46500	114.8 PL	Madison Cnty

Florida

Dept of Environmental Protection

Northwest Region - District 1

Frequency	Tone	Description
44.76000	CSQ	Big Lagoon State Pk (Escambia Cnty)
44.96000	CSQ	Big Lagoon State Pk (Escambia Cnty)

Northeast Region - District 2

Frequency	Tone	Description
44.76000	CSQ	Fort Clinch State Pk (Fernandina Beach)
44.96000	CSQ	Fort Clinch State Pk (Fernandina Beach)
159.14250		Fort George Island Cultural State Pk (Duval Cnty)
158.82750	131.8 PL	Homosassa Springs Wildlife State Pk (Citrus Cnty)
44.76000	CSQ	Ichetucknee Springs State Pk (Columbia Cnty)
44.96000	CSQ	Ichetucknee Springs State Pk (Columbia Cnty)
155.76750		Ichetucknee Springs State Pk (Columbia Cnty)
44.76000	CSQ	Little Talbot Island State Pk (Duval Cnty)
151.01000		Little Talbot Island State Pk (Duval Cnty)
44.76000	CSQ	Mike Roess Gold Head Branch State Pk (Clay Cnty)
44.96000	CSQ	Mike Roess Gold Head Branch State Pk (Clay Cnty)
44.76000	CSQ	O'Leno State Pk (Columbia Cnty)
44.96000	CSQ	O'Leno State Pk (Columbia Cnty)
154.06250		O'Leno State Pk (Columbia Cnty)
155.80500		Paynes Prairie Preserve State Pk (Alachua Cnty)
159.14250		Pumpkin Hill Creek Preserve State Pk (Duval Cnty)
155.88750		Stephen Foster Folk Culture Center State Pk (Hamilton Cnty)

Central Region - District 3

Frequency	Tone	Description
44.76000	CSQ	Anastasia State Pk (St. Augustine)
44.96000	CSQ	Anastasia State Pk (St. Augustine)
159.21750	103.5 PL	Anastasia State Pk (St. Augustine)
153.76250	103.5 PL	Blue Springs State Pk (Volusia Cnty)
155.73750	103.5 PL	Kissimmee Prairie Preserve State Pk
44.76000	CSQ	Lake Griffin State Pk (Lake Cnty)
44.96000	CSQ	Lake Griffin State Pk (Lake Cnty)
158.82750		Lake Kissimmee State Pk (Polk Cnty)
44.76000	CSQ	Lake Louisa State Pk ((Lake Cnty)
44.96000	CSQ	Lake Louisa State Pk (Lake Cnty)
154.80750		Lake Louisa State Pk (Lake Cnty)

154.98750		North Peninsula State Pk (Flagler Cnty)
44.76000	CSQ	Ravines Gardens State Pk (Palatka)
44.96000	CSQ	Ravines Gardens State Pk (Palatka)
158.78250	103.5 PL	Tomoka State Pk (Ormond Beach, Volusia Cnty)
155.43750		Wekiwa Springs State Pk (Orange Cnty - North)
155.96250	103.5 PL	Wekiwa Springs State Pk (Orange Cnty - South)
44.76000	CSQ	Wekiwa Springs State Pk (Orange Cnty)
44.96000	CSQ	Wekiwa Springs State Pk (Orange Cnty)

Southwest Region - District 4

Frequency	Tone	Description
44.76000	CSQ	Anclote Key Preserve/ Caladesi Island/ Honeymoon Island State Pk
44.76000	CSQ	Cayo Costa State Pk (Lee Cnty)
44.96000	CSQ	Cayo Costa State Pk (Lee Cnty)
156.21750		Collier-Seminole State Pk (Collier Cnty)
44.76000	CSQ	Delnor-Wiggins Pass State Pk (Collier Cnty)
44.96000	CSQ	Delnor-Wiggins Pass State Pk (Collier Cnty)
159.21750		Fakahatchee Strand Preserve State Pk
44.76000	CSQ	Highlands Hammock State Pk (Highlands Cnty)
158.79750		Highlands Hammock State Pk (Highlands Cnty)
44.76000	CSQ	Hillsborough River State Pk (Hillsborough Cnty)
44.96000	CSQ	Hillsborough River State Pk (Hillsborough Cnty)
44.76000	CSQ	Little Manatee River State Pk (Hillsborough Cnty)
44.76000	CSQ	Little Manatee River State Pk (Manatee Cnty)
44.76000	CSQ	Lovers Key State Pk (Lee Cnty)
44.96000	CSQ	Lovers Key State Pk (Lee Cnty)

Southeast Region - District 5

Jonathan Dickinson State Pk utilizes the Martin Cnty Trunked System.

Frequency	Tone	Description
44.76000	CSQ	Bahia Honda State Pk (Monroe Cnty)
44.96000	CSQ	Bahia Honda State Pk (Monroe Cnty)
158.78250	179.9 PL	Bahia Honda State Pk (Monroe Cnty)
158.76750		Bill Baggs Cape Florida State Pk (Dade Cnty)
156.21750	226 DPL	Curry Hammock State Pk (Monroe Cnty)
154.16750		Dagny Johnson Key Largo Hammock Botanical State Pk (Monroe Cnty)
158.76750	156.7 PL	Fort Pierce Inlet State Pk (St. Lucie Cnty)
158.85750	156.7 PL	Fort Zachary Taylor Historic State Pk (Monroe Cnty)
159.21750	103.5 PL	Hugh Taylor Birch State Recreation Area (Fort Lauderdale)
44.76000	CSQ	John D. MacArthur Beach State Pk (Palm Beach Cnty)
155.06250	156.7 PL	John Pennkamp Coral Reef State Pk (Monroe Cnty)
156.21750	156.7 PL	John U. Lloyd Beach State Pk (Dania)
158.82750		Lignumvitae Key Botanical State Pk/ Indian Key Historic State Pk (Monroe Cnty)
159.21750	179.9 PL	Long Key State Pk (Monroe Cnty)
159.26250	179.9 PL	Oleta River State Pk (North Miami Beach)
155.00250		Savannas Preserve State Pk (Saint Lucie Cnty)

Fish and Wildlife Conservation Commission

Frequency	Description
151.31000	Fish and Wildlife Conservation Commission
151.41500	Fish and Wildlife Conservation Commission
151.35500	Tactical/Car-to-Car
160.14000	Central
160.42500	Northwest
160.42500	Washinton, Holmes, and Jackson (Chipley)
161.44500	Northeast

Texas

Texas Statewide Public Safety

This system is APCO25 on VHF, so you'll need a digital receiver to hear any of the traffic.

Frequency	Tone	Description
155.46	114 NAC	Base Units A1
154.68	114 NAC	Mobile Input to Base A1
155.4675	118 NAC	Base Units A2
154.6875	118 NAC	Mobile Input to Base A2
155.445	123 NAC	Base Units B1
154.695	123 NAC	Mobile Input to Base B1
155.4525	128 NAC	Base Units B2
154.7025	128 NAC	Mobile Input to Base B2
159.21	162 NAC	Repeater 10 A
159.21	107 NAC	Repeater 11 A
159.21	111 NAC	Repeater 12 A
159.21	119 NAC	Repeater 13 A
159.21	123 NAC	Repeater 14 A
159.21	127 NAC	Repeater 15 A
159.21	137 NAC	Repeater 16 A
159.21	141 NAC	Repeater 17 A
159.21	146 NAC	Repeater 18 A
159.21	151 NAC	Repeater 19 A
159.2175	162 NAC	Repeater 10 B
159.2175	107 NAC	Repeater 11 B
159.2175	111 NAC	Repeater 12 B
159.2175	119 NAC	Repeater 13 B
159.2175	123 NAC	Repeater 14 B
159.2175	127 NAC	Repeater 15 B
159.2175	137 NAC	Repeater 16 B
159.2175	141 NAC	Repeater 17 B
159.2175	146 NAC	Repeater 18 B
159.2175	151 NAC	Repeater 19 B
155.5125	162 NAC	Repeater 20
159.0975	162 NAC	Repeater 21
155.505	162 NAC	Criminal Law Enforcement - Surveillance, Tactical

Texas Wide Area Radio Network

This system is used statewide by public safety agencies. The Houston region (called region 2) has the most direct exposure to the gulf oil spill. It is a trunked system running Type II Motorola.

DPS Houston

Frequency	Tone	Description
155.4675	118 NAC	Houston Dispatch
159.21	107 NAC	Huffman - Dispatch
155.46	162.2 PL	Houston wrecker dispatch
155.37		Jersey Village
155.3775		Jersey Village
155.445	162.2 PL	Jersey Village
155.4525		Jersey Village
159.09		Jersey Village
159.0975		Jersey Village
159.21		Jersey Village

159.2175		Jersey Village	159.2175	123 NAC	Jasper - Dispatch
159.09		Houston	155.3775		Lufkin
159.0975		Houston	155.445	162.2 PL	Lufkin
155.505	162.2 PL	Houston	155.4525		Lufkin
155.5125		Houston	155.46	162.2 PL	Lufkin
159.21		La Porte	159.09		Lufkin
			159.0975		Lufkin
			155.37	127.3 PL	Lufkin
			159.2175		Lufkin
			155.505	162.2 PL	Lufkin
			155.5125		Lufkin
			159.2175		Center
			155.46	162.2 PL	Coldsprings
			155.4675		Coldsprings
			159.09		Coldsprings
			159.0975		Coldsprings
			159.21		Coldsprings
			159.2175		Coldsprings
			155.46	162.2 PL	Jasper
			155.4675		Jasper
			159.09		Jasper
			159.0975		Jasper
			159.21		Jasper
DPS Beaumont					
Frequency	Tone	Description			
155.4525	128 NAC	Beaumont - Dispatch			
155.37	127.3 PL	Beaumont			
155.3775		Beaumont			
155.445	162.2 PL	Beaumont			
155.46	162.2 PL	Beaumont			
155.4675		Beaumont			
159.09		Beaumont			
159.0975		Beaumont			
159.21		Beaumont			
159.2175		Beaumont			
155.505		Beaumont			
155.5125		Beaumont			
DPS Bryan					
Frequency	Tone	Description			
155.46		Bryan - Dispatch			
159.2175		Cameron - Dispatch			
159.21		Flynn - Dispatch			
155.3775		Bryan			
155.445	162.2 PL	Bryan			
155.4525		Bryan			
155.4675		Bryan			
159.09		Bryan			
159.0975		Bryan			
159.21		Bryan			
159.2175		Bryan			
155.505	162.2 PL	Bryan			
155.5125		Bryan			
155.37	CSQ	Bryan			
155.37	CSQ	Bryan			
155.3775		Bryan			
155.445	162.2 PL	Bryan			
155.4525		Bryan			
155.46	162.2 PL	Bryan			
155.4675		Bryan			
159.09		Cameron			
159.21	141.3 PL	Cameron			
155.46	162.2 PL	Flynn			
155.4675		Flynn			
DPS Conroe					
Frequency	Tone	Description			
155.445	123 NAC	Conroe Dispatch			
159.2175	151 NAC	Huntsville Dispatch			
155.37	127.3 PL	Conroe			
155.3775		Conroe			
155.445	162.2 PL	Conroe			
155.4525		Conroe			
155.46	162.2 PL	Conroe			
155.4675		Conroe			
159.09		Huntsville			
159.0975		Huntsville			
DPS Lufkin					
Frequency	Tone	Description			
155.4675	118 NAC	Lufkin - Dispatch			
159.21	137 NAC	Center - Dispatch			
159.21	111 NAC	Shepherd - Dispatch			
			DPS Pierce		
			Frequency	Tone	Description
			155.4525	128 NAC	Pierce - Dispatch
			159.2175	123 NAC	Columbus - Dispatch
			155.535	146 NAC	Richmond - Dispatch
			159.21	127 NAC	Bay City - Dispatch
			155.37	127.3 PL	Pierce
			155.3775		Pierce
			155.445		Pierce
			155.46	162.2 PL	Pierce
			155.4675		Pierce
			159.09		Pierce
			159.0975		Pierce
			159.21		Pierce
			159.2175		Pierce
			155.445	162.2 PL	Glidden
			155.4525		Glidden
			155.46	162.2 PL	Glidden
			155.4675		Glidden
			159.09		Glidden
			159.0975		Glidden
			159.21		Glidden
			DPS Texas City		
			Frequency	Tone	Description
			155.5125	162 NAC	Texas City; Galveston Cnty Dispatch
			159.0975	162 NAC	Texas City - Dispatch
			155.685	162 NAC	Angleton; Brazoria Cnty Dispatch
			155.37	127.3 PL	Texas City
			155.3775		Texas City
			155.445	162.2 PL	Texas City
			155.4525		Texas City
			155.4675		Texas City
			159.2175		Texas City
			159.09		Danciger
			159.0975		Danciger
			159.21		Danciger
			159.2175		Danciger
			159.21		Hitchcock
			159.2175		Hitchcock
			155.505	162.2 PL	Santa Fe
			155.5125		Santa Fe
All frequency information courtesy of www.radioreference.com					

in use near the ground cleanup operations and at the ports for launch. No doubt they are also in use at the site of the well itself, but that is probably too far out in the Gulf for normal reception of low power handheld receivers.

Federal Response

Most of the government response seems to have fallen to the US Coast Guard as the primary agency on the scene. The Coast Guard is coordinating resources and assisting in actual cleanup and wildlife rescue in an ongoing operation. Of course, the maritime frequencies are available for any aspect of the operation, as well as a few specific channels the Coast Guard has reserved for its own use. If you're close enough to any of the operations to hear ship traffic, you'll likely find out first on the marine frequencies. Air support is also crucial in the effort so look at aviation frequencies as well.

States

Each state affected has its own operations on the scene, monitoring the situation if nothing else. Louisiana has been involved from the start as that was the first

state affected by the oil spill and has felt the deepest economic impact so far, with the loss of fishing and other marine-related business.

Mississippi, Alabama, and now Florida have also been hit. The impact on Florida tourism can't be underestimated, and that state has reacted swiftly in an attempt to deal both with the actual oil as well as the public relations impact of the spill. Texas is not out of the woods, either. Plus, hurricane season and the loop current may yet spread the oil both farther inland and up along the coast.

State and local responses will also involve a variety of radio communications. There may be police activity directing traffic in and out of affected areas or coordinating cleanup operations. There is also likely a presence of a state Department of Natural Resources, Parks, or Tourism involved. Again, much of the important traffic will likely be by cell phone, but if you're close enough to the action, it's worth a listen to any of the related frequencies to see what you can hear.

Check out the suggested targets in the accompanying tables. We invite you to contact us and share what you discovered.

Deepwater Horizon: A Brief History

The Deepwater Horizon was a very sophisticated oil exploration and drilling platform. It was built in 2001 and delivered to a subsidiary of Transocean and then leased to BP for its operations through 2013. The rig, measuring 396 by 256 feet, was rated as capable of operating in waters of up to 8,000 feet deep, and then drilling 30,000 feet down. In 2009, however, the Deepwater Horizon was used to complete the deepest oil well ever drilled, at 35,000 feet. Until the April explosion, it was by any measure a successful oil platform.

In February 2010, work began on the lower Mississippi Canyon project, about 50 miles off the coast of Louisiana in water 5,000 feet deep. The well was considered exploratory and was planned to a depth of 18,360 feet (including the 5,000 feet of water above it). It was then to be plugged and left for later operation by another rig as a production well.

The oil had been found and the final processes of sealing and capping the well were in progress on April 20 when an explosion occurred on the Deepwater Horizon. A column of seawater erupted onto the rig, shooting 240 feet into the air. Shortly afterward, a combination of mud, water, and methane gas followed. The gas soon became the primary component and then ignited into a series of small explosions and then a larger one engulfing the rig in a firestorm. When it erupted, 126 people were on board, and 115 were evacuated, many with injuries. Tragically, 11 were unaccounted for and presumed killed in the explosion. Firefighters sprayed water trying to cool the rig and get the blaze under control, but after 36 hours, the rig sank, leaving the blown-out well ruptured and spewing oil.

The Deepwater Horizon had been involved in other incidents and cited for safety violations during its operation. There is an ongoing investigation into both the specifics of this incident and the oversight role that government agencies should have in preventing such disasters. Regardless of the findings, which may not be known for a very long time, the leaking oil is now the worst oil spill in the history of oil exploration. Some progress has been made in stemming the flow and recovering oil at the well site, but a massive amount of oil is polluting the gulf and its shores for hundreds of miles.

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Set Your Sails For The Islands On Shortwave

Let's Play Collect The Dots—How Many Islands Can You Add To Your Log This DX Season?

by Gerry Dexter

The Cook Islands were once home to Radio Raratonga.

66N

"No man is an island," said poet John Donne. "But a man sure can snag one," said me!

Despite years of attrition, the number of islands that sport shortwave stations still nudges half a hundred. Reunion, Jamaica, Cooks, Turks and Caicos, Tahiti, and a dozen others may have gone silent but many more still await your attention. They may not all engender images of swaying palms and native girls or remote "get-away-from-it-all" sand beaches, but they still mostly qualify as attractive get-away spots, especially for the DXer.

A good shortwave challenge is to see how many of them you can add to your log over a DX season. Some are as easy as flipping the "on" switch; others may have you heading to the nearest bar seeking solace and understanding.

So what do you say, care to have a go? OK, here is our *Pop'Comm* survey of some of these (sometimes not so small) dots in the world's oceans.

ADMIRALTY ISLANDS (Papua New Guinea)—Once administered by Australia, the Admiralty Islands have been part of Papua New Guinea since 1975. There is only one station here and it'll make you an early riser: 3315 Radio Manus. (P.O. Box 505, Lorengau.)

ANDAMAN & NICOBAR (India)—Part of India's Union Territories, the Andaman Islands lie in the Bay of Bengal, clos-

"The [Andaman Islands] capital, Port Blair, boasts an outlet of All India Radio... Your best chance at this elusive signal is around your local sunrise or sunset at the spring or fall equinox."

er to the Malayan peninsula than they are to the Indian subcontinent. The capital, Port Blair, boasts an outlet of All India Radio. This AIR regional operates regularly on 4760 from 2355 to 0300 and 1030 to 1700. Your best chance at this elusive signal is around your local sunrise or sunset at the spring or fall equinox. At certain times it overlaps with the AIR station at Leh, which also uses 4760. Reports go to: ptblair@sancharnet.in or Haddon Post, Dalinipur, Port Blair, Andaman & Nicobar Islands.

ANGUILLA—This one is home to the Caribbean Beacon, which spends its days and nights relaying (the late), Dr. Gene Scott and his widow Melissa, over their University Network. Recently we've seen somewhat spotty operation, but chances are a check of 6090 and/or 11775 will produce results (if you haven't been blessed with reception already!). They are way, way easier to hear than verify, since they make it known they don't respond to reception reports. The address is beacon@anguillanet.com if you want to try anyway.

ASCENSION ISLANDS—This isolated spot in the South Atlantic is reported to be in dire financial straits. (Dire Straits?)

Gerry Dexter is *Pop'Comm's* "Global Information Guide" columnist.

I thought that was in Indonesian waters!) Ascension is home to a forest of communication towers belonging to the U.S. and the UK, most of them military and space-related. A few are used to relay the BBC and other international broadcasters over the BBC South Atlantic Relay Station, run by Britain's VT Communications. There are six 250-kW transmitters here. Hearing Ascension is not difficult—the trick is knowing when and where to listen. Take your copy of the 2010 *World Radio TV Handbook*, look up United Kingdom in the International Section and examine the list of BBC frequencies. Check the times and languages for those labeled "asc." (15400 is often used.) The BBC does not issue QSLs, but some people have had success writing to the site itself at: BBC Atlantic Relay, English Bay, Ascension Is., South Atlantic Ocean.

BIOKO (formerly Fernando Poo) (Equatorial Guinea)—This island lies opposite Gabon, north of E.G.'s capital, Bata, which is on the continent's Atlantic coast. The island's capital, Malabo, has the "other" government outlet. Radio Nacional uses only 6250 and is generally a little lax in its attention to sign on times. Nominally it goes on at 0530, but the actual event can vary by several minutes (or may not occur at all!). It operates with 20 kilowatts, and on a decent night for African reception it shouldn't be a problem. Reports go to: Apartado 1295, Malabo, Equatorial Guinea.

BONAIRE (Netherlands Antilles)—Known for its large Radio Nederland Relay, 5975 and 6165 are frequently used by Hilversum for relays of programming in Dutch and Spanish. The same technique for finding current times and frequencies can be applied here as it was for Ascension. Look for the "bon" indicator. Emails go to: letters@rnw.nl. Signals from Bonaire are usually very strong.

CUBA—Several decades ago, Cuba was alive with shortwave broadcasters, but no longer, thanks to its one-party dictatorship. Still, Cuba is about as easily heard as any on our list. And you can do so without dealing with the ubiquitous Radio Havana Cuba, which, even when it isn't everywhere, is about to sign on somewhere! Instead, go for Radio Rebelde, which usually puts in a fine signal feeding less nonsense and more great Cuban music. It supplies good signals on 5025. There is no direct email for reports, but RHC's Arnie Coro is reported to forward them via arnie@radiohc.cu.

CYPRUS—The Cyprus Broadcasting

Corporation airs programming on weekends via the BBC Middle East Relay on this divided island in the Mediterranean. The CBC is on Friday, Saturday, and Sunday from 2215 to 2245 using 6180, 7215, and 9670. Write them at: P.O. Box 4824, Nicosia 1397.

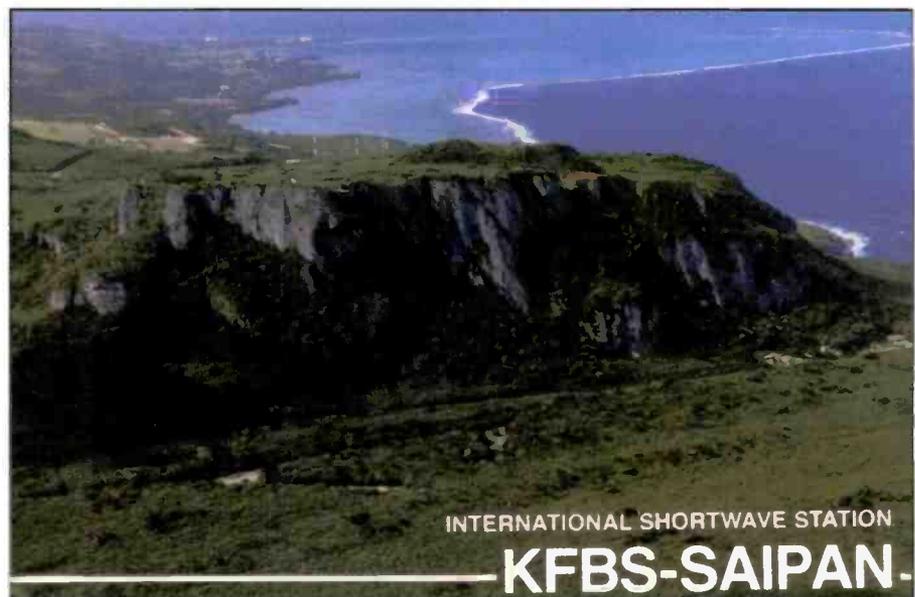
DIEGO GARCIA (British Indian Ocean Territory)—Most of the dozens of islands in this group are uninhabited, so if you really love the idea of solitude, this might be the place to go. A large portion of the main island is a gigantic joint UK-U.S. Naval Support Facility, which has a transmitter carrying programs from the American Forces Radio TV

Network. This outlet is on 4319 and 12579 in USB, although the higher frequency has not been reported in nearly forever; 4319 seems to make it about three times a year in the late afternoons, and then only briefly. Email to: Dgar@mediacen.navy.mil

ENGLAND (United Kingdom)—It's difficult to be specific about an organization so huge and vast in its reach. The BBC is relayed by a long list of stations and sites. To hear a broadcast from an actual site in England requires another schedule study. In the UK/BBC schedule in the *WRTH* look for times and frequencies with the indication "rmp" for



What a view! Transmitting towers for Adventist World Radio, Guam.



The Far East Broadcasting Company beams its programs from this Saipan site.



The Radio New Zealand International transmitting towers at Rangataiki.

Rampisham, “skn” (Skelton), or “wof” (Wooferton). Those three are the only shortwave broadcast sites still active in England. For a QSL, you might try writing the transmitter engineer directly, rather than trying to navigate the Bush House maze.

GREENLAND—This country can claim two things: being the world’s largest island and competing for the title of having the world’s most anemic shortwave broadcaster. Kaalait Nunnaata Radioa (KNR), which translates to “Gronlands Radio,” is owned and operated by the government. There is a very limited, low-power broadcast coming from Tasiilag, about one-third of the way up Greenland’s east coast. It’s active daily on 3815 with a shattering 200 watts, broadcasting in Greenlandic at 1500 to 1615 and in Danish from 2100 to 2215. The only chance we have—and it’s a mighty slim one at that—is in the wintertime during the latter part of the 2100 broadcast. If you get extraordinarily lucky let them know at: info@knr.gl.

GUAM—Trans World Radio, which wishes now to be called simply TWR, has large transmitters on Guam, with broadcasts in English, Russian, and a wide variety of Asian languages. The schedule is way too involved to get into here, so you’ll need to rely on your trusty *WRTH* or one of the online listings. Spots to seek out TWR from Merzio, Guam, include 7475, 9355, 9910, 9920, 9975, 11570, 11580, 12075, 12105, and 12130 at various times and in assorted languages. Reports to: ktwrfreq@guam.twr.org. Also coming from Guam is KSDA, Adventist World Radio, with programming for Asia in several languages. It uses four 100-kW transmitters at Facti Point, near Agat. Again, check a reference for current times and frequencies. Currently in use are 9980, 11995, 12105, 12035, 12120, 15660, 17635, and 17880. Fortunately both AWR and TWR include English IDs in their announcements. Email reports for AWR go to: aproffice@awr.org.

HAWAII—You have a couple of choices in adding this popular vacation state. World Harvest Radio has closed down its WHBN station there, so that leaves the AFRTS outlet at Pearl Harbor, which uses 6350 and 10320, both in USB. Try 6350 fairly early in the morning. Send mail reports to: technologist@dodmedia@osd.mil. Your other option is standard time and frequency station WWVH, which is frequently heard (most-



Papua New Guinea’s National Broadcasting Commission laid it all out on their QSLs.

ly on 5.0, 10.0, or 15.0) with a woman giving the announcements during the so-called silent period. Send reports to: wwwv@boulder.nist.gov

HISPANIOLA—The Dominican Republic shares this island with the shortwave-bereft Haiti. The Dominican Republic was doing nearly as poorly until Radio Amenercer (Dawn) returned to 6025 after a long absence. Owned by the Seventh Day Adventists, the station is on the air in Spanish from 0900 to 0300 daily. Reports can go to: amanecer@tricom.net.

JAWA (Indonesia)—The capital city, Jakarta, is where the Voice of Indonesia originates, which is on from early through late morning on variable 9525 in various languages, including English at 1000 and 1300. 11780 is sometimes in use instead of 9525. Also, there is a Radio Republik Indonesia outlet on 9680. Both stations can be reached through Kotak Pos 356, Jakarta 10110.

KALIMANTAN (Borneo) (Indonesia)—There are two opportunities here: 3325-RRI Palangkaraya using 10 kW (Jalan Husni Thamplin 1, Palangkaraya 73111) and 3976-RRI, Pontianak (Kotak Pos 6, Pontianak 78111).

Sarawak is on the northern (Malaysian) part of this large island, which it shares with Indonesia. Raddio TV Malaysia uses 5030, 7130, and 7270 from Kuching. 5030 is sometimes heard, as well as 7270, which carries the domestic Wai FM service. These will have to be early or fairly early morning attempts.

MADAGASCAR—There are many opportunities to log this island off the West Coast of Africa. One of these is the Radio Nederland relay at Talata-Volonondry, which involves too many possibilities to sort out here. To keep things simple, chose the government’s Radio Madagasikara that is proving to be a semi-regular this season. It uses 5010 with 100 kW daily from 0300 to 0500 in the local Malagasy language. The address is: B.P. 4422, Anosy 101, Antananarivo.

MOLUCCAS (Indonesia)—The only offering here is 3345 RRI-Ternate (Jalan Sultan Khairun Kedadan, Ternate 97720).

MICRONESIA, FEDERATED STATES OF (U.S. Free Association)—These islands include Phompei, Kosrae, Truk, and Yap. The first one on the list is the site chosen for a radio station calling itself “The Cross.” Last I heard, this was in the planning/testing stage. It will be operated by Pacific Missionary Aviation, P.O. Box 517, Kalonia, Pohnpei State, F.S.M.

NEW BRITAIN ISLAND (PAPUA NEW GUINEA)—As with the Indonesians, you’ll need to tune early for these, in those plus or minus 30-minute periods around local dawn. In New Britain you have two choices: 3905-Radio West New Britain,

P.O. Box 412, Kimbe; and 3385-Radio East New Britain, P.O. Box 393, Rabaul.

NEWFOUNDLAND (Canada)—CKZN in St. John's relays co-owned CBN mediumwave all day on 6160. Less often heard on this channel is CKZU in Vancouver, although for most of the U.S. CKZN is dominant. Send an email to: keithdurnford@cbc.ca.

NEW IRELAND (Papua New Guinea)—Like the Admiralties mentioned above, Australia also ran things here until 1975 when the island became part of Papua New Guinea. You have one chance for this one: 3905 Radio New Ireland, P.O. Box 477, Kavieng.

NEW ZEALAND—Check the international schedules for current times and frequencies. In addition to self-produced programs, Radio New Zealand International relays a lot of the New Zealand's national network. RNZI operates 24 hours a day and is a major voice in catering to listeners in the Pacific islands. In use at various times of the day are 6170, 7145, 9765, 9870, 9890, 11675, 11725, 13660, 15720, and 17675. Email to: info@rnzi.com.

NORTH SOLOMON ISLANDS (Papua New Guinea)—Another Australian-administered island that joined Papua New Guinea in 1975. And, again, only one choice here: 3335-Radio Burka, P.O. Box 35, Burka.

NUSA TENGGARA (Indonesia)—The Lesser Sunda Islands hold only one small station, and it is one of the increasingly rare non-RRI outlets. Radio Siaran Pemerintah Kabupaten from Nagada uses 3579 (now and then). The address is: Jalan Soekarno-Hatta, Bajawa. Flores, Nusa Tenggara. This one is a killer.

PALAU—One of those tiny Pacific Isles that fit into that rather awkward category of "Compact of Free Association" with the U.S., which it joined in 1993 upon independence. Station T8WH went on the air there a few years ago and was initially affiliated with the California-based High Adventure Ministries. The station is now part of World Harvest Radio and relays its programming. It runs four 100-kW transmitters on a number of shortwave frequencies, most often 9930 and 9965. English is aired from 0700 to 1600 on 12130 and 15725. Address: P.O. Box 66, Koror, Republic of Palau PW 96940.

NEW GUINEA (Papua New Guinea)—There are many targets on the PNG side of this island. The problem is catching the right conditions to get them into your 'phones. Again, check around your local dawn, especially at the equinoxes. Your targets include:

2410-Radio Enga (POB 300, Wabag) (possibly inactive)
3205-Radio West Sepik (POB 37, Vanimo) (possibly inactive)
3220-Radio Morobe (POB 1262, Morobe)
3245-Radio Gulf (POB 36, Kerema)
3260-Radio Madang (POB 2030, Madang)
3275-Radio Southern Highlands (POB 104, Mendi)
3290-Radio Central (POB 1359, Boroko)
3305-Radio Western (POB 25, Daru)
3335-Radio East Sepik (POB 66, Wewak)
3345-Radio Northern (POB 137, Popondetta)
3355-Radio Simbu (POB 228, Kundiawa)
3365-Radio Milne Bay (POB 111, Alotau)
3375-Radio Western Highlands (POB 104, Mendi)

PHILIPPINES—The Republic of Philippines was granted independence from the U.S. in 1946 following the end of World



The Radio Nederland Relay station at Bonaire in the Netherlands West Indies.

War II. There is a Voice of America relay station here at Tinang, and it's another opportunity to get lost in a jungle of ever-changing times, languages, and frequencies. The Far East Broadcasting Corporation has a station with almost as complicated a schedule. So, instead, let's look at Radio Veritas Asia, which has daily broadcasts to Asia, Russia, and China from transmitters at Paluiag. Try 1000 to 1200 in Mandarin on 9615 or in Hindi from 1330 to 1400 on 11870. There are plenty of other choices, which a check of the *WRTH* or other source can suggest.

ST. HELENA—Radio St. Helena scores very highly on the shortwave recognition chart, despite its rare appearance with low power from a place most people could not locate on a map. It's on the air one Saturday afternoon in November for "Radio St. Helena Day" using 11092.5 USB. Reception in 2009 was a disappointment, generally blamed on poor conditions. We hope for better luck this November. Stay tuned for the exact date. Be prepared to celebrate a birthday or two while you wait for a QSL! Reports to: Broadcasting House, Jamestown, St. Helena, STHL 1ZZ, South Atlantic Ocean. Indicate "via Capetown, South Africa" on the envelope.

SAO TOME—Is home to another IBB/VOA Relay site. At least the VOA relay at Pinheira consistently uses at least one frequency you can count on. It is quite regularly received on 4960 in the evenings (0300 and on) with English for Africa and usually in parallel with the Botswana Relay on 4930. The address is P.O. Box 522, Sao Tome, Sao Tome e Principe.

SEYCHELLES—These Indian Ocean islands hold the BBC Indian Ocean Relay. Again, with a major broadcaster's relay site you are left to do mostly your own digging to sort out which of the always-changing possibilities are best for your location. Here are a couple of possibilities: There is English from 1300 to 1400 on 15420 and from 1500 to 1530 on 11860. Contact the station at P.O. Box 48, Victoria, Republic of Seychelles, for a direct response.

SAIPAN (Northern Marianas)—The Far East Broadcasting Company operates a station here, at Marpi, using four 100-kW transmitters. There's also an IBB (VOA) Relay station here. You wonder how there can be enough room for antennas in such a small place! FEBC's KFBS commonly uses 9465, 9920, 11650, 12090, and 15580 for services to Russia, China, and other parts of Asia in various languages. You'll need to

breakdown its schedule in the current *WRTH* in order to find the best shots for your location. It's not that difficult a catch, though. Email: saipan@febc.org.

SINGAPORE (Malaysia)—You better not jaywalk or be spotted littering in Singapore or you may find yourself in jail! They don't mess around in this island city-state, home to the BBC Far East Relay station, which operates four 100-kW and five 250-kW transmitters. This is another opportunity to examine schedules and pick one or two to try. Look for "sng" next to a frequency in the UK part of the International Section of the *WRTH* and find something that looks like it will work for your location. Current possibilities include 6195 at 0900 and 11955 at 2300. Reports go to 51 Turut Track, Singapore 718930.

SOLOMON ISLANDS—These islands saw some of World War II's bitterest fighting. The Solomons gained independence from Britain in 1978. SIBC—the Solomon Islands Broadcasting Corporation (also known as Radio Hapi Isles)—has long been a late night/early morning staple on 5020 and 9545. The latter frequency is currently off the air but the former is being heard quite regularly in the early morning hours, often relaying Radio Australia or BBC News. Contact: sibcnews@solomon.com.sb or P.O. Box 654, Honiara.

SRI LANKA—The Tamil independence movement has finally been quelled and relative peace has returned to this idyllic spot south of India. In addition to the Deutsche Welle Relay (at Trincomalee) and the Voice of America Relay (at Iranawila), the Sri Lanka Broadcasting Corporation operates regularly on shortwave. Under good conditions you can get them around 0000 to 0100 using 9770, 11905, or 15745 in English or Hindi. Reports go to P.O. Box 574, Colombo 7. However, logging one or both relay sites might be easier. You'll need to look in the *WRTH*'s International Section under Germany for "trm" and under United States for "ira."

SULAWESI (CELEBES) (Indonesia)—Indonesia has over 3,000 islands and there was a time when it seemed as if all of them had a station. Sulawesi is one of the few still active. Try these on for size: 3995-RRI, Kendari (Kotak Pos 7, Kendari 93111) and 4750-RRI Makassar (Jalan Riburane 3, Makassar 90111). This is probably the most regularly heard of the 60-meter band Indos around local dawn.

SUMATERA (Indonesia)—About the only one still believed active on this island is 925-RRI, Jambi, with 10 kW. Contact: Jalan Jendral A. Yani 5, Telanaipura, Jambi 36122.

TAIWAN—Just before Mao and the communists took over the mainland, the nationalists escaped to this offshore island and set up a thriving capitalist society. The government's Broadcasting Corporation of China runs Radio Taiwan International. In addition to transmitting

direct from several sites on the island, it is relayed by WYFR in Florida (most easily heard), by Issoudun in France, and occasionally by Montinsery in French Guiana. To hear it direct, try English at 0000 on 11875 or at 1100 on 7445 or 11715. If neither works, check the *WRTH* for a time/frequency combination that will work for your location. Send email to: rti@rti.org.tw.

TINIAN (Northern Marianas)—Tinian, practically within sight of Saipan,

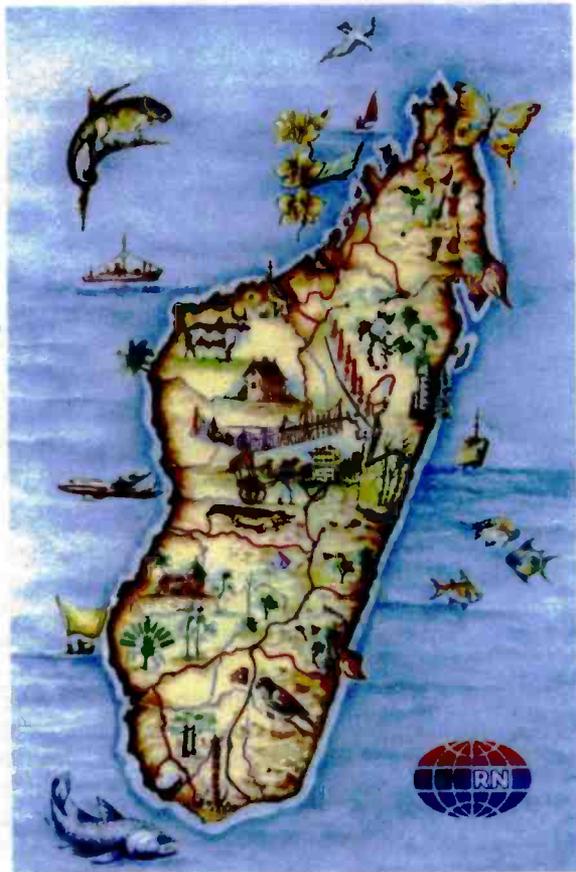


A control room operator at Radio Veritas Asia, Philippines.



El Morro Castle, overlooking Havana's harbor.

RADIO NEDERLAND



MADAGASCAR RELAY STATION

The Radio Nederlands Relay Station on Madagascar carries programs from several international broadcasters.

also supports part of the IBB Northern Marianas Relay, officially the Robert E. Kamosa transmitting station (named for a long-time VOA engineer). The site houses two 250- and six 500-kW transmitters. Try at 1200 to 1400 in Korean on 7235 or 1400 to 1500 in Mandarin on 7525 or check the VOA skeds for other possibilities. Use the VOA Washington address. It helps to clearly label the envelope "Reception Report." If hearing the Tinian Relay via VOA doesn't work, try Radio Free Asia, which probably makes more use of this site; they'll provide a full and speedier reply.

VANUATU—Once known as the New Hebrides, Vanuatu was administered jointly by both Britain and France in a so-called Anglo-French Condominium (makes you wonder about the maintenance fees!). That arrangement ended when the nation gained independence in 1980 and changed its name. Radio Vanuatu has long been active from the capital, Port Vila. While 3945 does not seem to be used consistently, but when it is active it's on from 0700 to 2000, which ham interference permitting, makes it doable very early in the morning. 7260 is active from 2000 to 0700, and you can sometimes catch this one in the post-midnight hour. Use P.O. Box 049, Port Vila for reports.

ZANZIBAR AND PEMBA (Tanzania)—Known unofficially as The Spice Islands, Zanzibar joined Tanganyika in 1964 to form the nation of Tanzania. Radio Tanzania or the Voice of Tanzania—the two seem to be used interchangeably—is wide-



Fiji Broadcasting Commission
The Voice of The Islands



Dear Listener
Thank you for your report on the reception of station _____
broadcasting on _____ kHz
at _____ GMT on (date) _____

We are pleased to confirm your report

Unfortunately there is not enough information for us to confirm your report

General Manager
Broadcasting House
Box 334 Suva, Fiji.



RADIO FIJI

The Fiji Broadcasting Commission was once a treasured target in the 75-meter ham band.

ly heard on 11735 from as early as 1700, often on through to 2100 sign off, complete with an English newscast at 1800 from the local "Spice FM" and the rest of the time in Swahili. Reports go to P.O. Box 1178, Zanzibar, Tanzania. It makes for a reception that is easy, yet exotic.

And the exotic land of Zanzibar is a fitting destination to end our sail around the islands of shortwave. I hope you enjoyed the trip and trust you haven't minded that you had to man the sails for part of the way (that is, do some of the research yourself). So fire up that receiver, start a log, and see how many dots in the ocean you can add. May the wind be at your back!

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How To Get An FCC Shore Station License

by Gordon West,
WB6NOA
WB6NOA@arrl.net

"This little-known FCC shore station license for VHF local and HF long-range communications has been around for half a century."

If you have a connection to the maritime industry and boats on the water, you could qualify under FCC Rules Part 80, subpart k, for a Private Coast Station license. This would let you run up to 1000 watts on HF marine SSB channels, and up to 50 watts on marine VHF channels. Licenses are granted to individuals and organizations for 10 years and are renewable.

With this license, you are permitted to transmit from shore to ships at sea, as well as vessels in your local harbor. You may use several FM channels in the marine VHF radio service and several HF single sideband (SSB) frequencies for very long-range communications. The content of your radio communications must be of a maritime nature; no superfluous "ham-type rag-chewing" is allowed.

If you live on the ocean or have a home on a big lake or river, you could qualify to obtain your own shore-to-ship marine VHF Private Coast Station license. If you live in the middle of the country, with no lakes or rivers nearby, you might still qualify for a shore-to-ship radio

license on marine SSB frequencies that refract off the ionosphere—your range could be 500 miles to 5,000 miles!

A Boon To Monitoring

This little-known FCC shore station license for VHF local and HF long-range communications has been around for half a century. But, until recently, the required paperwork and lawyer fees made obtaining the license nearly impossible for casual bait shop or small yacht club down at the local harbor. But now that the FCC has switched to electronic licensing, computer-savvy marine radio applicants may score a call sign and shore station authorization within days under the FCC's Universal Licensing System.

In addition to the commercial benefits for small businesses, more people monitoring the marine frequencies means greater safety. "Having more VHF and SSB shore stations monitoring the distress channels, plus guarding Digital Selective Calling emergency frequencies, will positively add to our important listening watches," says Joe Hersey of the US Coast Guard.

Marine VHF transceivers, plus new marine SSB long-range radio equipment, have built-in Digital Selective Calling (DSC) capabilities to sound off if a digital distress call is received. DSC is an integral part of the Global Marine Distress and Safety System (GMDSS), and the more stations continuously guarding DSC distress frequencies and VHF Channel 70, the greater the opportunity for multiple stations to report distress calls to their local Coast Guard agency.

Eligibility

Eligible entities for obtaining a shore station license, on both short-range VHF channels and long-range marine SSB frequencies, include the following maritime organizations and individuals:

- Yacht clubs
- Water taxi shoreside office
- Harbor masters and marine rescue squads
- Rental and charter boat shoreside facilities

Frequency	Loc#	Ant#	Freq ID	St C
<u>000156.35000000</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>FCL</u>
<u>000156.42500000</u>	<u>1</u>	<u>1</u>	<u>2</u>	<u>FCL</u>
<u>000156.45000000</u>	<u>1</u>	<u>1</u>	<u>3</u>	<u>FCL</u>
<u>000156.50000000</u>	<u>1</u>	<u>1</u>	<u>4</u>	<u>FCL</u>
<u>000156.52500000</u>	<u>1</u>	<u>1</u>	<u>5</u>	<u>FCL</u>
<u>000156.55000000</u>	<u>1</u>	<u>1</u>	<u>6</u>	<u>FCL</u>
<u>000156.60000000</u>	<u>1</u>	<u>1</u>	<u>7</u>	<u>FCL</u>
<u>000156.67500000</u>	<u>1</u>	<u>1</u>	<u>8</u>	<u>FCL</u>
<u>000156.70000000</u>	<u>1</u>	<u>1</u>	<u>9</u>	<u>FCL</u>
<u>000156.80000000</u>	<u>1</u>	<u>1</u>	<u>10</u>	<u>FCL</u>

The FCC shows VHF channel grants by frequency, not channel numbers.

- Shipyards and marine electronics dealers
- Lake, river and harbor sightseeing shore stations
- Yacht anchorages and slip rental facilities
- Individuals offering any type of ship repair service
- Marine hardware stores
- Live bait stores
- An individual dock master
- Non-profit marine corporations and associations
- Lock and bridge operators
- Charter boat shoreside facilities

The FCC electronic application requires detailed attachments describing how the shoreside radio station will be used to *regularly* communicate with specific ships at sea. You're not eligible simply by dint of being a radio hobbyist who enjoys yakking with ships at sea or the owner of a large yacht who wants to talk to his stock broker while out to sea.

The shore station license is usually granted to an exact location on land and any additional land stations that could be remote controlled. With proper documentation, the shore license could be granted to an individual, covering a general geographic area on a river, lake, or wide spread popular cruising area.

For instance, one recent licensee is an independent marine electronics technician who works out of his fully outfitted van

"The FCC electronic application requires detailed attachments describing how the shore-side radio station will be used to regularly communicate with specific ships at sea."

and needed portable and mobile communications to rendezvous with his customers in different harbors. It's important to note that the marine Private Coast Station system is meant for shore-to-ship traffic. It does *not* authorize the shore station licensee to outfit all of his service cars with marine VHF and talk land-to-land. The only exception would be emergency communications, or for the exchange of safety messages.

Communicating from one coast station to another is generally prohibited unless *both* stations are owned and operated by, say, the same tow boat company, and on a secondary basis, they need to talk between themselves regarding a boat out of fuel requiring help.

Channels

A shore station may be granted three or four VHF channels, *but not all 55 channels!* Distress Channel VHF 16, 156.800 MHz



The shore station license may grant both SSB (top) operation as well as VHF operation on land (bottom radio, tuned in to automatic position finding).

FM, is always part of the grant, plus DSC Channel 70, and a couple more channels for both commercial and non-commercial radio traffic.

Marine SSB channels are found on the following frequency segments: 2, 4, 6, 8, 12, 16, 22, and 26 MHz.

The FCC will usually allow only one or two channel requests in each of these MHz bands, including 2182 voice calling and distress, and 2187.5 DSC. The channels requested on HF would normally be the common ship-to-ship and ship-to-shore frequencies, known as ALPHA and BRAVO channels. As an example, on 4-MHz HF, Channel 4 A, 4146 kHz, and 4 B, 4149 kHz would be selected.

Long-range DSC frequencies would also be requested, as follows: 2187.5, 4207.5, 6312.0, 8414.5, 12,577.0, and 16,804.5 kHz. On these digital DSC channels, power output is limited to 150 watts, and the emission designator is 300HF1B.

On marine VHF channels, voice frequencies are listed as 16K0F3E, with 50 watts allowed as maximum power output. Marine VHF transceivers only put out 25 watts, but this is totally sufficient. The data mode for VHF Channel 70, 156.525 MHz, is emission 16K0F2B. Marine SSB voice channels are 2K80J3E. These emission FCC designators will help when attempting to file your application online.

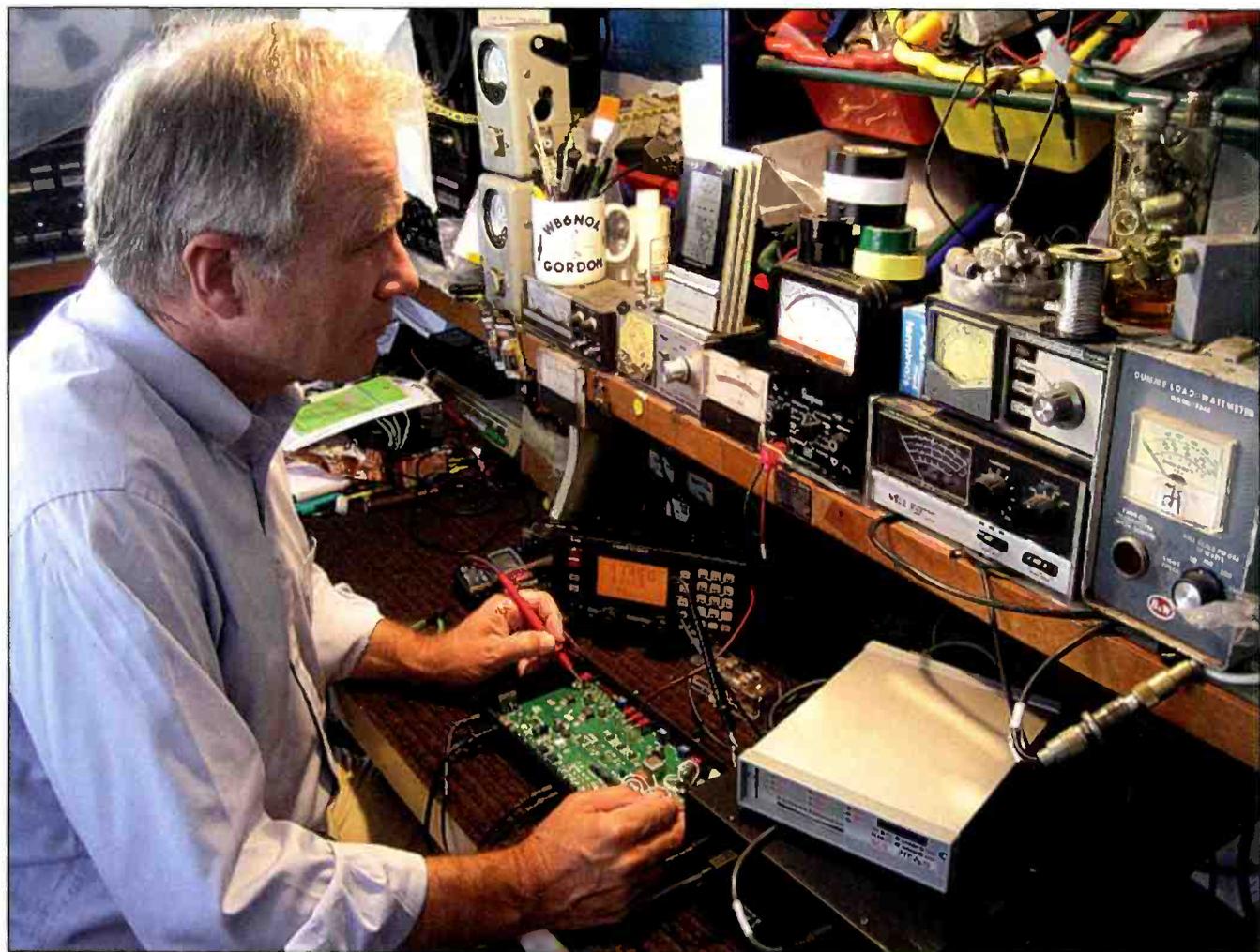
What You Need To Do

The FCC fee for a Coast Station license is \$570 for 10 years. You pay online with your credit card. Here are the forms you will need to complete:

- FCC 601, Information and Instructions
- FCC 601, Application for Wireless Telecommunications Bureau Radio Service Authorization
- FCC 601, Schedule D, Information and Instructions
- FCC 601, Schedule D, Station Locations and Antenna Structures
- FCC 601, Schedule G, Technical Data for Maritime and Aviation Services
- FCC 601, Schedule G, Technical Data

The FCC states, "You must file technical information for each fixed location, including the antenna structure and/or each handheld/mobile transmit location, temporary fixed station location, or itinerant station. It is recommended that applicants complete Section D prior to completing Section G."

The process can be painful. As you begin to work through the pages, the very smart FCC computer won't let you go on until it electronically deems your input is correct. See for your-



Marine electronics dealers can work ships at sea from the test bench on both long-range SSB as well as VHF short range.

self at the Universal Licensing System <http://www.FCC.gov/wtb/uls>. Luckily, the FCC offers live phone help at 888-CALL FCC. Just a few button pushes

gets you to a live operator, and believe me, these operators have almost every question on an FCC application down cold. They are polite, eager to help, and

if you stump them for a little while, they will take your number and call you back with an answer. They are also very computer savvy.

Your FCC-authorized shore station license is part of your maritime business, and if your business has 10 long-range charter fishing boats offshore, you are good to go on passing business traffic to your own fleet. But keep in mind, the license is primarily intended to meet the communication requirements of those boats at sea or in the harbor that are your current customers—don't come up on Channel 16 or 2182 kHz with a general call to all vessels that you have a "blue light special bottom cleaning rate for the next four hours"—this goes beyond the intent of the license.

Find Out More

If you have a maritime activity, and are principally interested in guarding distress channels and providing emergency and safety communications to ships at sea or down at the local lake, that's a solid reason to have this license. If you're interested in more details about how to obtain the shore maritime station license, drop me a note at WB6NOA@ARRL.net.



Shore stations may also take part in distress calls, which they may receive on SSB distress and safety channel 4S, 4125 kHz.

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Pop'Comm September 2010 Reader Survey Questions

This month we'd like to ask how you plan to spend the late summer days. Please use the Reader Survey Card and circle all appropriate numbers. We'll pick one respondent at random for a free one-year subscription, or extension, to *Pop'Comm*, so don't forget your address. Thanks for participating.

I'll be...

- Hunkered down and listening in the shack 1
- Operating via two-way radio 2
- On the road monitoring CB or other service 3
- Studying for a license/upgrade 4
- Working on getting ready for winter 5

May Survey Highlights

Our May survey concerned our Reader Survey respondents themselves. The vast majority (nearly 92 percent) of those who returned the response cards are current subscribers (come on, newsstand buyers—this is your chance to win a free sub!). Most are occasional or regular mailers of the cards; in fact only five respondents were sending it in for the first time. Over three quarters of you send them in to positively influence content; 28 percent admitted to doing so solely for the chance at the sub; one person only wanted to gripe. We are extremely happy to report that 97 percent of respondents said that *Pop'Comm* is meeting their needs as hobbyists.

The winner of a free subscription or extension to *Pop'Comm* for sending in a response to our May Reader Survey is **Paul Cassaday** of Clayton, New Jersey. Congratulations, Paul!

Finding And Conquering Radio Frequency Interference

Noisy Signal Ruining Your Listening Fun? Track Down And Eliminate That Maddening RFI

by Don Rotolo, N2IRZ

It's a humid late summer's night. I'm trying to stay cool in the shack with my electric fan, but it's not doing much to keep the dials of the Yaesu VR-5000 dry. I'm ready for my favorite show on 9825 kHz, when I hear it: a pervasive, raspy buzzing. It's all over the band, almost covering up the signal. Aargh! Where does it *come* from? Even more important, how do I make it *stop*?

Radio frequency interference (RFI) is the bane of the short-wave listener. Our fragile radio waves dissipate to almost nothing as they travel the ether to our antenna, then are amplified thousands of times to become sounds for our enjoyment. It doesn't take much to interfere with this process—a stray millivolt here or there brings the system to a crashing halt.

The main problem with RFI isn't so much that it interferes with our radio enjoyment, but that it's so darned difficult to get rid of. In many cases, however, using some basic methods we can at least find the source of the problem, which is the first step to eliminating it. In this article, we'll get to understand how electrical devices can interfere with radio reception, some methods that can be used to identify the source of the interference, and suggestions for reducing or eliminating its effects.

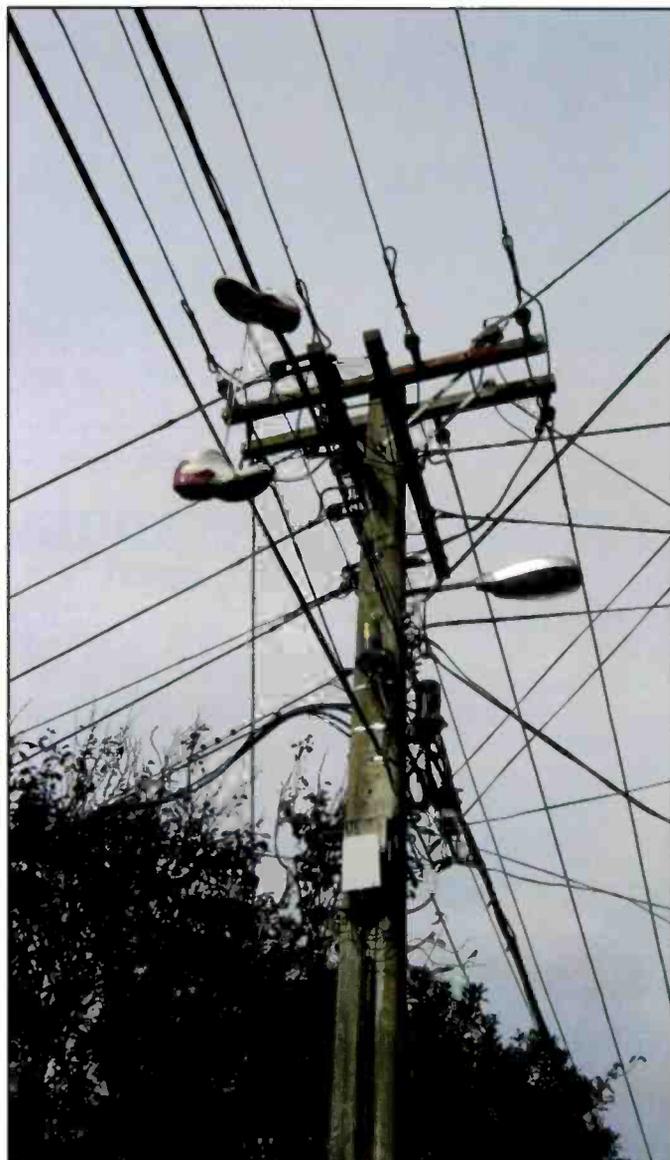
In that scene above, it turns out that my old electric fan was the culprit, sending out broadband noise from the sparking of the motor brushes. My super-sensitive receiver picked up that noise and delivered it to the speakers, not "knowing" that it wasn't what I wanted to hear. The solution, in this instance, was to buy a newer fan that has a synchronous AC motor, which has no brushes and is designed to dramatically reduce the RFI it produces.

Electricity And RF Noise

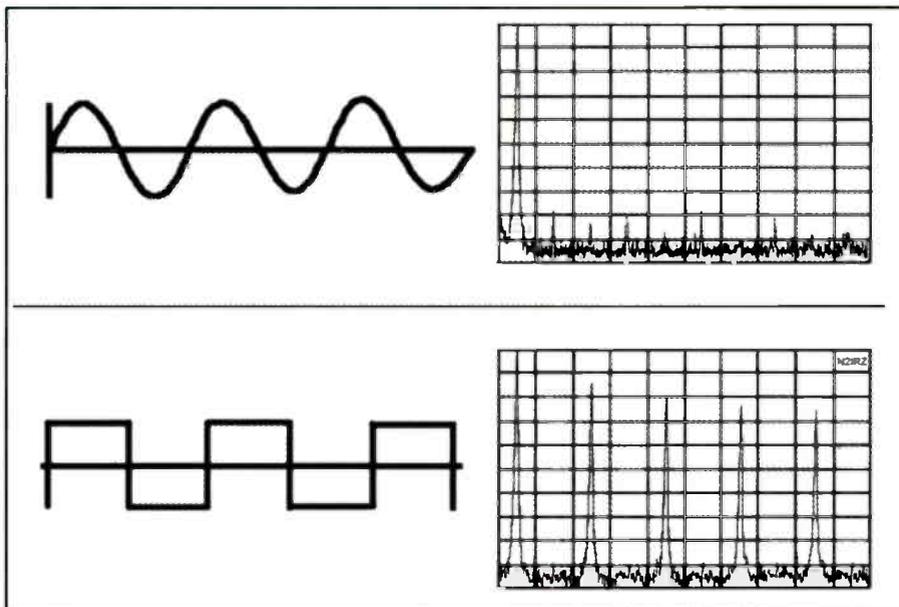
Let's begin by taking a look at electricity and how it can generate radio frequencies. For us, RFI has one very important characteristic that seems obvious: It can be heard on a radio receiver. And why can a receiver "hear" it? Because the frequency of the interference is within the range we call "radio."

Around the house, we encounter most electricity in one of

Don Rotolo, N2IRZ, is an electrical engineer, amateur radio operator, and tenacious RFI sleuth. He also writes the "Digital Connection" column for *Pop Comm's* sister magazine, *CQ*.



Common sources of radio frequency interference (RFI) are the power lines and utility equipment outside our homes. Listening to local AM radio in the car can help you pinpoint noisy power line equipment. If this is the source of interference to your receiver, your local power utility company will generally be happy to correct the problem.



A sine wave and a square wave in both the Time and Frequency domains. Note that the sine wave is a single frequency, while the square wave is made of several frequencies, all odd multiples of the fundamental frequency. These harmonics can extend well into the shortwave bands, causing interference.

three forms: direct current (DC), which is what we get from batteries, alternating current (AC), which we get from the power mains and wall outlets, and static electricity, which are those miniature lightning bolts we get when touching metal in a very dry climate.

DC does not produce RFI at all. Since the voltage changes very slowly, or not at all, there are no opportunities to hear this kind of electricity on a radio receiver. In technical terms, we can say that the frequency is too low to cause interference. If we start turning DC on and off, however, that changes things, as the switching action can generate electrical noise.

AC, the 50 or 60 Hertz (cycles per second) we have coming from the wall socket, also has a frequency too low to cause RFI, at least for the kinds of receivers we're using. That doesn't mean that something powered by AC can't interfere—mains-powered equipment (such as an electric blanket) is by far the most frequent source of RFI—but the AC supply *itself* isn't what's causing the interference.

Lastly, we have that pesky static electricity. Rubbing your feet on the carpet and touching some metal or another person creates a small spark, too small (and infrequent) to be anything other than a mildly painful nuisance. The spark does actually generate a broad spectrum of radio frequencies, but these are far too faint for our receivers to pick up. But we can't dismiss this phenomenon, since it

helps explain one major source for the kind of noise that really does interfere with our radio reception.

Let's take an extreme example of static electricity: lightning. By far the most powerful release of energy in the natural world that all of us have experienced, significant electromagnetic fields are created when thousands of amperes of current flow. Since the energy release is so quick, the frequencies generated reach well into the radio bands. That is, the faster the voltage changes, the higher the frequencies created, and lightning is pretty darn fast. Now let's look at the electrical theory behind that statement.

Generating Radio Waves

A pure sine wave consists of one frequency. When we look at the waveform in the time domain (Voltage vs. Time), it describes a sinusoidal wave that changes somewhat gradually from one voltage to the other, and when we look at it in the frequency domain (Voltage vs. Frequency) it shows a single spike of energy at the fundamental frequency.

A square wave, which has very fast transitions from one voltage to the other, looks in the time domain like a series of square "teeth." In the frequency domain we see not only that spike at the fundamental, but a series of spikes of energy at odd multiples of the fundamental.

For example, a square wave at 100 Hz will have a series of spikes (or harmon-

ics) at 300 Hz, 500 Hz, 700 Hz, and so on at odd multiples of the fundamental. These harmonics will normally decrease in amplitude as the frequency gets higher. The rate of this decrease is determined by how steep the slope of the line is during the transition from one voltage to the other, also known as the slew rate (in units of volts per microsecond). This means that a square wave with steep slopes will have more high-frequency energy than one with shallower slopes. This phenomenon isn't limited to square waves; in fact, any waveform that is not a pure sine will have some harmonics somewhere.

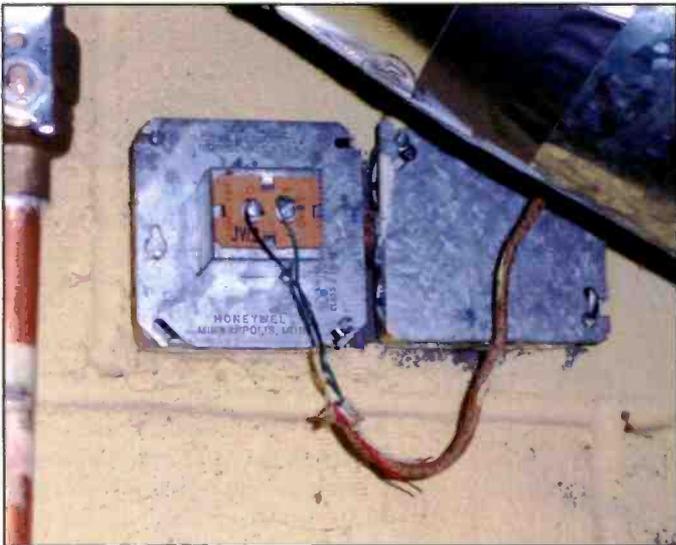
The reason for these odd harmonics comes down to simple math: If you add the voltages of odd harmonics of the fundamental frequency, they form a square wave. The higher these frequency harmonics go, the more square (steeper sloped) the waveform is. To see this illustrated, point your browser to <http://tinyurl.com/PopCommSquare> (click on the image to see the animation).

This means that if we have some voltage that changes rapidly—perhaps a bolt of lightning or a poorly designed switching power supply in a computer—we can hear the signal in our receivers. By definition, if you don't like it, it's interference. The bottom line is that the majority of RFI comes from AC-powered devices in our homes which are improperly generating electrical signals having steep-sloped waveforms, thus creating RF energy that makes it into our sensitive receivers as interference.

Sometimes we can use this effect to our advantage. Older receivers, where the tuning system was analog, often make use of this phenomenon by including something called a crystal frequency marker generator circuit. A stable quartz crystal is made to oscillate at 100 kHz (typically) and the waveform is purposely "squared off"; this generates a series of "marker" tones or signals every 200 kHz, which are used to calibrate the analog frequency dial.

The marker generator in my old Heathkit SB-102 ham transceiver is audible and usable throughout the HF ham bands. Normally the markers are switched off, though, unless I want to calibrate, because it does affect reception. Today's digitally tuned receivers don't have much use for this, since they're usually pretty close to the indicated frequency.

When we buy electrical devices, we assume they don't cause RFI. It's the job



Small power transformers, such as this one used for doorbells or heating thermostats, tend to become noisy over time. These can be hard to pinpoint, since they're often hidden behind piping in the cellar.



The main circuit breaker panel or fuse box for your home is the first place to start when you're searching out RFI. Switch off one circuit at a time until the interference stops—whatever is causing the problem will be on that circuit.

of the circuit designer to understand the effects of these unwanted frequencies and manage them so that they don't cause interference. What this means in a practical sense is that any time you encounter RFI, it's often caused by some electrically powered device that is either malfunctioning or poorly designed. There are some exceptions, however; for example, any naturally generated noise (like lightning) that we cannot control, or interference caused by intentional emitters (such as a radio transmitter). Often these are either momentary in effect or easily identified. There are weird cases of interference where two or more transmitted signals are "mixed" to some other frequency, but these are extraordinarily rare and beyond the scope of this article.

Finding The Source

Now that we know how some of these interfering radio frequencies are generated, how do we find their source? To start with, it's important to understand that RFI can get into your receiver in three ways: radiation, induction, or conduction. Radiation is picked up by the antenna, induction is picked up by wiring and components within the receiver, and conduction is the passage of electrical signals through the power and other wires leading into the receiver.

For RFI that is conducted, in many cases it is easier to filter the interfering signal than to find and fix it. We'll talk about conduction filters in a moment. If you can hear the interference with the antenna disconnected, it's getting in through conduction or induction.

For RFI that is delivered by induction, we can simply move the receiver farther from the interference source, since the strength of the interference decreases with the cube of the distance (a cube is a number times itself, times itself again). We can also shield the receiver itself against interference. Again, we'll talk about that in a moment.

Most of the RFI we encounter is radiated, making it more difficult to eliminate since the antenna that receives the interference is also receiving the desired signal. In this case, resolving the RFI requires that we find and eliminate the source of the interference.

The process is relatively easy for interference sources in our own living quarters or in other areas we can control. When the interference originates outside our property, however, we may need to tread delicately, since accusing a neighbor and making demands is probably not going to end happily. Let's start at home.

Most RFI sources are powered by the AC mains. Assuming you can hear the interference, just switch off circuit breakers (or remove fuses), one at a time, until the noise goes away. When you find the right circuit, unplug everything on that circuit, one at a time, to find the specific problem device. In nearly 75 percent of the cases I've investigated, this simple technique found the interference. Common culprits are computers and electric heating devices, but stories abound of doorbell and thermostat transformers putting out broadband noise caused by internal sparking.

Some Detective Work

If you've shut down the entire house's electricity and still hear the noise, it's time for some basic detective work. The power utility company's wires and equipment are wonderful sources of RFI—just drive around listening to AM broadcast

radio to find noisy power lines. Power line connections and transformers are notorious for continuous noise with a buzzing sound, since the power line frequency modulates the noise somewhat. If you trace the problem to noise power equipment, your local power company will generally be happy to come out and fix it. Not only is it good business (noisy equipment means failing equipment), but they are required by the FCC to keep their system from generating RF noise. Just be sure to supply the utility pole tag number when contacting them, and make a note of the nearest cross street.

While finding an RFI source outside your home can be as easy as driving in your car while listening to AM broadcast, it can also present a problem difficult enough to drive Sherlock Holmes crazy. The very first step in finding a source of interference is getting a better idea of where to look. To get started in radio direction finding (RDF), disconnect your regular antenna and connect a directional antenna instead, one you can hold in your hands. This can be a home-made dipole on a wooden stick, or a commercially built Yagi beam or log-periodic. (If your radio is a handheld, it's even easier. Read on.)

Radio Direction Finding

To build such a dipole, start with a connector of the type you need for your receiver's antenna, such as PL-259, with a short piece of coaxial cable attached, perhaps six feet long. At the other end, bare the center conductor and separate it from the braid by about two inches. Connect two pieces of wire, each about three feet long, one to the center conductor and the other to the braided shielding, and attach the whole "T"-shaped assembly to some wood. The dimensions are not critical, and you can just use what you have handy. (If you're unclear on this, illustrations abound on the Internet and in hobby resource books.)

While listening to the interference, slowly rotate the antenna. When the interference is loudest, the *flat* of the T is facing towards the interference source; at its quietest, the *arms* of the T are facing the source. This will be a subtle difference, so you need to concentrate and listen carefully, perhaps using headphones. If you have a variable RF gain control (or an in-line variable attenuator), use it now to make the signal very weak, so the differences become more obvious. You might also travel several hundred yards away to

let the interfering signal get weak enough to track this way.

If you have a handheld radio, you can use your body to block the noise signal while again turning in a circle. Hold the antenna vertical, a few inches from your body, right about chest level. The noise will be loudest when you are facing the source and quietest when the source is behind your back. If the signal doesn't vary enough to find the direction, wrap the antenna and upper part of the radio loosely in aluminum foil, which should cut down the signal enough for you to get a direction.

While these RDF techniques are useful, they're not foolproof. It takes some skill and practice to do this well, and without a means of making the signal very weak, it may not work at all. You can also get a lot more information on the Internet by searching for "radio direction finding" and "finding radio interference."

The ideal situation is found with a highly directional antenna like a Yagi beam with several elements, along with a variable RF attenuator. Note that you can also get RDF equipment that uses the Doppler effect to find a noise source. One such device is the Ramsey Electronics DDF-1. At \$170, it's not for everyone, but

perhaps someone in your local radio club has something like it.

Intermittent Noises

What about those cases where the interference comes and goes? If it stays around long enough, the techniques above might catch it, but if it's fleeting, it sometimes helps to keep a log of when it can be heard. After several days or weeks, check the log and see if you can detect a pattern.

For example, some time ago I was hearing a loud noise all across the band, up to about 8 MHz, that lasted almost exactly five minutes. It only happened a few times a day, usually in the morning and just before dinner during the week, and at odd times on weekends. After keeping a log for almost a month, it dawned on me that the times corresponded to my neighbors' comings and goings: Every time they opened or closed their garage door, there was noise.

I explained my suspicions to my neighbor, Ralph (we're good friends, and he's an electrical engineer), and when we opened his garage door, you could actually hear the light bulb "sizzling"—the light bulb on his electric garage door opener was arcing and wiping out my

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radio. Removing the bulb, we found that the dot of solder on the bottom was partly melted and burned away. Installing a new bulb fixed that one.

Knowing the typical sources of interference will help you track a specific culprit. In addition to transformers, computers, heating appliances (and other big



If you have electric heat, the thermostat contacts can become dirty or worn over time. The miniscule arcing that occurs at the load contacts will generate RFI. Other heating appliances, such as electric blankets, can also generate RFI. For intermittent noise, keep a log to help identify patterns.

power users), other causes include gas-line engines (which can sound like a playing card being hit by bicycle spokes), fluorescent light bulbs (both tube and compact type), and electric motors.

If your detective hits a wall, by the way, the American Radio Relay League www.arrl.org maintains teams of volunteer Technical Specialists who will help you investigate RFI problems. Contact your Section Manager or ARRL Headquarters for more information.

A Good Grounding

OK, so now we've found the source of the interference, but it's not as simple as unplugging whatever it is. Now what?

The first step is to ground your equipment with a good RF ground. The third prong of the electrical outlet is a good *safety* ground, but it is often a poor *RF* ground. RF travels on the outer skin of a wire, and long thin wires have a high impedance at RF frequencies. Instead, run braided wire (such as the shield of RG-8 wire) to a dedicated RF ground (such as a cold water pipe made from copper, or an eight-foot-long ground rod driven into the soil) keeping the connection as short as possible and avoiding tight bends. If this isn't easily done, search the Internet for other ideas for RF grounds. You still need the safety ground, but the RF ground will help with interference.

The RF ground will also help reduce interference from Induction. The metal case of the receiver conducts electrical fields to the RF ground. For magnetic fields, you need something that conducts magnetism (like steel, but not aluminum),

but you don't need a "ground," just "wrapping" the circuitry with a magnetic shield is sufficient.

Filters And Chokes

For conduction, you can get power filters for AC and DC power lines. Available commercially at places like RadioShack and similar, these have inductors and capacitors which filter out conducted noise. The filters for DC are made for automotive applications, while the AC filters are for computers and other sensitive equipment. You can make a filter if you like; again, just do a search on the Internet or consult the *ARRL Handbook* for details. If the filter you get can be grounded, connect it to your RF ground for best effectiveness. You can also get ferrite beads or other shapes that will help choke off stray RF on the power leads.

Ferrites can also be helpful in choking off any stray RF on your antenna line. Amidon (www.amidoncorp.com) is a well-known supplier of ferrite toroids and other products which can be used for this purpose.

The Noise Bridge

If you're technically inclined, you can build a noise bridge, which uses a second antenna to receive the "noise." You then subtract the noise from the signal + noise, leaving only the signal. These devices can reduce—but not eliminate—noise of a periodic or modulated nature, but not background "hiss." An Internet search will bring up several circuits, or you can check out the one in the *Interference Handbook* (By William R Nelson, WA6FQC, ISBN 0-933616-01-5) in Chapter 7. You can also buy one commercially; offerings include the Ten-Tec (www.tentec.com) model 1051 (\$19) and MFJ www.mfjenterprises.com model MFJ-202B (\$80).

Keep On Plugging Till You Can Unplug

Now that you're armed with some basic tips and remedies, get sleuthing. But remember, if your efforts aren't panning out, you don't have to just "live with it." Most RFI can be cured, often inexpensively, so if you're stumped reach out to the ARRL, as mentioned before, before you throw up your hands in defeat. We all experience RFI at some point or another, but we shouldn't let it decrease our listening enjoyment.

Finding *WorldRadio Online*

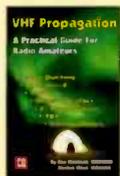


To access the current issue of *WorldRadio Online* as well as past online issues, downloading tips and other info, you'll need to go to the *WRO Welcome Page* on the *CQ* magazine website.

Here's how to do it:

- (1) Go to the *CQ* homepage at: www.cq-amateur-radio.com.
- (2) Find the *WorldRadio Online* logo to the left of the *CQ* magazine covers. Click on it. This will take you to the *WRO Welcome Page*. At this point, you have several options. There are links to a variety of informational pages. We recommend that you read the "Viewing and Downloading Tips" before doing anything else. The Back Issues link will take you to previous issues (beginning January 2010) to download and view. **Enjoy!**

Pop'Comm Books & CDs



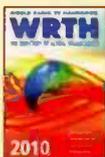
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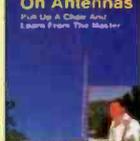
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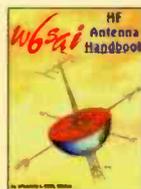
station accessories for VHF FMing, working OSCAR satellites, fun on HF, trying CW, building simple antennas, even a complete working HF station you can build for \$100.

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by Bill Orr, W6SAI

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This listing is designed to help you hear more shortwave broadcasting stations. The list covers a variety of stations, including international broadcasters beaming programs to North America, others to different 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	9665	Radio PMR, Pridnestrovie (Moldavia)		0330	6030	Radio Oromiya, Ethiopia	Oromiya
0030	9675	Radio Cancao Nova, Brazil	PP	0330	6130	Radio Tirana, Albania	
0030	9715	RDP Intl., Portugal	PP	0330	6150	Hungarian Radio	HH
0030	9820	Radio Austria International	GG	0330	6155	Radio Austria International	
0100	3975	Hungarian Radio	HH	0330	9445	Radio Prague, Czech Republic	
0100	6010	Radio Sweden, via Canada		0330	9925	Voice of Croatia, via Germany	Croatian
0100	6135	Radio Santa Cruz, Bolivia	SS	0330	12035	BBC Middle East Relay, Cyprus	
0100	9580	KBS World Radio, South Korea		0400	4775	TWR, Swaziland	GG
0100	11720	Voice of Vietnam	VV	0400	4790	Radio Vision, Peru	SS
0100	7811u	AFRTS, Florida		0400	4915	Radio Difusora Macapa, Brazil	PP
0200	4875	Radio Difusora Roraima, Brazil	PP	0400	4930	Voice of America, Botswana Relay	
0200	4885	Radio Clube do Para, Brazil	PP	0400	4960	Voice of America, Sao Tome Relay	
0200	4985	Radio Brazil Central	PP	0400	5910	Marfil Estereo, Colombia	SS
0200	5045	Radio Cultura do Para, Brazil	PP	0400	5915	Deutsche Welle, via England	
0200	9410	BBC		0400	5950	Radio Taiwan International, via Florida	
0200	11780	Radio Nacional Amazonas, Brazil	PP	0400	5960	Radio Japan, via Canada	JJ
0200	11935	Radio Japan, via Bonaire		0400	6010	La Voz de tu Concencia, Colombia	SS
0200	3250	Radio Luz y Vida, Honduras	SS	0400	6020	China Radio International, via Canada	
0300	7110	Radio Ethiopia	Amharic	0400	6165	Radio National, Chad	FF
0300	4780	Radio Djibouti	FF	0400	6175	Voice of Vietnam, via Canada	SS
0300	4965	CVC-The Voice-Africa, Zambia		0400	6185	Radio Educacion, Mexico	SS
0300	4976	UBC Radio, Uganda		0400	6270	Radio Cairo, Egypt	
0300	5915	Radio Darbanga, Netherlands, via Vatican	AA	0400	6821	Galei Zahel, Israel	HH
0300	5920	TWR, via Russia	vern	0400	7240	Deutsche Welle, Rwanda Relay	
0300	5954	ELCOR tests, Costa Rica	SS	0400	7245	Islamic Republic of Iran Broadcasting	
0300	6055	Radio Exterior Espana, Spain	SS	0400	7275	RT Tunisienne, Tunisia	AA
0300	6060	Super Radio Deus a Amor, Brazil	PP	0400	7295	RT Algerienne, Algeria	AA
0300	6120	Islamic Republic of Iran Broadcasting		0400	7310	Radio Romania International	
0300	6135	Channel Africa, South Africa		0400	7505	WRNO, Louisiana	
0300	7200	Radio Omdurman, Sudan	AA	0400	9535	Radio Exterior Espana, Spain	SS
0300	9420	Voice of Greece	Greek	0400	9645	Vatican Radio	RR
0300	9645	Radio Romania International		0400	9805	Radio France International	
0300	9665	Voice of Russia, via Moldova		0400	9875	R. Voice of the People, (to Zimbabwe)	
0300	9740	Miraya FM, Sudan, via Slovakia	EE/AA	0400	12070	Radio Rossii, Russia	RR
0300	9790	China Radio International, via Cuba	CC	0400	12080	Voice of America, via Madagascar	
0300	11625	Vatican Radio	Somali	0500	7255	Voice of Nigeria	
0300	3215	Adventist World Radio, via Madagascar	Malagasy	0500	7335	Vatican Radio	Malaysian
0300	11710	RAE, Argentina	FF	0500	7440	Radio Ukraine International	
0300	11960	China National Radio	CC	0500	11725	Radio New Zealand	
0300	13730	Radio New Zealand		0800	4965	Radio Santa Monica, Peru	SS
0300	3220	Radio Sondergrense, South Africa	Afrikaans	0800	4990	Radio Apinte, Suriname	DD
				0800	3290	Voice of Guyana	

UTC	Freq.	Station/Country	Notes	UTC	Freq.	Station/Country	Notes
0800	9635	RT Malienne, Mali	FF	1700	15690	Radio Taiwan International, via France	
0900	6160	CKZN, Canada		1800	11655	Radio Nederland, Madagascar Relay	
0900	6170	Radio New Zealand		1800	15440	Deutsche Welle, Portugal Relay	GG
0900	6175	Voice of Malaysia	Malay	1900	9675	Broad. Svc. of the Kingdom, Saudi Arabia	
1000	5020	Solomon Islands Broadcasting Corp.		1900	9745	Radio Sawa, USA, Botswana Relay	
1000	6025	Radio Amanecer, Dominican Republic	SS	1900	9905	Radio Free Asia, USA, via N. Marianas	CC
1000	7200	Yakutsk Radio, Russia	RR	1900	11750	Adventist World Radio, via South Africa	
1000	7320	Magadan Radio, Russia	RR	1900	11860	Radio Jamahiriya, Libya	Hausa
1000	9470	All India Radio	Hindi	1900	12005	RT Tunisienne, Tunisia	AA
1000	9575	Africa Number One, Gabon	FF	1900	12095	Radio Thailand	
1000	9580	Radio Australia		1900	13625	Radio Free Asia, USA, N. Marianas Relay	CC
1000	3925	Radio Nikkei, Japan	JJ	1900	13640	Radio Tirana, Albania	
1030	3330	Ondas del Huallaga, Peru	SS	1900	15540	Radio Kuwait	
1030	4950	Radio Madre de Dios, Peru	SS	2100	9330	Radio Damascus, Syria	
1100	3340	Radio Misiones Intl., Honduras	SS	2100	9410	Radio Prague, Czech Republic	
1100	5040	Radio Libertad, Peru	SS	2100	9625	CBC Northern Service, Canada	
1100	5120	Ondas del Suroriente, Peru	SS	2100	11760	Radio Havana Cuba	
1100	6020	Radio Australia		2100	11865	Deutsche Welle, Rwanda Relay	
1100	6348	Echo of Hope, South Korea (to North)	KK	2100	12085	Radio Damascus, Syria	
1100	7260	Xinjiang PBS, China	CC	2100	15225	Radio Veritas Asia, Philippines	
1100	3905	Radio New Ireland, Papua New Guinea	Pidgin	2100	15235	Channel Africa, South Africa	
1100	3910	ABC Northern Territories Service, Australia		2100	15515	Radio Australia	
1100	3290	Radio Central, Papua New Guinea	Pidgin	2100	17680	CVC-La Voz, Chile	SS
1100	3220	Radio Morobe, Papua New Guinea	Pidgin	2200	9760	Cyprus Broadcasting Corp,	Greek; wknds
1200	5075	Voice of Puijiang, China	CC	2200	6060	Radio Nacional, Argentina	SS
1200	5985	Myanmar Radio, (Burma)	Burmese	2200	6090	Radio Nigeria	Hausa
1200	4750	Radio Republik Indonesia	II	2200	9704	La Voix du Sahel, Niger	FF
1200	9430	FEBC, Philippines	Pidgin	2200	9890	Voice of Russia	
1200	9525	Voice of Indonesia		2200	9915	BBC South Atlantic Relay, Ascension Is.	
1200	3385	Radio East New Britain, Papua New Guinea	Pidgin	2200	11670	Radio Nacional, Venezuela, via Cuba	SS
1200	9760	Voice of America, Philippines Relay		2200	11940	Radio Romania International	
1200	9930	World Harvest Radio, via Palau		2200	12090	Far East Broadcasting Co., via Saipan	VV
1200	9650	KBS World Radio, South Korea		2200	12095	BBC South Atlantic Relay, Ascension Is	
1200	12065	Voice of Russia	RR	2200	12095	BBC South Atlantic Relay, Ascension Is	
1200	6130	Lao National Radio, Laos	LL	2200	15110	Radio Exterior Espana, Spain	SS
1200	2485	ABC Northern Territories, Service, Australia		2200	15630	Voice of Greece	Greek
1300	6070	CFRX, Canada		2200	17735	Radio Canada International	FF
1300	6195	BBC, Singapore Relay		2200	17755	Radio Exterior Espana	SS
1300	7235	Voice of America, N. Marianas Relay	Korean	2200	11820	Broad. Svc. of the Kingdom, Saudi Arabia	AA
1300	7295	Voice of America, via Russia	CC	2200	15345	RTV Marocaine, Morocco	AA
1300	7595	Radio Free Asia, Philippines Relay	Burmese	2200	11980	China Radio International	
1300	9400	FEBC, Philippines	CC	2200	15470	RDP International, Portugal	PP
1300	9425	All India Radio	Hindi	2230	4935	Radio Capixaba, Brazil	PP
1300	9445	Radio Liberty, USA, Thailand Relay	Kazakh	2300	5940	Voz Missionaria, Brazil	PP
1300	9690	All India Radio		2300	6010	Radio Inconfidencia, Brazil	PP
1300	11530	Denge Mesopotamia, Moldova (to Iraq)	Kurdish	2300	6100	Radio Canada International	
1300	11665	Radio Taiwan International	Mandarin	2300	7125	Radio Guinee, Guinea	FF
1300	11675	Polish Radio, via Austria		2300	7220	Radio Romania International	
1300	11725	Deutsche Welle, Rwanda Relay	GG	2300	11590	Radio Cairo, Egypt	
1300	13590	CVC-The Voice-Africa, Zambia		2300	12030	Radio Havana Cuba	SS
1300	13650	Voice of Korea, North Korea	CC	2300	13740	Radio Free Asia, USA, Saipan Relay	Khmer
1300	11805	Adventist World Radio, Guam		2300	15265	Radio Japan, via Bonaire	JJ
1400	11715	KJES, New Mexico		2300	15345	Radio Nacional, Argentina	SS
1500	17725	Radio Jamahiriya, Libya		2300	5035	Radio Aparecida, Brazil	PP
1700	12040	Voice of Russia		2300	13570	Radio Sweden	Swedish
1700	12080	Radio Nederand, via South Africa		2300	15310	Radio Veritas Asia, Philippines	Tagalog
1700	15450	Voice of Turkey		2300	6090	Amhara State Radio, Ethiopia	Amharic
				2300	9490	Radio Tirana, Albania	Albanian
				2300	15605	Radio France International	
				2300	4700v	Radio San Miguel, Bolivia	SS

The Uniden HomePatrol

If You Have Trouble Programming A VCR, This Brand New Scanner Is For You

by Tom Swisher, WA8PYR
airscan65@gmail.com

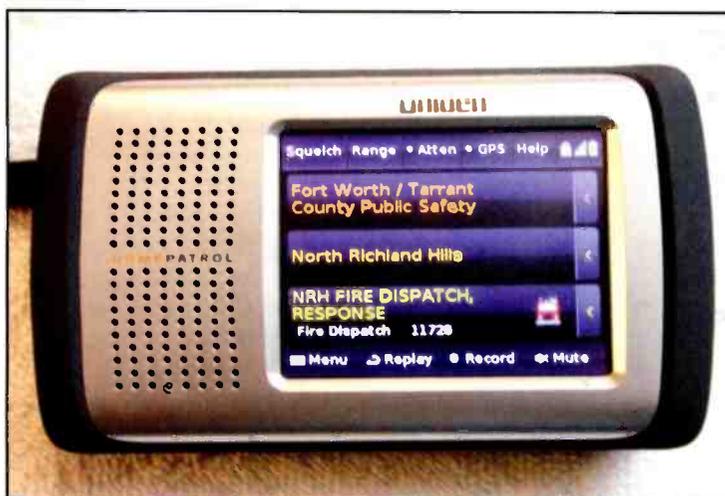
“Within a cool three minutes of opening the box and installing the batteries, the user will be able to monitor all applicable local systems by simply entering a zip code, or a city/state name.”

The revolutionary Uniden HomePatrol receiver, introduced by Uniden America during an Open House at the company's headquarters in Fort Worth, Texas, on June 26, promises to be an excellent new tool for the casual user as well as the dedicated technophile.

Receiving all the normal scanner bands, modes, and system types, both analog and digital, the HomePatrol receiver is designed to allow the average individual to get up and running, monitoring their local Police, Fire, and EMS agencies as quickly and easily as possible.

Within a cool three minutes of opening the box and installing the batteries, the user will be able to monitor all applicable local systems by simply entering a zip code, or a city/state name. An optional external GPS unit (not included) can also be connected when traveling to allow scanning by GPS coordinates; the receiver will update its scanning file every few minutes based on the current GPS coordinates.

Tom Swisher, WA8PYR, is *Pop'Comm's* “Civil Aviation Monitoring” columnist.



By offering nearly program-free and instantaneous scanning capability, Uniden's new HomePatrol receiver is positioned to revolutionize monitoring.

These features will make the HomePatrol very popular with casual users and those simply curious to try scanning, people who until now have been left behind by the complexity of modern scanning receivers.

The HomePatrol will also be of great interest to public safety agencies for use in mobile command post vehicles and communications interoperability trucks. Since these vehicles often respond to incidents over a wider area than just their home jurisdiction, the HomePatrol will be a very useful tool. The ability to arrive on the scene of an emergency and immediately have the capability to, by simply entering a zip code or using GPS coordinates, monitor the appropriate local channels within two minutes would be a very valuable capability indeed.

In addition to the default Police, Fire, and EMS selections, the user can also enable other listening favorites, such as Public Service, Military, Amateur (Ham) Radio, Railroad, and Aviation. One can also set up a personal favorites file loaded with preferred listening targets for even faster loading and scanning. Also included is a built-in audio recording capability which allows the user to check the last 30 seconds of recorded audio, or even lock on to a particular channel and record all communications on that channel up to the available capacity of the included 2GB Secure Digital memory card.

Powered by the RadioReference database, a copy of which is stored internally, the unit's firmware and database can be updated at least once per week by simply connecting it to an Internet-capable computer with a USB cable. The unit even includes simple Windows software for updating the receiver and building a Favorites file. Operating off four AA batteries, the accessories included with the unit will most likely include a desk stand, wall charger, and vehicle adapter.

Loaded with features for casual users and technophiles alike, the HomePatrol is scheduled to be available by October 1. No price has been set yet, but stay tuned for an in-depth review of the HomePatrol receiver in the next issue of *Popular Communications*.

New, Interesting, And Useful Communications Products

GRE's PSR-700 EZ-Scan-SD

GRE America has introduced the PSR-700 EZ-Scan-SD, which combines the ease of use of a portable media player with the monitoring capability of a state-of-the-art scanning receiver. Frequency coverage: 25–54, 108–136.99, 137–174, 216–512, 764–781.99, 791–796.99, 806–960 (excluding cellular bands), 1240–1300 MHz. Frequency steps: 3.125, 5, 6.25, 7.5, 8.33, 10, 12.5 and 25 kHz. Major features of the PSR-700 include: Easy-to-understand media player user interface, offering simplified keypad and display with familiar Play, Pause and Navigation controls; Entire USA database stored on an SD card for near instant access to comprehensive pre-programmed radio data; Upgradeable CPU firmware and library through provided PC software application; PC software application lets you modify or add your own Scanlist; SKYWARN store spotter functionality; SAME and all hazards weather alerting; Multi-system trunking (Motorola, EDACS and LTR); Spectrum sweeper; Built-in service searches.

The PSR-700's extreme ease of use will be especially attractive for beginners. To monitor the frequencies in use in your area, you simply scroll through the library, select your city or county, and tell the radio to scan.

The MSRP for the GRE PSR-700 EZ-Scan-SD is \$229.99. For additional information, visit <www.greamerica.com>.



A great scanner for beginners, the GRE PSR-700 EZ-Scan-SD combines the familiarity of popular media players with a comprehensive pre-programmed radio database and powerful scanner functionality.

ICOM IC-R6 Communications Receiver

The ICOM IC-R6 receives an ultra wideband frequency range, provides a triple conversion circuit for superior sensitivity, and offers receiver characteristics that make it less susceptible to interference. The small (7.1 ounces) but rugged IC-R6 tunes from 100 kHz to 1309.995 MHz (less cellular and gaps) in AM, FM Narrow and FM wide modes, letting you monitor amateur stations, AM, FM, shortwave broadcasts, analog TV audio, and a variety of utility communications. Major features include: 100-channel-per-second high-speed scanning; 1,300 memory channels in 22 banks; Voice squelch control (opens the squelch only when a modulated signal is detected and ignores unmodulated beat noise); 150 mW of audio output power (50 mW with external speaker, not supplied); up to 15 hours of operation from the supplied NiMH rechargeable battery; other power choices.



Web prices for the ICOM IC-R6 run from about \$200 to \$260. For more information, visit www.ICOMAmerica.com.

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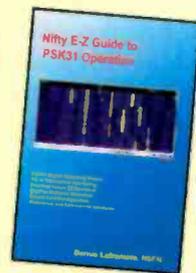
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HD Radio™ Now And (Maybe) Into The Future

The Technology Promises Much, But Can It Deliver?

by Bruce F. Elving

Like it or not, so-called HD Radio, the marketing moniker for IBOC (in-band/on channel) broadcasting, is upon us. But will it be the dawn of an exciting method of digitally transmitting information and entertainment on radio in a new environment, much like digital television, or will lack of consumer acceptance doom the technology?

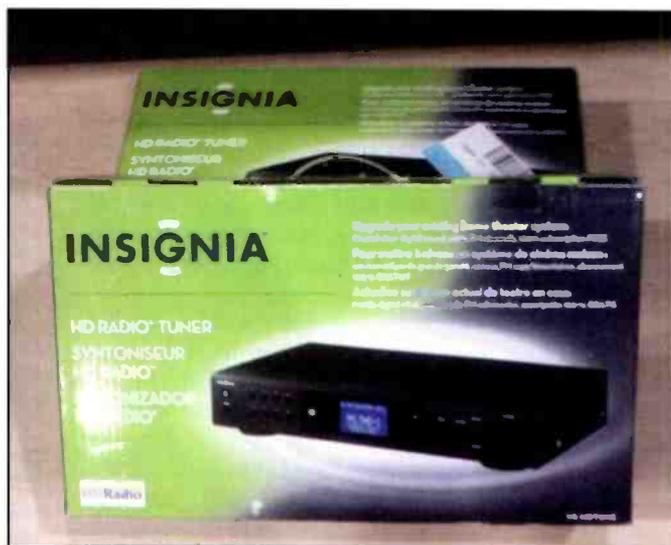
While HD has been available for several years now, main channel FM remains the dominant form of aural broadcasting, and there's evidence that its newest cousin is really struggling, even in metropolitan areas. Oh, the stations are on the air with the HD signal, to be sure, and folks can, if they're lucky, find a store selling the special radios. But on the whole, broadcasters have failed to inspire consumers to visit their favorite consumer electronics store and open their checkbooks.

Some stations seem to have simply "given up"; others, rather than expecting people to have or acquire the special radios, are turning to FM translators to relay the HD signal to a main band station. In Nashville, for example, W271AB 102.1, a translator, is relaying the HD-2 signal of WPRT-FM 102.5 Pegram-Clarksville-Nashville. WPRT-FM is a rock station known on its main and its HD-1 as "The Party." A co-owned translator in nearby Clarksville has similarly jumped on the HD bandwagon, having converted from carrying WQZQ (AM), after floods in May 2010 knocked WQZQ off the air. Yes, FM translators, originally envisioned to relay nearby stations for better reception, have recently gotten the blessing of the Federal Communications Commission to relay AM stations in the local area, as well as the HD-2 or HD-3 of nearby FM stations.

But it's not just the media moguls and government overseers who will control HD's destiny. Radio hobbyists and other listeners will shape how the "battle" might be waged—and what the final outcome may be. Obviously, how we use our checkbooks indicates our support of HD, or lack thereof. But also our comments to station management or to the engineers working at a station can influence what is programmed locally on that medium.

Those advocating for HD radio face an uphill battle. The HD Radio Alliance claims 1.3 million radio spots have aired in 2009 promoting the technology. "While a large number of those ads

Bruce Elving is an FM DX experimenter, writer, and publisher who has turned his hobby into a cottage industry, providing FM radios modified for more selectivity. He holds a Ph.D. in instructional communications, and has been an FM listener since the late 1940s.



Is HD living up to the early hype? Can it? The Insignia NSHD FM-AM tuner looked positively lonely at my local Best Buy when I visited. It was the only HD receiver the store had.

were promotional announcements run by member stations free of charge, others were paid through funding provided by device makers, retailers and automotive companies," says *Inside Radio*, June 23, 2010.

A Local Snapshot

Despite such promotion, HD remains an elusive commodity. According to *Twice* magazine, the three top players in consumer electronics nationally are Best Buy, Wal-Mart, and RadioShack. In preparing this article, I visited local outlets of all three companies, plus two others, in my medium-size city of Duluth, Minnesota. The results of my admittedly informal survey confirmed for me that public interest in HD is lacking.

The Best Buy store I visited had one HD radio, the Insignia NSHD FM-AM tuner for \$99.99. At first the clerk didn't know what I meant by HD, but a co-worker told us where the Insignia could be found on the company's shelves. At the local Wal-Mart, the clerk in the electronics area also hadn't heard of HD and together we searched the shelves and found nothing. I asked him to check their website, and sure enough he found the iLUV HD radio receiver, at \$159.88. Three other units were pictured,

including a clock radio, but all marked as online only. At RadioShack, the salesperson was familiar with the technology, and said they'd had HD radios in the past, but not now. They were dropped because of limited HD programming in the local area (only one station offers anything distinct on HD, a public

station with classical music; several others have HD-1, which is the regular FM station, only digital). He told me to visit PioneerElectronics.com and look for the DEH-P5299HD.

Sears had nothing, nor did D.A.D.S. Electronics, a local business that specializes in sales and installations of mobile FM radios, where the owner knew of HD, but didn't have any units in stock. The dearth of offerings didn't jibe with the marketing hype at least in Duluth.



In a rapidly changing market, the Accurian HD tabletop I used to compare HD and FM/SCS broadcast reception in my car (see text) is already a bygone product.

More Radio For More People?

That can't be welcome news for the HD Digital Radio Alliance. Comprising a dozen traditional broadcasting companies, the Alliance has worked zealously to see that the technology is promoted in the marketplace. In the Boston market, for example, Greater Media used 15- and 30-second ads to promote the technology on all its stations. "You're going to see a massive push for radio here," said Peter Smyth, chief executive of Greater Media.

This is—was?—exciting news in view of the fact that an HD station has tremendous potential. It can run its main program on the HD-1 channel, a special program in stereo on HD-2, and a separate monophonic program on HD-3, or the newer HD-4 band.

Stations that broadcast it may have one, two, or three special HD programs they can put out. A basic HD installation at a station involves only the regular FM stereo program, hearable as analog stereo. It sounds pretty much the same as the regular FM, except it is not affected by multipath. A car radio will get the signal pristinely, if in a strong, local signal area. HD-2, if a station has it, might be a stereo music program entirely different from the regular FM station, while HD-3 might be a mono talk program, perhaps a relay of an affiliat-



A close-up of an "in-car" setup I used to attempt HDTV audio reception. The inverter, which powered it in the car, can be seen in front of the radio. (Photo by Carol Elving)

ed AM station. A sports station in the Washington, D.C., area is using its new-found HD-4 ability to carry another co-owned sports station.

So here we have a technology that allows one station to offer four entirely separate programs on HD. Now multiply that by the number of local stations one owner can have, which could be up to five FMs plus two AMs, and you can imagine the potential for serving the public. Of course, only the FM stations have the ability for multiple program services, while HD on AM does not get out well, and it only enhances what the regular AM offers.

HD-equipped stations here in Minnesota are using the special channels to complement their main fare. This is a good thing, and it's something that operators of stations with an SCA (Subsidiary Communications Authority) subcarrier never quite comprehended. FM subcarrier radio has been most famous for offering Muzak to stores and for having special reading services to the blind, but the drawback has been the need for special

radios and a semi-secret technology not many of the public had access to. HD is supposed to be more democratic.

The HD Difference, Technically Speaking

Of course, in addition to how it will fit into the media landscape, HD Radio is of great interest from a technical standpoint, and for hobbyists in particular, especially for its DXing potential.

With a large receive antenna, HD can be picked up from a distance of about 200 km, although not consistently. Kirk Kersten, chief engineer of noncommercial KUMD 103.3 Duluth, confirms that HD has only about a 1 percent injection rate, or power ratio. The FCC recently allowed that figure to rise to a 4 percent injection rate, which if implemented widely, would give HD a more robust signal. Compare that with the FM/SCS (subsidiary communications services) band subcarriers, which can use about 10 percent of the main station's total RF power

(although some stations cripple their subcarriers by injecting them at a much lower rate). SCS, however, has scratchier audio quality and is subject to crosstalk from the main FM channel.

Listening to HD is like listening to FM stereo with main-station clarity, but instead of occupying a 100-kW channel, it resides out on the hinterlands of the station baseband at up to 1000 watts max. That allows stereo to be perceived, and with no background hiss, but when the signal drops out there's perfect silence—just like Digital TV during a fade. Or the HD program may collapse into the main analog station, forcing the listener to retune to hear the HD program. This is especially annoying when trying out HD in a moving vehicle, such as when exiting a tunnel.

The HD signal is fragile, nurtured on the side of a main-channel signal. Some critics have suggested that the "OC" in IBOC stands for "off channel." What bothers DX hobbyists and others is the increased difficulty tuning FM on adjacent channels. While I've experienced some trouble tuning in such adjacents, it's not impossible. Listeners to the HD medium will likely be more impressed with the sound quality and the additional program sources than depressed over loss of easy access to adjacent channel stations.

Stop The Foot-Dragging, Pleads The Industry

Part of the urgency in getting HD off the ground comes from a perceived threat to terrestrial broadcasters posed by the satellite radio service Sirius XM. In the United States, the National Association of Broadcasters took note, and when Canada adopted a separate digital band, U.S. broadcasters went for the IBOC system now commonly referred to as "HD." The perception they want to instill is that radio offers compact disc-type sound quality—sound as good as that provided by a satellite system—along with multiple channels and program sources.

Broadcasters have an uphill fight for the technology to truly take hold and not devolve into another AM Stereo or FMX. Moreover, not all broadcasters agree that HD is the way to go. One criticism came from Bill Spry, founder of WMWX 88.9 in the Cincinnati market, who called the technology "a joke," due to its limited coverage and adjacent-channel interference.

Canada may finally jump onto the HD bandwagon, however. The movers and shakers in that country are having second thoughts about the Eureka 147 HD system, since virtually no radios are available. In the Canadian RadioShack catalog, you had to know exactly what you were looking for in order to find a Eureka 147 radio that would tune in the "L Band" (1452–1492 MHz). Some Canada HD stations have gone off the air, with 76 stations remaining, almost all a simulcast of existing FM and AM stations. The Canadian Radio-television and Telecommunications Commission (CRTC) is expected to allow other types of broadcasting in those 40 megacycles (or MHz), and to authorize a U.S.-type IBOC system. And Canada would be no closer to nighttime use of IBOC on AM than the U.S. is.

Even if HD is a failure in the end, it will have made a contribution toward the manufacturing of better quality FM radios. The units with HD all appear to have better selectivity, sensitivity, sound quality, and stereo than virtually anything else on the market for the at-home listener. Of course, quality FM tuners and receivers still have the edge, but with HD sets hovering around \$100 per unit, the value is now there for the consumer. If the technical quality of the radios and the HD broadcasts remain high, broadcasters may find consumers willing to spend more time with radio. This, in turn, could spell more advertising dollars and profits for commercial radio, and more attention to and response from underwriters and other donors to noncommercial radio.

Putting HD Through Its Paces On The Road

I've been listening to HD Radio for a few years now, both at home and in vehicles, and I recently conducted a side-by-side comparison of HD reception and quality versus FM/SCS. I did this using the now-discontinued Accurian HD receiver and a homebrew FM/SCS unit built from a kit and installed in an ordinary FM-AM radio.

Tuning to the same 200-km-distant station, I found that the HD signals came in quite well. Both the first and second HD signals were in stereo, while SCS at 67 kHz (with a children's religious program service) suffered from the audio diseases of hiss, monophonicity, and impaired quality.

I also tested the fragility of the HD signal in my car. Powering the Accurian with an AC inverter, and stringing out the supplied ribbon-wire antenna between the car mirror and rear window coat hook, I got consistent reception right in the 70-dBu coverage area of the main station. It faded out in tunnels, taking about 8.4 seconds after the car got in the clear for the



The weather was certainly chillier when I made my radio comparisons. Here you also see the ribbon-wire antenna I strung in the car. (Photo by Kristine Elving)

HD audio to come back. In more rural locations, HD-2 was absent a considerable part of the time, while HD-1 audio blended into the main station.

When HD-1 came back, there was a delay of about half a second, which is how Paul Guello, chief engineer of KUWS 91.3 Superior, Wisconsin, had set the controls. In discussions with Paul, who was no stranger to mobile HD Radio tuning, we agreed that HD's performance up the multipath-prone hills and down the valleys of Duluth was impressive, even when driving close to all the transmitters with their propensity to destructively overload FM radios. Paul's arrangement in his car consisted of a Boston Acoustics HD radio, an inverter, and special roof-mounted antenna. On a drive to Milwaukee, clear across the state of Wisconsin, he said that the HD signal dropped out about 15 miles before the main station signal faded out.

The Radios

HD receivers tend to be excellent performers, both on FM and AM. They are sensitive and selective. They all get stereo from non-HD stations, but unfortunately,

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some lack a stereo light. A few don't provide RDS (radio data systems) information, which is transmitted on an analog subcarrier at 57 kHz, even though they all have displays with space for such information. The RDS information may include call letters, song title and artist, station slogan, and program type, and while HD can combine features previously found only on RDS sets, most manufacturers include both technologies to assist the listener.

The equipment landscape changes rapidly, and the Accurian model I used in my tests has since gone by the wayside, but there are numerous other offerings out there. Major manufacturers include Sony, Sangean, TEAC, and Jensen, and the field is expanding. While specific models seem to come and go, you'll find portables, boombox-style tabletops, and in-car radios.

So far, the Insignia NS-HD01 receiver already mentioned and a Coby portable system are the only HD radios I'm aware of that can be battery operated; most plug into an AC outlet or are designed for cars. Among the plug-ins, you'll also find

tuners for connecting to your stereo amplifier and speakers.

For those who don't have one of the built-in mobile radios with HD, or an adapter to play HD through an existing radio, you can listen to HD on the go as I did—using an AC inverter along with a modulator (or using an AUX input on the front of a car radio). The HD Radio Alliance has been working with nine car manufacturers to offer a device to convert any car radio to HD, but the target date for availability is unknown.

A Slow Momentum

As we find ourselves needing to cram additional programming into an ever more crowded broadcast spectrum, FM subcarriers may have met their Waterloo in HD. HD is a wide-open aural system for the public to sample at will, unlike SCS, which has been an addressable system of interest to broadcasters themselves and specialized audiences, but not to the general public. Perhaps the FCC could change IBOC to an SCS-based service, much like FM Extra, which was tested extensively on KNXR 97.5 Rochester,

Minnesota. That would pack more of an RF wallop into the extra bands and afford listeners additional monophonic and/or stereo program sources, without the station bullying its way past the 200-kHz wide FM station channel.

What's still missing is oomph. With the low powers that stations employ for HD, connection to a good antenna for a home set is very helpful, though signal amplifiers (boosters) have been found to be of no benefit. Especially frustrating is trying to receive HD inside steel buildings, offices, and in high rises. Some in the broadcast industry are calling for a 10-dB increase in HD power levels, such as to 10,000 watts for a 100-kW station, although a 4-dB increase has, as pointed out above, been approved. Others, such as National Public Radio, which is concerned about increased interference to stations on adjacent channels from nearby markets, have urged a go-slow approach, waiting to see how ongoing studies turn out.

There's another reason for caution as well: The technology does not come cheap. The care and feeding of the HD signal is all proprietary, with patents held by the iBiquity Corporation. It costs the broadcaster about \$100,000 to go the HD route, and that price, particularly during a recession, is more than enough to turn many stations away from adopting it, especially stations in small markets.

Post Script: AM HD

Listeners may have noticed increased noise on the AM band, particularly at night. For instance, WABC 770 New York made some out-of-town reception of WBBM 780 Chicago difficult. A small AM station, WYSL 1040 Avon New York, complained of interference from WBZ 1030 Boston's HD signal. Some AM broadcasters, such as WBAP 820 Dallas Texas, have reportedly turned off their HD, or limited it to daytime use. There is no opportunity, however, for HD to offer separate programming from the main AM channel; its value is in higher fidelity audio and stereophony for those who live close to the AM transmitter. The HD technology is, of course, nearly ubiquitous on FM.

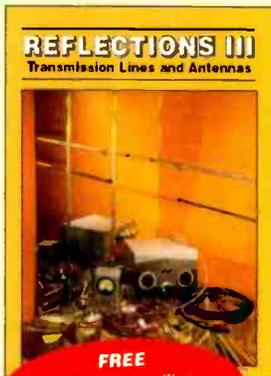
After long years of self-promotion by the industry, HD is finally making the radar screens of listeners, whether it's perceived favorably or unfavorably.

Just what the future will look—and sound—like time will tell.

REFLECTIONS III

by Walter Maxwell, W2DU

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A Minor Mystery And Lots More News

by Gerry L. Dexter
gdex@wi.rr.com

“Star Radio [Liberia] has begun tests from its own transmitter using 4025 from 1100 to 1500 and 0000 to 0300.”

A mystery station appeared on 5954 kHz a couple of years ago airing Latin American music sans announcements. The station later proved to be a test of a new transmitter manufactured by the Elcor Corporation in Costa Rica. Now, a similar test is occurring on the same frequency, running from as early as 2200 to sometimes as late as 0400. The location is (or was) believed to be Guapiles, some 40 miles northeast of San Jose. No one seems to know for certain whether this is the same transmitter tested two years ago or a new unit undergoing a shakedown cruise. At present it is being heard quite well in most of the U.S., though it helps to pick a time when WYFR is not camping next door on 5950.

Occasionally, local AM or FM broadcasters get big ideas and decide to reach out to the world on shortwave. The fact that the station does not have a shortwave transmitter is no longer an “issue.” (“What’s the big deal? Just rent some relay time.”) Such was the case a couple of years ago when Liberia’s Star Radio took to the international bands briefly via Sentech’s Meyerton, South Africa, facility. Usually operations like these prove to be only temporary, and indeed, Star

Radio was gone from shortwave after considerably less than a year. But for once, flirtation led to the real thing. The station is back on shortwave, this time for real. Star Radio has begun tests from its own transmitter using 4025 from 1100 to 1500 and 0000 to 0300. I don’t know the power but it’s probably a kilowatt or less. If you hear it you can use the “contact us” link on its website at www.starradio.org.lr, or reach out via snail mail to 12 Broad St., Snapper Hill, Monrovia, Liberia. We wish them long life and good luck.

You can now add Hungary to the small but growing list of orphan broadcasters that are no longer being transmitted from their home country. Hungarian Radio is now heard via Wertachtal, Germany. The Jaszbereny site is no longer being used by the former Radio Budapest; in fact, its status is uncertain.

Jacob Meyer, the founder of WMLK in Bethel, Pennsylvania, passed away back in April. I don’t know what effect this will have on the station’s plan to employ a new 250-kW transmitter. R.I.P., Jacob.

A new opposition broadcast is Radio Y’Abaganda, targeting Uganda via Issoudun (France) on 15410 Saturdays from 1700 to 1800. Another new-ish opposition broadcaster targeting Africa—La Voix de Djibouti—continues to use 15615 Thursdays only from 1530 to 1630.

If you’re searching for LRA36 from Antarctica on 15476, its active hours are now reduced to just 1200 to 1500 Monday through Friday.

Radio Slovakia International has made some strange scheduling moves. On Monday, Tuesday, and Wednesday it uses only a single frequency. On even weeks English at 0100 will be on 5930, the 0700 broadcast will be on 11650, and the 1630 and 1730 broadcasts will be on 6055. On odd weeks the 0100 and 0700 broadcasts will be on 9440 with the 1630 and 1830 broadcasts remaining on 6055. Assuming the station personnel can keep this straight you have to wonder about the poor listener; is it even worth the trouble to tune in? And never mind that some



Rich D’Angelo verified the seldom-heard Deutschlandfunk on 6190.

Help Wanted

We believe the "Global Information Guide" offers more logs than any other monthly SW publication (430* shortwave broadcast station logs were processed this month!). Why not join the fun and add your name to the list of "GIG" reporters? Send your logs to "Global Information Guide," 213 Forest St., Lake Geneva, WI 53147. Or you can email them to gdex@wi.rr.com. Please note that attachment files do not always go through. See the column text for formatting tips.

**Not all logs get used. There are usually a few which are obviously inaccurate, unclear, or lack a time or frequency. Also discounted are unidentifieds, duplicate items (same broadcaster, same frequency, same site), and questionable logs.*

of the time/frequency pairings just don't work for most of North America!

Reader Logs

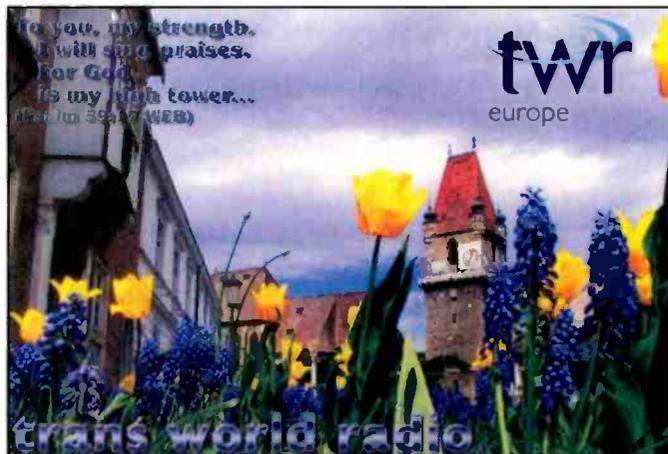
Remember, your shortwave broadcast station logs are always welcome. But *please* be sure to double or triple space between the items, list each logging according to the broadcaster's home country, and include your last name and state abbreviation after each. Also needed are spare QSLs or good copies you don't need returned, station schedules, brochures, pennants, station photos, and

A Guide To "GIG-Speak"

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

(l)	listed
(p)	presumed
(t)	tentative
*	sign on/off time
//	parallel frequency
AA	Arabic
ABC	Australian Broadcasting Commission
AFN	Armed Forces Network
AFRTS	Armed Forces Radio TV Service
AIR	All India Radio
am	amplitude modulation
ancr	announcer
anmt(s)	announcement(s)
AWR	Adventist World Radio
BBCWS	BBC World Service
BSKSA	Broadcasting Service of the Kingdom of Saudi Arabia
CBC	Canadian Broadcasting Corp.
CC	Chinese
CNR	China National Radio
co-chan	co-channel (same) frequency
comml	commercial
CPBS	China People's Broadcasting Station
CRI	China Radio International
DD	Dutch
DJ	disc jockey
DW	Deutsche Welle/Voice of Germany
EE	English
f/by	followed by
FEBA	Far East Broadcasting Association
FEBC	Far East Broadcasting Company
FF	French
GBC	Ghana Broadcasting Corp.
GG	German
HH	Hebrew; Hungarian
HOA	Horn of Africa
ID	identification
II	Italian; Indonesian
Intl	International
IRIB	Islamic Republic of Iran Broadcasting
IRRS	Italian Radio Relay Service
IS	interval signal
JJ	Japanese
KBS	Korean Broadcasting System

KK	Korean
Lang	language
LSB	lower sideband
LV	La Voz; La Voix
M	man
NBC	National Broadcasting Corporation (Papua New Guinea)
nf	new frequency
ORTB	Office de Radiodiffusion et Television du Benin
PBS	People's Broadcasting Station
PP	Portuguese
PSA	public service announcement
QQ	Quechua
RAE	Radiodifusion Argentina al Exterior
RCI	Radio Canada International
Rdf	Radiodifusora, Radiodiffusion
REE	Radio Exterior de Espana
RFA	Radio Free Asia
RFE/RL	Radio Free Europe/Radio Liberty
RFI	Radio France International
RHC	Radio Havana Cuba
RNZI	Radio New Zealand International
RR	Russian
RRI	Radio Republik Indonesia; Radio Romania International
RTBF	RTV Belge de la Communaute Francaise
s/off	sign off
s/on	sign on
SIBS	Solomon Is. Broadcasting Corp.
sked	schedule(d)
SLBC	Sri Lanka Broadcasting Corp.
SS	Spanish
TC	time check
TOH	top of the hour
TT	Turkish; Thai
TWR	Trans World Radio
unid	unidentified
USB	upper sideband
UTC	Coordinated Universal Time (= GMT)
UTE, Ute	utility station
v	variable
vern	vernacular (local language)
VOA	Voice of America
VOIRI	Voice of Islamic Republic of Iran
VOR	Voice of Russia
W	woman
ZBC	Zambian Broadcasting Corp.



TWR responded to a Rich D'Angelo report of reception on 6105 via Nauen.

anything else you think would be of interest to our readers. And how about sending a photo of you at your listening post? I'm still waiting!

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

ALBANIA—Radio Tirana, 6130 heard at 0345 with news of the Balkans. (Maxant, WV)

ALGERIA—RT Algerienne, 7295 via Issoudun at *0400 sign on and into AA, closing at 0458*. (D'Angelo, PA)

ANGUILLA—Caribbean Beacon, 6090 at 0426 carrying Gene Scott. (MacKenzie, CA)

ARGENTINA—Radio Nacional, 6060 with SS coverage of a football match at 2251, time pips on the hour and continued with coverage. Also, RAE, 11710.8 at 0346 with FF pgmg to 0400 pips, final ID and off. (D'Angelo, PA) 2303 in SS. (MacKenzie, CA) 2320 with Radio Nacional pgmg. (Alexander, PA)

ASCENSION ISLAND—BBC South Atlantic Relay, 9915 at 2217. (Brossell, WI) 12095 on the EU and Greece. (Jackson, PA)

AUSTRALIA—Radio Australia, 6020 at 1116 and 15515 at 0301, //15240. (Yohnicki, ON) 9580-Shepparton at 1050 with features on crime and trials. (Fraser, ME) 11660-Shepparton at 2124, 15515-Shepparton at 0252, 15560-Shepparton at 2238, 17750-Shepparton at 0312 and 21725-Shepparton at 0238. (MacKenzie, CA) 11945 at 0710, 15515 at 2025, 15560 at 0350 with a sports call-in and 17750 at 0930. (Maxant, WV)

ABC Northern Territories Service: 2310-Alice Springs, 2325-Tenant Creek and 2485-Katherine all noted at weak to moderate to good levels around 1040-1050. (Wilkner, FL)

CVC-Asia/Pacific, 6260 via Tashkent in Hindi at 0032. Poor. (Parker, PA)

AUSTRIA—Radio Austria Intl, 9820-Moosbrunn with news in GG at 0036. (Parker, PA)

BOLIVIA—Radio Santa Cruz, Santa Cruz, 6134.8 at 0100 with SS pops and ballads, ID and sign off anmts at 0108. (Alexander, PA)

BOTSWANA—VOA Relay, Mopeng Hill, 4930 with news of Africa at 0425. (Parker, PA)

BRAZIL (*All in PP—gld*)—Radio Difusora Roraima, Boa Vista, 4875.4 monitored at 0201 with pops. (Parker, PA) 0337 with religious-sounding talk. ID and close down anmts just past 0400 and off at 0404. (D'Angelo, PA) 0945. (Wilkner, FL)

Radio Clube do Para, Belem, 4885 monitored at 0419 with anmts, ID and jingles. (Parker, PA)

Radio Difusora, Macapa, 4915 with M crooner at 0422. (Parker, PA)

Radio Brazil Central, Goiania, 4985 at 0828 with M ancr and slow music. (Parker, PA)



Winter in Mongolia as pictured on this Voice of Mongolia QSL received by Rich D'Angelo for his reception on 12085.

Radio Voz Missionaria, Florinapolis, 5939 at 2335 with a preacher. Weaker on //9665. (Alexander, PA)

Radio Inconfidencia, Belo Horizonte, 6010 at 2350 with Brazil-pops, anmts. ID at 2358. (Alexander, PA)

Radio Cancao Nova, Cachoeira Paulista, 9675 in at 0030. (Linonis, PA)

Radio Transmundial, Santa Maria, 11735 (p) at 2000 with M/W talk, abruptly off at 2010. (Alexander, PA)

Radio Nacional da Amazonia, Brasilia, 11780 in at 0253. (MacKenzie, CA) 0300, with Deutsche Welle underneath. (Yohnicki, ON) 0315 with talk, anmts, news and occ. Brazil-pops. Off in mid-song at 0344. (D'Angelo, PA) 1010 with PP talk by M/W. (Ng, Malaysia)

BULGARIA—Radio Bulgaria, 11700 at 2300 with IS, ID, and into EE to NA. (Jackson, PA)

CANADA—Radio Canada Intl, 6100 at 2315 with *The Link*. (Jackson, PA) 15455 in PP at 2247 and 17680 in PP at 2120. (MacKenzie, CA)

CBC Northern Service, 9625 at 0415 with pop/rock. (MacKenzie, CA) 2115 on a circus injury. (Maxant, WV)

CFRX, Toronto, 6070 at 0053 carrying the "Esso Talk Network." (Parker, PA) 1220 with a Frank Sinatra song. (Maxant, WV)

CKZN, St. John's (Newfoundland), 6160 at 0935 on population increases in the Maritime Provinces. (Maxant, WV)

CHU, Ottawa, 3330 with FF/EE time anmts at 0500. (Yohnicki, ON) 2315, 7850 at 2120 and 14670 at 2230. (Maxant, WV) 7850 at 0500. (Yohnicki, ON)

CHILE—CVC-La Voz, 17680 in SS at 2143. (MacKenzie, CA)

CHINA—China Radio Intl, 6020 via Canada at 0413, 9790 via Cuba at 0359, 15160 in CC at 0315 and 13630 at 2116. (MacKenzie, CA) 7215-Xi'an, in (I) JJ at 1304, 7255-Shijiazhuang, in RR at 1315, 7265-Urumqi, in (I) Hindi at 1306, 7325-Jinhua, in (I) JJ at 1315, and Kunming in CC at 2229. Also, 9540-Kunming, in CC at 1337. (Brossell, WI) 9440-Kunming, in Khmer with CC lesson heard at 1250. (Ng, Malaysia)

China National Radio/CPBS: Xijiang PBS, Urumqi, 4330 in (I) Kazakh at 1217, CNR-1, Beijing, (p) 4460 in Mandarin at 1221, Voice of Pujiang, Shanghai, 5075 in Mandarin at 1203. CNR-5-Beijing, 7620 in Mandarin at 1055 and 9410 in Mandarin at 1212. CNR-1, 9500-Shijiazhuang, in Mandarin at 1222 and Ne Menggu PBS, Hohhot, (p) 9520 in Mandarin at 1315. (Taylor, WI) CPBS, 11750 in CC at 2230, 11935 at 0335 and 11960 in CC at 0346. (MacKenzie, CA) 5030-Beijing in CC at 1329, Xizang PBS-Lhasa (Tibet), 7385 in (p) TT at 1320, Xinjiang PBS, Urumqi, 7260 in Mandarin at 1127 and Voice of Pujiang, 9705-Shanghai, in CC at 1341. (Brossell, WI) 5925-Beijing, with classical music at 2120 and 6165-Beijing, in Hokkien dialect at 2135. (Ng, Malaysia) Voice of the Strait, 6115-Fuzhou, with M/W in Amoy at 1130. (Ronda, OK)



The pirate Radio Mushroom QSLed for Rich D'Angelo.

This Month's Winner

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

This month's prizewinner is **Mark Taylor** of Madison, Wisconsin, who now sips from a Universal Radio coffee mug. Universal is your easy-order, one-stop source for everything DX. You can get a free copy of the company's giant shortwave and accessories catalog by sending an email to dx@universal-radio.com, phoning (614) 866-4267, or going the old-fashioned route and sending a note to 6830 Americana Parkway, Reynoldsburg, OH 43068. You should also check out Universal's extensive website at www.universal-radio.com. Please mention *Pop'Comm* and "GIG" when writing.

Firedrake music jammer, 9380 against reported Sound of Hope at 1204. (Taylor, WI) 11500 against an unknown target heard at 1345. (Brossell, WI)

COLOMBIA—La Voz de tu Concencia, Puerto Lleras, 6010 at 0425 with local music, SS anmts, short EE ID at 0432 and "the voice of your conscience" slogan, SS talk. (Alexander, PA)

Marfil Estereo, Puerto Lleras, 5910 with lively ranchero at 0435. (Parker, PA)

COSTA RICA—ELCOR transmitter tests, 5954v from sign on at 2259. Poor, in noisy conditions. (Alexander, PA) 0020 pop vocals and massive adjacent channel QRM. (Parker, PA) 0257 with mellow Latin music, vocal segues to sign off at 0358 with mention of a test transmission. (Taylor, WI)

CROATIA—Voice of Croatia, 9925 via Germany in Croatian at 0350. (MacKenzie, CA)

CUBA—Radio Havana Cuba, 5970 in PP at 0410, 12020 in SS at 0338, 11730 in SS at 2150, 11760 at 2114, 12020 in SS at 0243, 13760 in SS at 0233, 15380 in SS at 0307 and 17705 in SS at 2240. (MacKenzie, CA)

Radio Rebelde, 5025 in SS at 0346. (MacKenzie, CA)

CZECH REPUBLIC—Radio Prague, 9410 at 2145 on EU relations. (Maxant, WV) 9445 signing on in EE at 0330. (Linonis, PA)

DJIBOUTI—Radio Djibouti, 4780 monitored at *0249 sign on with O/C, NA, M in AA with ID and opening anmts. (D'Angelo, PA)

DOMINICAN REPUBLIC—Radio Amanecer, Santo Domingo, 6025 monitored at 1000 with light instls, SS ID and light contemporary SS religious music. (Alexander, PA)

ECUADOR—La Voz del Upano, Macas (t), 5040 in SS at 0221, ancr with brief music bridge, second ancr, then talk between two M. Off in mid-sentence at 0223. (Taylor, WI)

EGYPT—Radio Cairo, 11590 with domestic music at 2345. (Maxant, WV)

ENGLAND—BBC Singapore Relay, 6195 at 1307 on recession recovery. (Brossell, WI) 9410 at 0454, 12035 Cyprus Relay, at 0336 and 17615 Singapore Relay, in CC at 0318. (MacKenzie, CA) 7310 with features at 0500. (Maxant, WV) 9410 on soul food at 0230. (Linonis, PA)

UK Rocks the World, 15760 (via Wooferton?) at *1458–1558 with a rock thing, numerous IDs and request for reports. Reception reports to ukrockstheworld@googlemail.com. (D'Angelo, PA)

ETHIOPIA—Radio Ethiopia, 7110 monitored at 0316 with M in Amharic hosting HOA vocals, newscast at 0330. (Alexander, PA)

Radio Oromiya, Geja, 6030 at *0325 with IS until 0329 when M with ID and opening in (l) Oromo language. Brief talk by M, HOA vocals. (Alexander, PA)

Radio Xoriyo Ogadenic, 15540 via Pridnestrovie from *1430–1500*. Talk in (l) Somali, local tribal chants, HOA music. Mon-Fri. only. (Alexander, PA)

FRANCE—Radio France Intl, 9805 at 0410 with Africa news. (Maxant, WV)

GERMANY—Deutsche Welle, 5915 via Rampisham in RR at 0445. (Parker, PA) 6180 Portugal Relay at *0400 opening in EE. Also //7240 Rwanda. (D'Angelo, PA) 6140 via Novosibirsk in (l) Mandarin at 1300, 11725 Rwanda in GG at 1937 and 15440 Portugal Relay in GG at 1828. (Brossell, WI) 7240 at 0405, 9805 in FF at 0415 and 11865 at 2130. (Maxant, WV) 7240 Rwanda Relay at 0436, 9840 Rwanda Relay in GG at 0422, 9825 Portugal Relay in GG at 0356, 11865 Rwanda Relay at 2120, 15640 Rwandan Relay at 2150 and 17820 via Cypress Creek in GG at 2235. (MacKenzie, CA) 11865 Rwanda at 2130. (Fraser, ME) 15640 at 0910 and 17845 via Singapore in GG heard at 1230. (Ng, Malaysia)

GREECE—Voice of Greece, 9420 in Greek at 0315 with U.S. pop and traditional Greek music. (Linonis, PA) 0355 with Greek vocals. (Maxant, WV) 0436. Also, 15630 in Greek at 2201. (MacKenzie, CA)

GUAM—Adventist World Radio, 17880 in Mandarin monitored at 0305. (MacKenzie, CA)

GUINEA—Radio Guinee, 7125 at 2200 with vernacular and FF talk, local Afro-pops. Abrupt sign off at 2302* (Alexander, PA) (p) at 2324–2353* with M in long FF talk. Carrier cut unexpectedly at 2353. (D'Angelo, PA)

GUYANA—Voice of Guyana, 3290, being heard as early as 0205 and as late as past 0900 with US pop vocals, some BBC pgning, light instrumentals, EE religion and Koran. (Alexander, PA) 0256 with slow, romantic music, along with unexplained Reloj-like metronome for awhile. (Parker, PA)

HONDURAS—Radio Misiones Intl/HRMI, Comayaguela, (p) 3340 at 1138 with EE interview on a missionary trip. (Taylor, WI)

HUNGARY—Hungarian Radio, 3975-Jaszbereny from *0400 with music, ID and news in HH. (D'Angelo, PA) 6150 with M/W talk at 0103. (Parker, PA)

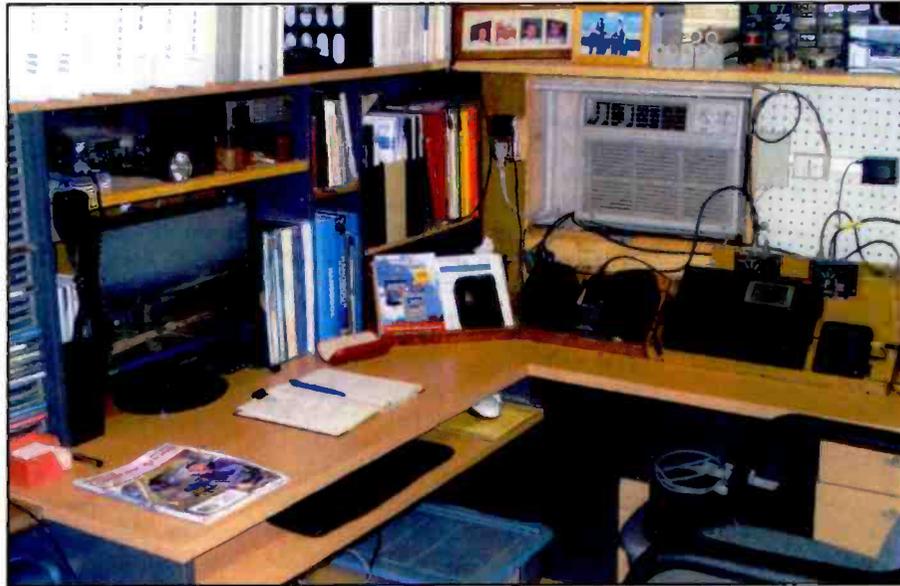
INDIA—All India Radio, 6280 at 2135 with talk on India's finances. (Maxant, WV) 9425-Bangaluru in (p) Hindi at 1322, 9470-Aligarh in (p) Hindi at 1331 and 9690-Bangaluru with sports news at 1339. (Brossell, WI) 11840 in possible CC at 1200. (Jackson, PA) 17705-Bangaluru in CC at 1240. (Ng, Malaysia)

INDONESIA—Radio Republic Indonesia, 4750-Makassar (Sulawesi), in II at 1215. (Linonis, PA) 3870-Wamena (Irian Jaya), in II at 1104. (Brossell, WI)

Voice of Indonesia, 9525 a 1045 with women discussing the economy. (Maxant, WV)

IRAN—Islamic Republic of Iran Broadcasting, 7245 at 0133 with Koran and religious talk, //9495. (Parker, PA) 0207 with W and EE commentary, then a man. (Taylor, WI)

ITALY—IRRS (Italian Radio Relay Service), 15710 via Rimavska Soboda at 1410 without the usual Miraya FM pgmng, U.S.-produced pops, light instls and inspirational music. IRRS ID and



Mike Thomas, KD4SYD's radio shack. Nice! And thank you!

Milano, Italy. address at 1508 and 1608. (Alexander, PA)

JAPAN—NHK World Radio Japan, 5960 via Canada in JJ at 0405, 9835 in JJ at 1750, 11935 via Bonaire in JJ at 0247, 13640 in JJ at 2203, 13650 in Thai at 2306, 15265 in JJ at 2305, 15325 in JJ at 0340, 17560 in JJ at 0322 and 17810 in JJ at 0244. (MacKenzie, CA) 9605-Yamata with EE at 1000 and 11740 via Singapore in CC at 1315. (Ng, Malaysia)

KUWAIT—Radio Kuwait, 15540(nf) at 1955–2112* with EE pgmg. mostly Euro-pop vocals, several IDs. This is ex-11990. (Alexander, PA)

LIBYA—Radio Jamahiriya, 11860 in (I) Hausa at 1912. (Brossell, WI) 17725 with "Voice of Africa" service at 1510. (Fraser, ME)

MALAYSIA—RT Malaysia/Asyik FM, 6050-Kajang at 0850 with rock/pop tune and Voice of Islam, 6175-Kajang with EE news by M monitored at 0900. (Ng, Malaysia)

MEXICO—Radio Transcontinental, Mexico City, 4800 in SS at 0940 with intermittent loss of carrier. (Maxant, WV)

Radio Educacion, Mexico City, 6185 at 0540 with music and SS talking. (Maxant, WV) 0702 with M and full ID and frequency in SS, f/by talk on different types of Mexican "musica." (D'Angelo, PA)

MONGOLIA—Mongolian Radio 2, 7260-Ulaanbaator at 0212. Indigenous songs with string and bowed instruments accompanying. Mention of "Mongolitsk (sp?) Radio" at 0225 and abruptly off at 0234. (Taylor, WI)

NETHERLANDS—Radio Nederland, 11655 Madagascar Relay monitored at 1825 on history of the theater in Holland. Also, 12080 via South Africa at 1915 on human rights abuses in Iran. (Brossell, WI)

Radio Dabanga, 5915 via Vatican at 0351 with various M in AA, ID at 0357 and quick closedown. (D'Angelo, PA)

NEW ZEALAND—Radio New Zealand Intl, 6170 at 0925 with DJ and oldies vocals.

Also, 11725 at 0502 with news about wages and the economy. (Maxant, WV) 13730 at 0330 on evading taxes by having a HQ in the Marshall Islands. (MacKenzie, CA)

NIGER—La Voix du Sahel, Niamey, 9705 at 2150–2301 with FF and vernacular talks, local flute music. Afro-pops, local tribal vocals and instls. Koran at 2254, flute IS and NA at 2259. (Alexander, PA)

NIGERIA—Radio Nigeria, Kaduna, 6090 at 2150 in (I) Hausa with local tribal chants at 2202. Weak and covered by Anguilla at their 2203 sign on. (Alexander, PA)

Voice of Nigeria, 7255 at 2225 with talks in (I) Hausa. (Brossell, WI)

NORTH KOREA—Voice of Korea, 3250 in JJ at 1134 with W in extended talk, with Luz y Vida also on this channel. (Taylor, WI) 9730-Kujang to East Asia at 0140. (Parker, PA) 13650 in CC at 1300. (Ng, Malaysia) 0355 in CC. Also, 13760 in FF at 0347. QRM from Radio Free Asia. (MacKenzie, CA)

NORTHERN MARIANAS—Far East Broadcasting/KFBS, 12090 in VV at 2252 with vocals, M with comments, EE ID and off at 2300. (MacKenzie, CA)

OPPOSITION—Radio Voice of the People (to Zimbabwe), 9875 at *0400–0457* with Afro-pops, opening ID in EE and vernacular, short Afro-pop music breaks. EE from 0443–0457. (Alexander, PA)

Denge Mesopotamia (to Iraq), 11530 via Moldova at 1355 with talks in (p) Kurdish. (Brossell, WI)

Echo of Hope (to North Korea), 6348 at 1124 in KK. (Brossell, WI)

Radio Y'Abaganda (to Uganda), 15410 at *1700 sign on with Afro-pops, then non-stop tape loop of tones and anmt, "We're sorry you've reached a station that is unavailable at this time. Please try again later." Vernacular talk at 1734. Saturdays only. (Alexander, PA)

PALAU—T8WH, 9930-Medorn, with

In Times Past...

Here's your "blast from the past" for this month...

Nicaragua—Radio Sandino, operated by the Sandinista guerillas broadcasting against the Somoza government in Nicaragua on 7588, April 3, 1979, in SS at 2359. (Dexter, WI)

World Harvest Radio at 1220 and religious pgm in EE. WHR ID at 1230. (Ronda, OK)

PAPUA NEW GUINEA—Radio Morobe, Lae, (Papua), 3220 in Tok Pisin at 1132 with U.S. pops and M ancr. (Taylor, WI)

Radio East New Britain (New Britain), Rabaul, 3385 in Tok Pisin at 1215, but barely audible above local noise. (Jackson, PA)

Radio New Ireland, Kaviang, (New Ireland), 3905- at 1111 with talks in (p) Pidgin and clear mentions of "NBC," "bye-bye" and "thank you" at 1130. (Brossell, WI)

PERU—Ondas del Huallaga, Huanuco, 3330 at 1030 with usual SS female ancr. Seemed to have been off the previous two days. (Wilkner, FL)

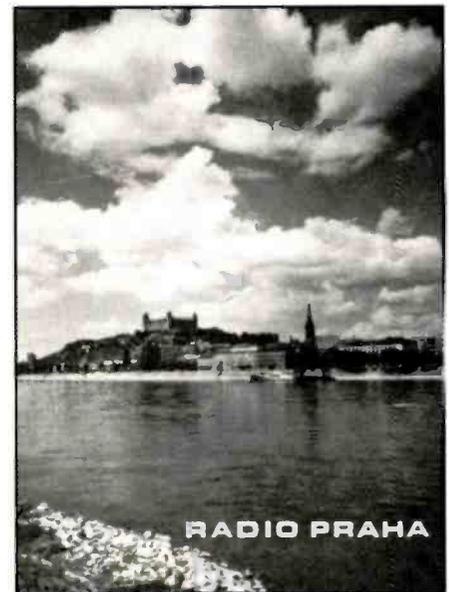
Radio Vision, Chiclayo, 4790 with M in SS at 0405. (Parker, PA)

Radio Madre de Dios, Puerto Maldonado, 4950 with SS in the 1030 period almost daily of late. (Wilkner, FL)

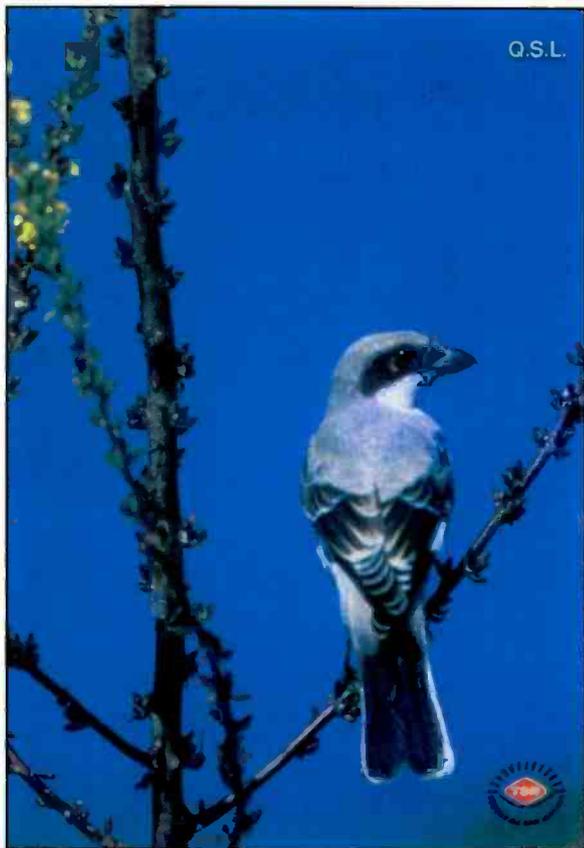
Radio Santa Monica, Wanchaq, 4965 at 0833 with M talk and brief campos selections. (Parker, PA)

Radio Libertad, Junin, 5039 heard at 1046 with "en el tempo de Peru" during a brief break in RHC's transmission. (Wilkner, FL)

Ondas del Suroriente, Quillabamba, 5120 at 1033 with "musica latina." (Wilkner, FL)



Here's a QSL classic from the late 1970s from Radio Prague. (Thanks Doug Brown, Ontario)



The Voice of Turkey doesn't use a bird call IS, but it features a "Spider Bird" on one of their QSLs.

PHILIPPINES—FEBC International, 9400 in CC at 1326. (Brossell, WI) 9430 in CC at 1200 with a call-in pgm. (Jackson, PA)

PIRATES—MAC. 6925 at 0027 and 2218 with '60s things. heavy metal. "Ultraman." (Hassig, IL) 0033-0051 rock things. (D'Angelo, PA) 0059 with Paul Starr. Email given as macshortwave@yahoo.com. (Hassig, IL)

Radio Mushroom, 6925u at 0152-0202 with various selections. Says they are the only pirate powered by nuclear energy. (D'Angelo, PA) 0050-0059 with Pink Panther theme, classic rock. radiomushroom@gmail.com for reports. (Zeller, OH)

Radio Gaga, 6925u at 2229 and 2318 with rock. SSTV segment at 2246 and 2352 sign off times. (Zeller, OH)

The Crystal Ship, 6876 at 2230 but very poor under powerful hash. (Hassig, IL) 2230-2330 with rock and a fake Toyota ad. (Alexander, PA)

Captain Morgan, 6924.6 at 0016-0052* with old jazz blues vocals, hosted by Captain Morgan. Email: captainmorganshortwave@gmail.com. (D'Angelo, PA)

WBNY, 6925u at 1408-1446 with a telethon pgm for the purpose of wiping out "dumb ass monkeys." Several promos for WBNY t-shirts. (Zeller, OH)

Northwoods Radio, 6935u at 0139-0152 with slogan "broadcasting freedom from the Great Lakes." (D'Angelo, PA)

Outhouse Radio, 6930u monitored at 0100 with rock and various instrumentals. Frequency is slightly variable. (Hassig, IL)

Voice of Next Thursday, 6899 at 2200 with mentions of Commander Bunny. Email to voiceofnextthursday@gmail.com. (Hassig, IL)

Wolverine Radio, 6925u at 0358-0422* with non-stop rock. ID at 0420 f/by slow FAX or SSTV until carrier was terminated. (D'Angelo, PA)

Blue Ridge Radio, 6925u monitored at *2227-0004* with a mix of rock and 1940s pop tunes. They said they were broadcasting "from

high up in the Blue Ridge Mountains." blueridgeradio@gmail.com. (Zeller, OH)

KIPM, 6850.7 at 0100-0115 with Alan Maxwell and an old story from years ago, gave the defunct Box 69 address. A possible relay by MAC? (Hassig, IL)

Radio Amica (Euro) 7610 at 2325-2340 with talk in II, Euro-pops. (Alexander, PA)

PRIDNESTROVIE/MOLDOVA—Radio PMR, 9665 in EE at 0045 with pgm on Pridnestrovian-Moldavian war. EE segments are 0000-0015 and 0045-0100. (Fraser, ME) 2354-0021 with O/C with clock ticks, f/by M with opening ID. "This is Tiraspol, the capital of the Pridnestrovian Moldavian Republic" and various features and news items. W with FF ID and opening FF pgm at 0014. (D'Angelo, PA)

POLAND—Polish Radio, 11675 via Austria with news at 1355. Off at 1400. (Brossell, WI)

PORTUGAL—RDP Intl, 9715 in PP with soft ballads at 0030. (Linonis, PA)

ROMANIA—Radio Romania International, 7230 at 1200 with sign on in EE to Europe. Also heard on 9660 in GG at 1325. (Brossell, WI) 7310 at 0410 on Siberian coal mine explosion. (Maxant, WV) 9645 in EE at 0352. IS and off at 0358. (MacKenzie, CA) 9745-Tiganesti in SS at 2324. (D'Angelo, PA) 9755 in SS at 2125. (Ng, Malaysia) 11940 at 2245 in EE to NA. (Jackson, PA) 15210 at 1125 on the Romanian art scene. (Fraser, ME)

RUSSIA—Voice of Russia, 9665 via Moldova at 0340 on the history of Russian soldiers and 9735 heard at 0405 on an upcoming treaty meeting. Also, 15425 at 0330 with *Kaleidoscope*. (MacKenzie, CA) 12040 at 1745 on a cardboard artist. (Fraser, ME) 9890 at 2110. (Maxant, WV) 12065 in RR at 1200 sign on. (Linonis/Jackson, PA) 15585-Vladivostok at 0320 with *News and Views*. (Ng, Malaysia)

Radio Rossii, 5940-Madgadan at 1110 with M in RR, music. (Ronda, OK) 12070 in RR at 0400. (MacKenzie, CA)

Kamchatka Radio, 6075 at 1304 with talks in RR. (Brossell, WI) Yakutsk Radio, 7200 in RR at 1048. (Brossell, WI) 0158 in RR, M with local ID: "Yakutsk Radio...Radio Sakha" and into theme. (Taylor, WI)

Magadan Radio, 7320 in RR at 2227, into Radio Rossii pgm. (Brossell, WI)

RWANDA—Radio Rwanda, 6055 in FF at 0546. (Maxant, WV)

SAO TOME—Voice of America Relay, Pinheira, 4960 at 0413 with news review. (Taylor, WI) 0428 with editorial, f/by *Press Conference USA*. (D'Angelo, PA) 0431 with news. (Parker, PA)

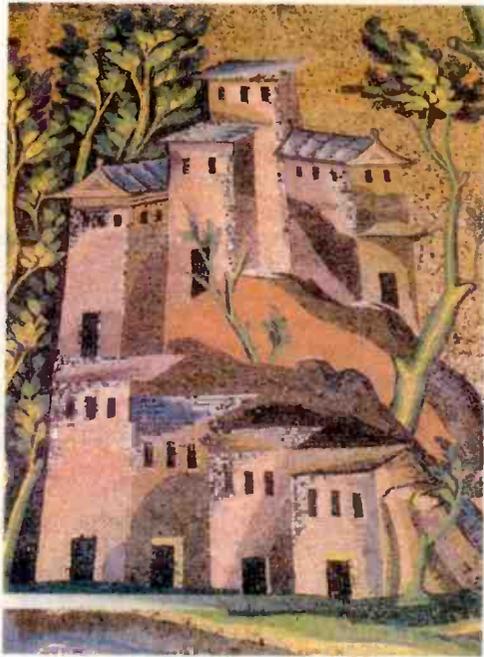
SAUDI ARABIA—Broadcasting Service of the Kingdom, 9675 in (I) Turkish at 1934. (Brossell, WI) 11820 with Holy Koran service in AA at 2242, //11915. (MacKenzie, CA) 2300 close. (Jackson, PA)

SOUTH AFRICA—Channel Africa, 6135-Meyerton at 0408 with W hosting interviews. (D'Angelo, PA)



WRMI's 50-kW transmitter. (Thanks Charles Maxant, West Virginia)

1968 - 2008
40 Jahre deutschsprachiges Programm
RADIO DAMASKUS



View from the Omayyad Mosque



المديرية العامة لهيئة الإذاعة والتلفزيون
SYRIAN RADIO TELEVISION

germanlangdpr@rtv.gov.sy

More art from Syria's Radio Damascus. (Thanks Paul Gager, Austria)

SOLOMON ISLANDS—Solomon Is. Broadcasting Corp., 5020 with island music at 1020. (Wilkner, FL) 1152 with U.S. oldies and DJ chatter to 1200 close. (Taylor, WI)

SOUTH KOREA—KBS World Radio, 9580-Kimjae on "Earth Day" at 0140. (Parker, PA) 9650 via Canada at 1210 on economic cooperation with Holland. (Jackson, PA)

SPAIN—Radio Exterior de Espana, 6055 in SS at 0415, 9535 in SS at 0419, 11815 Costa Rica Relay in SS at 2240, 15110 in SS at 2206 and 17755 in SS at 2130. (MacKenzie, CA) 6055 in EE at 0000 sign on to North America. (D'Angelo, PA) 9650 at 2130. (Maxant, WV) 11910-Xi'an in SS at 1353. (Brossell, WI)

SURINAME—Radio Apinte, 4990 in local language with M/W aners, brief music bits at 0823. (Parker, PA)

SUDAN—SRTC/Radio Omdurman, 7200 at *0238 sign on with Koran, AA talk, local music, chirping bird. Sign on time varies. (Alexander, PA) 0404-0431* close. Talks in AA, mentions of Sudan and news to 0420. (D'Angelo, PA)

Miraya FM, 9740 via Slovakia at 0320 with AA talk, Miraya jingles, EE news at 0401, back to AA at 0415. Also 15710 via Slovakia at 1415. (Alexander, PA)

SWAZILAND—TWR, 4775-Mpangela Ranch in GG at 0401. (Parker, PA) 0404 with religious pgm in GG, theme at 0428, EE ID, and into a local language. (Taylor, PA)

SWEDEN—Radio Sweden, 6010 via Canada at 0142 on Stockholm's founder. (Parker, PA)

SYRIA—Radio Damascus, 12085-Adra, 2055 with AA songs and into EE at 2059. (Ronda, OK) 2130 with anti-Israel comments. (Maxant, WV) 2150 with local music. EE news summary and off at 2202. (Alexander, PA)

TAIWAN—Radio Taiwan Intl, 5950 via Florida in Mandarin at 0405. (MacKenzie, CA) 11665 in CC at 2210. (MacKenzie, CA) 5950

via Florida at 0410. (Maxant, WV) 11665 in (I) Mandarin heard at 1348. (Brossell, WI) 15690 via Florida with CC pops at 1750. (Fraser, ME)

TURKEY—Voice of Turkey, 15450 at 1235 with *Attaturk in Memories* pgm. (Fraser, ME)

TUNISIA—RT Tunisienne, 7275-Sfax in AA at 0440. (MacKenzie, CA) 9720 in AA at 0400. (Linonis, PA) 12005 in AA at 1915. (Brossell, WI)

UGANDA—UBC Radio, 4976 at 0350 with drums heard just over the noise floor. (Maxant, WV)

UNITED STATES—Voice of America, 7235 Northern Marianas Relay in KK at 1315, 7295 via Novosibirsk in CC at 1312 and 11560 Philippines Relay on the auto industry at 2214. (Brossell, WI) 9760 Philippines at 1245, 11805 Philippines in II at 2232 and 13755 Thailand Relay in EE at 2300. (MacKenzie, CA) 12080 via Madagascar at 0420 on NGOs in Africa. (Ronda, OK) 12080 at 0455 with *Africa Today*. (Maxant, WV)

Radio Free Asia, 7595 Philippines Relay in Burmese at 1345 and 9905 Northern Marianas Relay in CC at 1900. (Brossell, WI) 13625 Northern Marianas in CC at 2135, 13740 Saipan (NM) in Khmer at 2318, 13760 Timian (NM) in CC at 0318 and 13775 Saipan in CC at 2255. (MacKenzie, CA)

Radio Sawa, Botswana Relay, 9745 in AA at 1920. (Brossell, WI) Radio Liberty, 9445 Thailand Relay in (I) Kazakh at 1330. (Brossell, WI)

AFRTS, 7811u-Key West with *Earth and Sky* at 0156. (Taylor, WI) WYFR/Family Radio, 9280 via Yunlin in Mandarin at 1158 and 15670 via Wertachtal in Hindi at 1540. (Taylor, WI) 9280 in CC at 1138 and 9485 via Irkutsk in (I) II at 1334. (Brossell, WI) 9505 at 0340. (Maxant, WV) 11560 via Taiwan at 1300. (Ng, Malaysia) 15440 in Hakka to 0258*. (MacKenzie, CA)

WRNO, Louisiana, 7505 at 0405. (Maxant, WV) WWCW, Tennessee, 4840 at 0343, 5935 at 0359 and 7465 at 2220. (MacKenzie, CA)

WWRB, Tennessee, 3185 heard at 0320 and 5050 at 0351. (MacKenzie, CA)

KJES, New Mexico, 11815 at 1438. (D'Angelo, PA) WEWN, Alabama, 6890 at 0510, 9455 at 0445 and 11520 at 0900. (Maxant, WV) 9455 at 0345. (Linonis, PA)

Adventist World Radio, 3215 via Madagascar in Malagasy at 0326. (MacKenzie, CA) 11750 via South Africa at 1939 and 15240 in (I) Fulani at 1917. (Brossell, WI)

Suab Xaa Moo Zoo, Colorado, 7530 via Belgium in Hmong heard at 2250. (Ng, Malaysia)

VATICAN—Vatican Radio, 9645 monitored at 0400 with IS, into RR. (Linonis, PA) 11625 in Somali at 0344. (MacKenzie, CA)

VENEZUELA—Radio Nacional, 11670 via Cuba in SS at 2220. (MacKenzie, CA)

VIETNAM—Voice of Vietnam, 6175 via Canada in SS at 0432. (MacKenzie, CA) 9550 at 1320, mixing equally with China Radio International, both in Mandarin. CRI was //9540. (Taylor, WI) 11720 in VV at 0115. (Brossell, WI)

ZAMBIA—CVC-The Voice-Africa, 4965 at 0414 with contemporary Christian music. (Taylor, WI) 0440 with local music. (Parker, PA) 13590 with a call-in pgm at 1225. (Maxant, WV)

And, once again, order is restored! Many thanks and high fives to the following who did the good thing this month: Robert Brossell, Pewaukee, WI; Rich D'Angelo, Wyomissing, PA; Stewart MacKenzie, Huntington Beach, CA; Michael Yohnicki, London, ON; Brian Alexander, Mechanicsburg, PA; Robert Wilkner, Pompano Beach, FL; Jack Linonis, Hermitage, PA; Jim Jackson, Hermitage, PA; Robert Fraser, Belfast, ME; George Zeller, Cleveland, OH; William Hassig, Mt. Prospect, IL; Dave Balint, Mentor, OH; Charles Maxant, Hinton, WV; Peter Ng, Johor Bahru, Malaysia; Jim Ronda, Tulsa, OK, Mark Taylor, Madison, WI; and Rich Parker, Pennsburg, PA.

Thanks to you all, and until next month—good listening!

Trivia And Toons

by R.B. Sturtevant, AD7IL

Q. Why does the government have the authority to regulate broadcast and amateur radio transmissions? Doesn't the Constitution give us the right of Free Speech? That should cover what and how we use radio, shouldn't it?

A. You bring up an interesting point, and obviously there are many people who feel that way, but I'm afraid that you're on shaky ground. In the early days of radio, and before licensing, what some call "free radio" was the norm. But as more people started using radio it became obvious that there weren't enough airwaves to "go around." Some people even misused the ether to make false distress signals—unfortunately many of them were young radio amateurs. In short, chaos ruled.

The airwaves were declared a National Resource to be managed by the federal government. In the 1920s and '30s, local and state governments tried to pass anti-amateur laws to further regulate the use of radio within their jurisdictions. The Secretary of Commerce, Herbert Hoover, said in March of 1923 "The Government owns the ether!" when he addressed the Radio Telephony Conference held in Washington that year. It was emphasized that no local ordinance can supersede a federal one.

Free speech (conducted in person at a specific location or on the airwaves) can't be restricted, but those who wish to transmit any speech over the air must follow the rules. The rules have to be set by some entity, and the federal government does it in this country.

Q. Was Hertz the actual discoverer of Hertzian, or radio, waves?

A. Sounds reasonable, doesn't it? German physicist Heinrich R. Hertz was the first to demonstrate, in 1886, that rapid variation in electrical current would generate radio waves in the air. These waves were called Hertzian in his honor. Many scientists

picked up on Hertz's work and made their own contributions, but Hertz himself was following up on the work of Scottish mathematician and theoretical physicist James Clerk Maxwell. In the 1860s, Maxwell developed a set of mathematical equations relating to the nature of electricity, magnetism, and induction. He showed with what become known as Maxwell's equations that electric and magnetic fields travel through space in waves. But perhaps "Maxwellian Waves" just doesn't have the same ring to it. Nevertheless, Albert Einstein said that Maxwell made the greatest contribution to physics since Isaac Newton.

Q. What was the first company to produce radios for the mass market?

A. That would be the Crosley Corporation of Cincinnati, Ohio, which manufactured many different consumer items, including automobiles. In 1921, Crosley introduced a radio set for mass consumption.

Industrialist Powell Crosley was initially known as an automobile manufacturer. When his son asked him for a radio, Crosley found that the only radios for sale went for more than \$100. Instead of buying his son a radio, the entrepreneur bought a book on radio and built one. Crosley spotted a business opportunity. Working with students at the University of Cincinnati, he conceived a simple design for mass production. Called the Harko (from the word "hark"), this mass-produced marvel carried the low cost of \$20. His device gave Crosley the title "the Henry Ford of radio." By 1924 the Crosley Corporation was the world's largest manufacturer of radios. To stimulate sales Crosley started the Crosley Broadcasting Corporation to give radio purchasers more stations to listen to. During World War II the CBC was even operating five shortwave stations for the Office of War Information.

SPURIOUS SIGNALS

By Jason Togyer KB3CNM



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by John Clarricoats, G6CL

RSGB, 1st Ed., 1993, 307 pages

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If you're interested in building equipment for the amateur radio microwave bands, the designs in this book are sure to please! Projects have been selected from International authors and all projects use modern techniques and up-to-date components. Details on how to obtain ready-made boards are included with most projects.

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Fully updated, lists all islands that qualify for IOTA, grouped by continent, and indexed by prefix. Award rules and includes application forms.

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The Antenna Experimenter's Guide

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Takes the guesswork out of adjusting any home-made or commercial antenna, and makes sure that it is working with maximum efficiency. Describes RF measuring equipment and its use, constructing your own antenna test range, computer modeling antennas. An invaluable companion for all those who wish to get the best results from antennas!

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Broadband Vs. Broadcasters: The Debate Heats Up

by Bruce A. Conti
contiba@gmail.com

The proposed FCC National Broadband Plan calls for 500 MHz of radio spectrum to be made available for broadband use over the next 10 years, 300 MHz obtained over the next five years. Part of the plan includes the voluntary reallocation of 120 MHz of broadcast television spectrum for broadband to be completed by 2015. Though broadcasters have expressed concern over the loss of spectrum, the FCC puts a positive spin on the plan in the push forward.

As John Leibovitz, Deputy Chief of the Wireless Telecommunications Bureau says:

The idea is to have win-win scenarios—the idea is that rather than having combative proceedings where one person is having their spectrum taken away or being asked to move, instead we create a mechanism that gives them an economic incentive to voluntarily offer up their spectrum, so that they can move somewhere else to provide their service in a different band, so that someone else who may value the spectrum more highly than the current user can move in and nobody does it against their will. Everybody gets part of the economic benefit—especially the American people get the economic benefit of making sure the spectrum is used for whatever purpose is the most appropriate given where technology is and what types of services people are using.

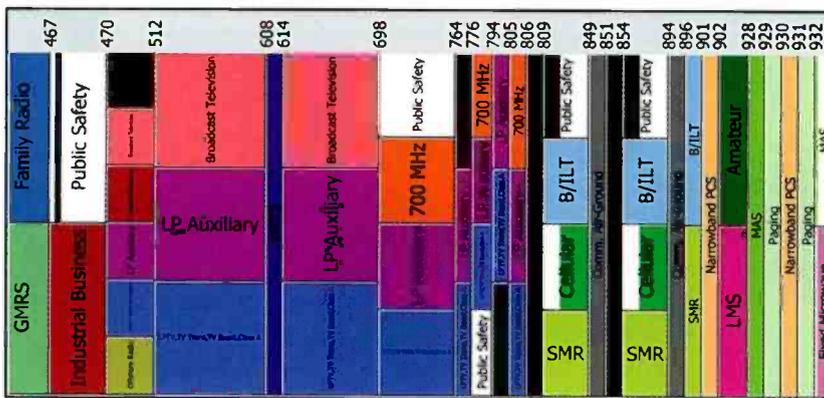
“FCC working sessions were held over the summer to discuss methodologies for repacking the TV band...The Society of Broadcast Engineers (SBE) expressed disappointment over the process...”

William Lake, Chief of the Media Bureau further explains:

The Commission’s proposal to invite voluntary participation by TV broadcasters in a spectrum exchange is an opportunity knocking at their door. Broadcasters who are strapped for capital may find that answering that knock will be just what they need to kick their performance up to the next level.

Many—though not all—broadcasters find themselves today to be capital constrained as they contemplate taking advantage of the many potential benefits of the DTV transition. Whether they seek to develop new digital content, expand their new media platforms, or exploit new technologies that enable transmission of two HDTV streams on a 6 MHz channel, these broadcasters may find that they are spectrum poor—their scarcest resource is not spectrum but the capital needed to make those improvements. To help broadcasters be all that they can be, ways need to be found to help them get that capital.

A voluntary spectrum exchange offers these broadcasters a chance to get the needed capital infusion to make the investments that will position them to serve their communities even better going forward. The Commission has yet to work out the details of such a voluntary program, and broadcasters’ input to that process will be key. But a broadcaster is likely to have the option of contributing half of a 6 MHz channel and sharing spectrum with another station that has done the same, or Congress willing, to contribute a 6 MHz channel to an incentive auction in which the broadcaster will share in the auction proceeds. Either way, a broadcaster will be able to use the capital thus generated to jump to an improved business model in its continued broadcast activities, making it a stronger contender in the multimedia ecosystem that is evolving daily. Innovative spectrum-sharing arrangements should cre-



FCC Spectrum Dashboard graph of allocations surrounding UHF DTV broadcast frequencies.

#	Common Name	Radio Service	Tags	Frequency Band (MHz)	Licensee Name	Market	Call Sign
1	COOPER FOWLER MEDIA COMPANY	Broadcast Television	Television	518 - 524	COOPER FOWLER MEDIA COMPANY	TOPEKA, KS	K5QA
2	FREE STATE COMMUNICATIONS, L.L.C.	Broadcast Television	Television	680 - 686	FREE STATE COMMUNICATIONS, L.L.C.	TOPEKA, KS	KTKA-TV
3	ION MEDIA KANSAS CITY LICENSE, INC.	Broadcast Television	Television	692 - 698	ION MEDIA KANSAS CITY LICENSE, INC.	KANSAS CITY, MO	KPXE-TV
4	KCWE-TV COMPANY	Broadcast Television	Television	572 - 578	KCWE-TV COMPANY	KANSAS CITY, MO	KCWE
5	KMBC HEARST TELEVISION INC.	Broadcast Television	Television	560 - 566	KMBC HEARST TELEVISION INC.	KANSAS CITY, MO	KMBC-TV
6	MEREDITH CORPORATION	Broadcast Television	Television	668 - 674	MEREDITH CORPORATION	KANSAS CITY, MO	K5MO-TV
7	MEREDITH CORPORATION	Broadcast Television	Television	530 - 536	MEREDITH CORPORATION	KANSAS CITY, MO	KCTV
8	NVT TOPEKA LICENSEE, LLC	Broadcast Television	Television	548 - 554	NVT TOPEKA LICENSEE, LLC	TOPEKA, KS	K5NT
9	PUBLIC TELEVISION 19, INC.	Broadcast Television	Television	494 - 500	PUBLIC TELEVISION 19, INC.	KANSAS CITY, MO	KCPT
10	SCRIPPS HOWARD BROADCASTING COMPANY	Broadcast Television	Television	632 - 638	SCRIPPS HOWARD BROADCASTING COMPANY	LAWRENCE, KS	KMCI-TV
11	SCRIPPS MEDIA, INC.	Broadcast Television	Television	638 - 644	SCRIPPS MEDIA, INC.	KANSAS CITY, MO	K5HB-TV
12	TRINITY CHRISTIAN CENTER OF SANTA ANA, INC.	Broadcast Television	Television	512 - 518	TRINITY CHRISTIAN CENTER OF SANTA ANA, INC.	ST. JOSEPH, MO	KTAJ-TV
13	WDAF LICENSE, INC.	Broadcast Television	Television	590 - 596	WDAF LICENSE, INC.	KANSAS CITY, MO	WDAF-TV

FCC Spectrum Dashboard search results for Jefferson County, Kansas, filtered for broadcast television.

ate new opportunities for minority and niche broadcasters to prosper.

A working paper series by the Omnibus Broadband Initiative presents the analysis and research behind the National Broadband Plan, available at the FCC www.broadband.gov website. Paper number 3, released in June, details the "repurposing" of broadcast television spectrum. "The combination of a voluntary, incentive auction followed by a repacking of channels could make great strides towards achieving the goal to which the Plan aspires, of recovering 120 MHz from the broadcast TV bands," cites the paper, which indicates a significant drop in the number of free over-the-air viewers and a more efficient use of spectrum by wireless broadband in support of the reallocation.

FCC working sessions were held over the summer to discuss methodologies for repacking the TV band, among other issues related to broadband, to which a number of broadcast industry engineers and technical experts were invited. The Society of Broadcast Engineers (SBE) expressed disappointment over the process in which "experts" were selected for the working sessions, indicating that broadcast owners were well represented, not broadcast engineers.

In an open letter to FCC Chairman Julius Genachowski, Vincent A. Lopez, SBE President, wrote the following:

At best, the Bureau staff charged with organizing this Forum did so in a manner that is not conducive to an effective study of the four major topics of discussion. At worst, it appears that the participants in the panel were chosen in order to provide the Commission with the appearance of an industry consensus, evidencing a predetermined outcome: the reclamation of a large amount of spectrum utilized currently for free over-the-air television service, and for the broadcast auxiliary facilities that are critical to the creation of content for broadcast, cablecast, and satellite video to the public, in favor of an auction of that broadcast and auxiliary spectrum for broadband use.

The SBE requested that working sessions be open to the public rather than by invitation, and/or postponement so the sessions could be reworked to involve a broader and more representative group of broadcast engineers.

The National Association of Broadcasters (NAB) is also keeping an eye on the broadband plan. "Spectrum policy should reflect the continuing importance of both broadcasting and broadband to America's communications future," states Erin L. Dozier, NAB Senior Vice President and Deputy General Counsel.

"Proposals that would impede innovation by broadcasters and/or reduce the availability of new and existing services to consumers are not in the public interest."

This NAB public comment was part of a letter regarding another hot topic: FCC proceedings on a petition for rulemaking governing retransmission consent—fees charged by television stations for the carriage of over-the-air broadcast signals on cable and satellite subscription services.

Spectrum Dashboard

The Official Blog of the Federal Communications Commission is available to the public at <http://reboot.fcc.gov>. Here categories such as the National Broadband Plan, Future of Media, and Spectrum Dashboard can be selected to learn more about meetings, current notices, and proposed rulemaking, along with options for public comment.

Of particular interest, the Spectrum Dashboard was launched by the FCC earlier this year, designed specifically for those concerned about current spectrum allocation at high frequencies with respect to national broadband. It does not cover frequencies below 225 MHz. The Dashboard provides a general chart of allocation by frequency, and listings of spectrum allocation by county. Browse using the map, select a state, then select a county, and a list of all licensed services, including broadband wireless, mobile radio, and broadcast television serving the county, is generated. Search results can be filtered by licensee name or by radio service.

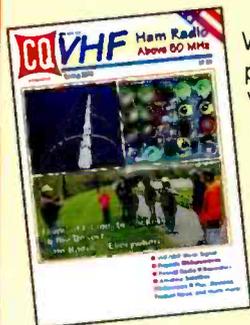
Watching DTV Is Hard Work

DTV continues to get poor reception reports. In response to the June edition of "Broadcast Technology" about the future of free TV, Robbie Spain in Wyoming writes, "With the cliff effect, just being able to watch TV is becoming a chore these days! This technology was not really well worked out before being made prime time anyway. I think that TV as we knew it is really gone."

The cliff effect refers to the sudden loss of a digital signal. An analog signal can remain viewable despite signal degradation, such as a weak signal (snow), reflections (ghosting), and local interference. However, interference to a digital signal will cause momentary freeze-ups or complete loss of signal, as if the signal dropped off a cliff. Signal loss can be caused by changes in the weather.

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This Month In Broadcast History

75 Years Ago (1935)—Two popular series debuted on radio: *The Adventures of Dick Tracy* on Mutual and *Popeye the Sailor* on NBC. Mexican border blaster XERA signed on at 840 kHz. Though listed with

250 kW of power it self-proclaimed as the world's most powerful broadcaster with 1 MW and was predecessor to XERB of Wolfman Jack fame.

50 Years Ago (1960)—The first-ever televised debate between presidential candidates was broadcast from the studios of WBBM-TV Chicago. This historic debate between John F. Kennedy and Richard M. Nixon focused on domestic issues. Congress amended the Communications Act of 1934 to provide penalties short of license revocation for violation of FCC rules.

25 Years Ago (1985)—660 WNBC New York fired afternoon show host Howard Stern due to differences with management about program content. Stern returned to the airwaves a couple months later at WXRK FM, where his syndicated talk show was launched.

WBBM-TV
TELEVISION **2**

ionospheric conditions, or local interference, even the spark plug of your neighbor's lawnmower.

The following from Richard Berger, Registered Monitor/SWL Station KNY2SC, GMRS WQCD443, is symbolic of many reports of DTV reception difficulties in the New York City metro area. Richard writes:

In reading the June 2010 edition of *Pop'Comm*, I note I am not the only one having problems with the HDTV signals. I have spent a bunch of my (no longer so) disposable income on converter boxes and antennas to replace my "rabbit ears." I can see the Empire State Building to the north of my house, which is one of the transmitter sites I am receiving. Others are across the Hudson River. I am told, from the Meadowlands area. There is at least one more station I used to watch, during analog service, from Garden City.

Why am I having so much trouble picking up the broadcasts? Signal drop-off seems severe. The signals change by the hour, and the weather. What's going on? I feel like I am in a 1950s TV sit-com showing the problems with TV back then.

To get some stations I practically have to lean to the east while standing on my right foot and holding my left hand 17 inches from the "omni-directional" HDTV antenna's coax cable. Ordering a beam antenna would mean I could aim it, but what if I wanted to watch a *CSI* show, while taping a *Law and Order*, at the same time? The stations are broadcasting from different directions, and I'd actually get neither. The last rooftop antenna we had was blown down by Hurricane Donna in 1960, and I fear the chimney coming down if I attach any outside antenna to it, be it an HDTV, a scanner, or CB antenna.

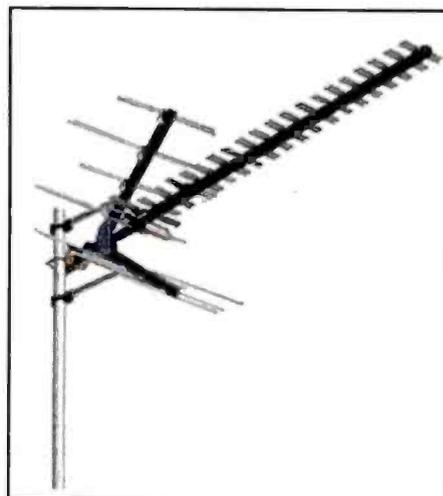
Any suggestions as to what to do?

Richard might be on the right track in thinking about an outdoor beam antenna

for the best reception. In the June edition of "Broadcast Technology," Walter Schivo, KB6BKN, reported the ability to receive only nine out of some 23 DTV signals. Walter decided to take action with a new antenna and is happy to report the following positive results:

My son Darren, KD6GCG, and I removed the old Finco P5 UHF dish at our mountain home which is at 4,000 feet in Michigan Bluff, California. We installed a new Winegard HD9095P as it was the largest antenna we could find. We mounted this in place of the Finco, about six feet above the roof, and were able to receive 25 channels including many of the sub-channels.

As we are northeast of Sacramento in the hills, we did receive stations from San Francisco as well as Sacramento. Stations were still dropping out at various times. With a Winegard Cromstar 2000 AP4700 booster feeding the signal to a distribution amplifier,



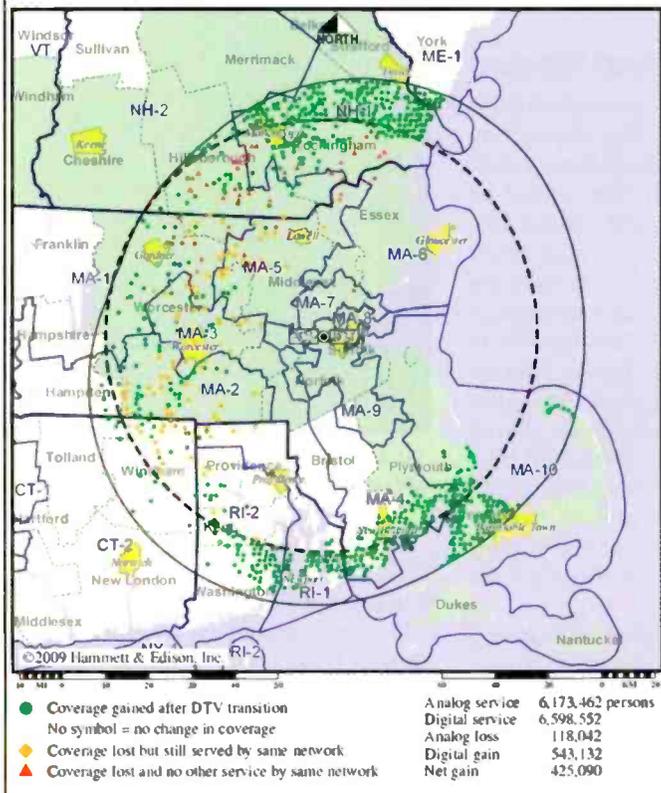
The Winegard HD9095P UHF DTV antenna.

TV Station WFXT • Analog Channel 25, DTV Channel 31 • Boston, MA

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Digital CP (solid): 780 kW ERP at 363 m HAAT, Network: Fox
vs. Analog (dashed): 1950 kW ERP at 357 m HAAT, Network: Fox

Market: Boston, MA



This coverage map obtained from the FCC indicates viewer gains and losses for WFXT Fox 25 Boston as a result of the switch to digital.

we now receive 37 channels plus the sub-channels. We still lose the same two to three channels during the day, but they come back by turning the antenna slightly. For the most part all the others held with no cliff effect on them.

Our location is subject to heat inversion from the Sacramento Valley. It will be interesting to see what effect the heat inversion will have on reception, but for the most part it's the best we can do in this rural location. Local phone service is installing fiber optics, but has no plans to offer TV service in our location for several years.

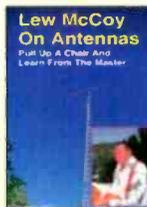
The Winegard HD9095P is a UHF Yagi-style antenna designed for deepest fringe reception. The Winegard AP2000 series of amplifiers, as with any RF amplifier, can improve signal reliability, but will not necessarily extend receiving range or help pull in a signal. Visit winegarddirect.com for more information about Winegard antennas and accessories for over-the-air DTV reception.

Use of a local professional TV service to install an outdoor beam antenna might be your best bet to cure DTV reception problems if you're unable to do it yourself like Walter. The Antennacraft HDMS9100 Programmable Direction Memory indoor/outdoor antenna could be the answer to DTV reception for an urban location like New York City where plenty of signal strength is available but from different directions. The 9100 includes an RF remote control with channel memory so you don't have to manually reorient the antenna every time the channel is changed. Antennacraft offers several antenna models with



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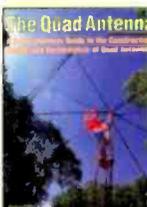


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by Low McCoy, W1ICP

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The Quad Antenna

by Bob Haviland, W4MB

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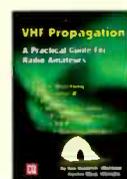


The Vertical Antenna Handbook

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You'll learn basic theory and practice of the vertical antenna. Discover many easy-to-build construction projects.

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VHF Propagation Handbook

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by Ken Neubeck, WB2AMU & Gordon West, WB6NOA

The combined ham radio experience of the authors represents many years of VHF observations and research. Tropo Ducting, Sporadic-E, Aurora, Meteor Scatter, F2 Propagation, TEP, Combo Modes, it's all here!

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33 Simple Weekend Projects

by Dave Ingram, K4TWJ

Do-it-yourself electronics projects from the most basic to the fairly sophisticated. You'll find: station accessories for VHF FMing, working OSCAR satellites, fun on HF, trying CW, building simple antennas, even a complete working HF station you can build for \$100. Also includes practical tips and techniques on how to create your own electronic projects.

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remote control. Take a look at the company's products at www.antennacraft.net.

Remote control antennas similar to the 9100 recently replaced adaptive array or switched beam Smart Antenna technology. The Smart Antenna uses software to phase various elements of the antenna, finds the combination that produces the strongest signal for each station received, and stores the information in memory. When a channel is selected, the Smart Antenna is automatically switched to the best direction for reception. Because phasing is used to direct the antenna, no mechanical rotation is required for Smart Antenna operation. A Smart Antenna requires a DTV converter box or receiver with an antenna control port that is compatible with the EIA/CEA-909 interface standard.

The Smart Antenna, however, seems to have been phased out by manufacturers, in some cases retrofitted with remote control that allows for fine-tuning based on reception conditions. Visit www.solidsignal.com to check out the full array of antennas available today, or to discuss your options with a DTV antenna professional. Solid Signal carries Antennacraft and Winegard models.

For the record, the FCC lists 401 television stations with a predicted loss of 2

percent or more viewers after the switch to digital. Maps of coverage areas for various markets, created for the digital transition in 2009, are available at www.fcc.gov/dtv/markets.

DTV In Canada And Mexico

For better or worse, Canada decided to follow the decisive U.S. digital transition strategy by mandating a firm analog shut-off date. The switch to digital must be complete by August 31, 2011. Some analog stations are already simulcasting over-the-air digital signals, mostly in the Montreal, Toronto, and Vancouver metro areas. CITY-TV Toronto was the first to simulcast analog and digital signals. CITY-DT signed on the air in 2003 after being granted a transitional digital license. As in the U.S., there will be a major re-shuffling of assigned digital channels when analog is shut off, but stations will be allowed to continue to identify by virtual channels rather than the actual channels.

In Mexico, the transition from analog to digital is proceeding at a much slower pace, scheduled to be complete by 2022 at the earliest. In 2004, Mexico adopted the same ATSC digital standard as the U.S. and Canada. Earlier this year, the Hi-



TV Azteca transmitter site in Merida, Mexico. (Photo by Chris Kadlec)

TV division of TV Azteca, a major national network, announced the first DTV multi-casting service launched in Mexico City, carrying Cookie Jar network programs. The Televisa national network is accelerating digital deployment as well.

Though most of the early adopters of digital broadcasting are in Mexico City, many border stations that serve U.S. viewers are also now broadcasting digital signals, including Tijuana CW affiliate XETV 6 serving southern California, and San Diego's premier Spanish language station, XEWT 12. As of this writing, a total of 38 DTV stations were on the air in Mexico.

Keep Watching For New Developments

Despite the difficulties with DTV reception and the potential loss of spectrum, all is not lost. The array of available DTV antennas is a good indicator of strong interest in free over-the-air TV, and manufacturers are responding by offering new solutions to reception problems. It seems that more and more people are considering antenna TV as cable bills continue to rise. Now let's hope that broadcasters and the FCC make the right decisions for the future of television.

Next month "Broadcast Technology" returns to the AM radio dial. Send in your logs via email or join *Popular Communications* on Facebook.

Until then, 73 and Good DX!

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I Quit Using POTS (You Can, Too)

by Dan Srebnick, K2DLS
k2dls.rfbits at gmail.com

VOIP entered my life in a big way about five years ago. If you've somehow missed the memo, VOIP stands for Voice over Internet Protocol. It involves the use of the Internet and internet-working technologies as a transport for voice conversations that might have otherwise taken place on the plain old telephone system (POTS) or via radio frequency (RF).

VOIP came into my life thanks to the ineptitude of my local wireline telco. After a sustained period of rain, I complained to telephone repair about some static on the line. I was given the usual speech in which the repair representative informed me that, if the problem was found not to be inside my premises rather than outside, I would incur a service charge. I returned my usual comment that I had tested to the network interface on the side of the house and that I was certain the problem was external. A repair crew came out, and sure enough found a problem with the outside wiring. Some faulty cable was replaced and all should have been well. However, the responding telephone repair technician decided to reverse the polarity of the telephone line coming into my residence.

Telephones are powered by DC current and the polarity of that current is important to older

"I want to thank my local wireline carrier for ultimately pushing me away from their service and in this direction—without their unresponsiveness I would not have taken the plunge so long ago!"

telephones. One of my older telephones will not sound a touchtone digit if the polarity is reversed. So I again called my local telco repair to report this new problem, which occurred as a result of fixing the old problem. This time, I was told that that problem must be inside my residence and that there would be a service charge for someone to come out and fix it because I lacked the requisite wiring maintenance plan. After several attempts to get someone to understand the true nature of the problem, I gave up and ported my phone service over to an inexpensive VOIP carrier, Sunrocket.

To use a VOIP provider in place of a local wireline carrier, one needs a fairly reliable and fast broadband Internet connection; luckily, my local cable provider is up to the task. FCC rules require that telephone providers support number

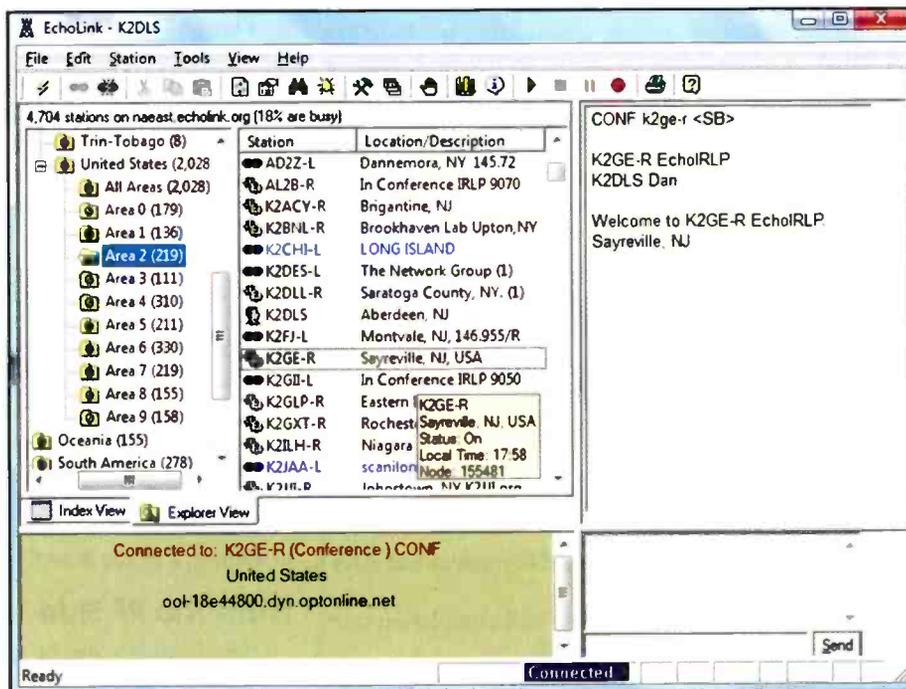


Figure 1. I use EchoLink client software to connect to the K2GE repeater in Sayreville, New Jersey. Note the screen "flyover" which shows that their node number is 155481.

portability, so I was able to transfer my longtime POTS wireline phone number over to the new VOIP provider.

The VOIP provider supplies a box called an analog telephone adapter (ATA) that is the bridge between your telephone and the Internet. I disconnected my home telephone wiring from the outside plant at the network interface on the side of my home, then connected the ATA to the internal house wiring. This allowed for VOIP service on every phone in the house.

Sunrocket was cheap at \$200 a year for unlimited phone service, taxes included. Plus, the service was not bad, I had a second selective ring number in a different area for no extra charge, and I could even send and receive faxes over VOIP. It was too good to be true. Really. After a couple of years, Sunrocket filed for bankruptcy. Now I use 8x8 (www.8x8.com), which has a \$240 annual plan and taxes of about \$5/month extra. The company does not pass fax traffic unless you pay extra for a dedicated fax number. But these fees are for unlimited calling for an entire year to the U.S. and Canada, so while not as good a deal as Sunrocket, it's still pretty good.

I get features like caller ID, three-way calling, call waiting, and voicemail for no extra charge. There's a Web interface that lets you look at call history and set account options, including the ability to permanently block annoying callers. I want to thank my local wireline carrier for ultimately pushing me away from their service and in this direction—without their unresponsiveness I would not have taken the plunge so long ago!

There are lots of cheap VOIP providers out there, and if you're looking for very inexpensive calling at a reliability factor somewhat less than a POTS line, this may be for you. Other players include Vonage and your local cable company. See "Some VOIP Caveats," however, before taking your own plunge.

EchoLink

Hams have at least a couple of VOIP modes of their own. EchoLink is a popular VOIP mode that allows for linking of RF stations. EchoLink also facilitates the use of your personal computer or iPhone as a tool to make contacts with over hams via an RF link or the Internet.

The EchoLink software, which was written by Jonathan Taylor, K1RFD, is offered free of charge to licensed amateur radio operators. The Windows version of the software can be downloaded from www.echolink.org/register_data.jsp. You must enter your callsign and a valid email address in order to download the software. EchoLink for iPhone can be downloaded directly from the Apple App Store. Both software installations support the use of a headset or microphone/speaker combination for connection to both RF and Internet-attached stations. After downloading the software, you need to be validated through a process known as authentication.

Some VOIP Caveats

Before you opt out of POTS for VOIP, you should be aware of the following:

- If your Internet connection goes down, calls go to voice mail.
- If power goes out, a UPS on your cable modem and ATA are invaluable.
- Some providers suffer from a lower call completion rate than a POTS carrier, requiring redials.
- Make sure that your provider can set up your physical location properly for 911 calls so that the appropriate personnel can locate your residence or business in case of emergency.

Authentication in an EchoLink context means that you have proven that you are who you claim to be and that you are a licensed radio amateur, and therefore an eligible user. There are several methods of authenticating for the first time, including mailing a copy of your amateur radio license for review or submitting a Logbook of the World digital certificate. Some impatient hams I know find this first step an annoyance, but its purpose is to protect the integrity of the system. The echolink.org website has an excellent list of frequently asked questions covering the subject of callsign validation.

EchoLink On A Windows PC

Upon authentication, you'll receive a validation code in the U.S. mail. Once you receive this, you'll want to start up the software and go through the Tools / Setup menu of the EchoLink client, where you'll set up things like your callsign, name, location, and email address. Also take a look at the Audio tab, and make sure that the correct microphone and speaker/headphone are selected. You'll also probably have to take care of a port-forwarding configuration matter with your cable or DSL router.

Port Forwarding

EchoLink uses User Datagram Protocol (UDP) ports 5198 and 5199 for the voice stream and requires that these ports be reachable on the computer running the EchoLink software. So UDP ports 5198 and 5199 need to be forwarded on your router or firewall to the IP address of the computer on which you will use EchoLink. If this sounds confusing, there's a helpful website recommended by the EchoLink folks at www.portforward.com. I checked the instructions for the Linksys WRT54G, which is the router I use, and they were reasonably good and accurate.

When you think you're all set, run the Firewall/Router Test on the Tools menu. It will check connectivity and let you know if there are any issues that need to be worked out.

Using EchoLink

Figure 1 shows the main EchoLink screen. You'll see that stations can be browsed by region and call area. Some stations have a prefix of "-R". This means that the station is a repeater; other stations are suffixed by "-L". These are SYSOP mode stations, which are also connected to RF, so you can connect to an individual, a SYSOP mode simplex station, or a repeater. There are also conferences which link together several stations or repeaters. Conferences are sometimes setup for a specific purpose, a common interest, a language, or region.

Your first contact should be with the EchoLink Test Server. Select Station / Connect to Test Server. This will allow you to use the volume control settings on your computer to adjust transmit and receive volumes. If you don't hear your own voice come back from the Test Server, no one else will hear you either.

Remember that your EchoLink client can receive as well as initiate calls. If you want to control who can call you, there are security settings available. Incoming as well as outbound calls can be controlled by callsign or country of origin. Take a look at Figure 2 to see how this is configured.

From The RF Side

EchoLink can also be used via any DTMF (those touch tone sounds) capable transceiver. My local repeater, run by the Raritan Bay Radio Amateurs, is EchoLink node 155481. If you have a local EchoLink-capable repeater, you could key in this

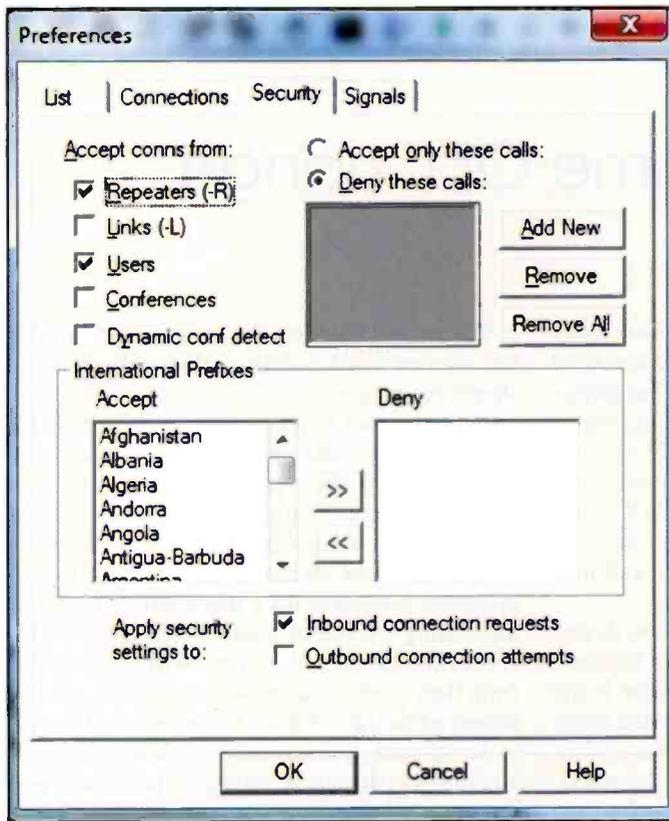


Figure 2. The Preferences / Security tab can control who can connect to your station and from where.

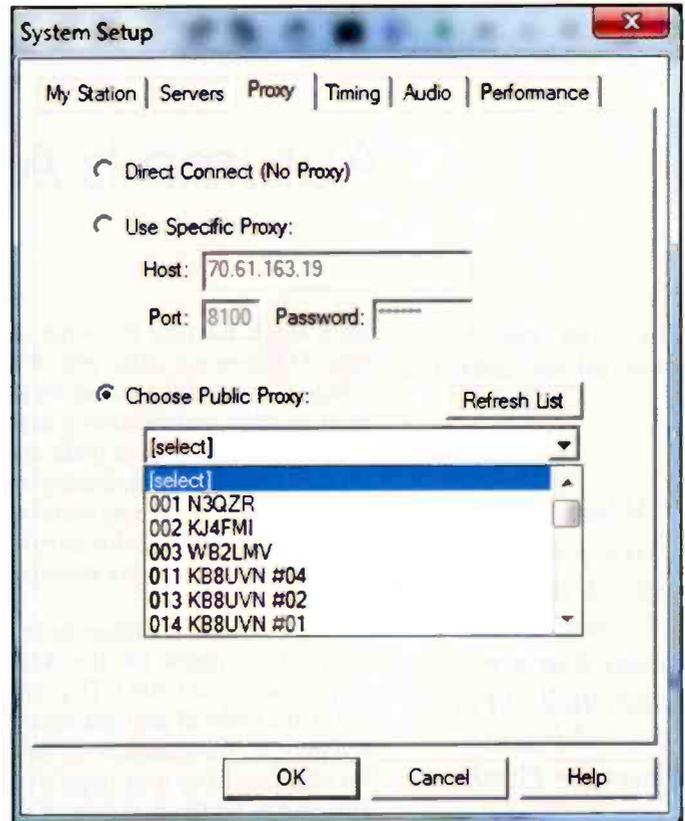


Figure 3. Selecting a public proxy lets you get around the requirement to make a port-forwarding configuration change on your Internet router.

node number via the DTMF pad, and your local repeater would be connected to my local repeater for a call. Sometimes a local prefix or suffix is required by a particular installation. It is best to ask a local control operator for permission and site-specific instructions before sending any signaling tones over a repeater, and be sure to identify using your amateur callsign whenever you do. I usually say something like "K2DLS connecting to EchoLink," drop my carrier, await the courtesy tone if the machine has one, and proceed from there. Doing so will help make your experience using a non-familiar EchoLink-connected repeater a pleasant and welcoming one, especially while you're traveling. A complete listing of default codes used in EchoLink installations can be found at www.echolink.org/Help/dtmf_functions.htm.

You can connect to the EchoLink test server via RF as well as via your PC. Enter 9999 on your DTMF pad and you'll hear an announcement that you are being connected to the ECHOTEST Conference. Make a couple of short transmissions and, as the name suggests, your voice will be echoed back to you via the repeater. Enter # when done and you'll be disconnected.

Via Proxy

There may be times when you wish to use the PC-based EchoLink client, but are not in a position to perform the port-forwarding trick mentioned above. You might be staying in a hotel or using some type of public WiFi situation to attempt a connection. In this case, you'll need to configure your EchoLink client to use one of the many public proxies available (Figure 3). A proxy makes a connection to another system on your behalf. In the case of an EchoLink proxy, it tun-

nels the UDP connections back to your PC using a single Transmission Control Protocol (TCP) port, in much the same way your PC connects to a Web server. This setting can be found under Tools / Setup / Proxy.

EchoIRLP

There are now a number of gateways that can connect to both EchoLink and another VOIP gateway system called IRLP. IRLP stands for the Internet Radio Linking Project and is an RF-to-RF linking system without the end user client component of EchoLink. An EchoIRLP node will require an additional prefix or code to differentiate between IRLP and EchoLink node numbers. As suggested earlier, to improve your initial experience, ask a local control operator.

Vanity Node Numbers

Vanity callsigns are popular, but vanity node numbers? For a small donation, there are premium four-digit node numbers available. More information is available on the EchoLink website. (I think I'll hold out for a one-digit vanity node number. Maybe number six?)

But Is It Radio?

It's what you want it to be. If it's fun and enhances your enjoyment of your hobby, it's all good. Don't fret, participate. Email me at k2dls.rfbits@gmail.com or call me via EchoLink. I often monitor the K2GE repeater, which is EchoLink node number 155481, during the morning and evening drives (EST).
73 de K2DLS

Autumn Is A Time Of Change

by Tomas Hood,
NW7US, nw7us@arrl.net

“When the solar wind picks up speed, and when the magnetic field lines that are stretched out on the solar wind pass the Earth, geomagnetic storms may be triggered. For radio signals, this could be a good thing, or a bad thing...”

On **S**eptember, it's time for some of the best long-range DX openings of the year. With autumn right around the corner, the season for radical improvement in radio propagation conditions is beginning. This is the time to make sure that you finish any antenna project, double-check your coax, ladder line, and grounding system. The DX “hunting” season is opening this month! Let's get right to the exciting shortwave propagation conditions starting in September.

At the end of September the sun will be directly over the equator. On the Autumnal Equinox (September 23 at 0309 UTC), everywhere in the world, the hours of daylight are equal to the hours of darkness. This results in an ionosphere of similar characteristics over large areas of the world. This makes for the best time of the year for long

DX openings between the temperate regions of the Northern and Southern Hemispheres on all shortwave bands.

Expect a vast improvement on the higher frequencies (22 meters up through 11 meters) with more frequent short-path openings from mid-September through mid-October between North America and South America, the South Pacific, South Asia, and southern Africa. The strongest openings will occur for a few hours after sunrise and during the sunset hours. Many international shortwave broadcast stations will soon change from their summer schedule to a winter schedule, taking advantage of this change in propagation.

Long-path openings also improve during the equinoctial periods. A variety of paths are opening up on 31 and 22 meters. Expect a path from



Figure 1. Among the views of Earth afforded astronauts aboard the International Space Station (ISS), surely one of the most spectacular is of the aurora. These ever-shifting displays of colored ribbons, curtains, rays, and spots are most visible near the North (aurora borealis) and South (aurora australis) Poles as charged particles (ions) streaming from the sun (the solar wind) interact with Earth's magnetic field. The aurora has a sinuous ribbon shape that separates into discrete spots near the lower right corner of the image. While the dominant coloration of the aurora is green, there are faint suggestions of red to the left of image center. Dense cloud cover is dimly visible below the aurora. The curvature of the Earth's horizon (the limb) is clearly visible, as is the faint blue line of the upper atmosphere directly above it (at image top center). Several stars appear as bright pinpoints against the blackness of space at image top right. (Source: NASA/Astronaut photograph ISS023-E-58455 was acquired on May 29, 2010, provided by the ISS Crew Earth Observations experiment and Image Science & Analysis Laboratory, Johnson Space Center. The image in this article has been cropped and enhanced to improve contrast.)

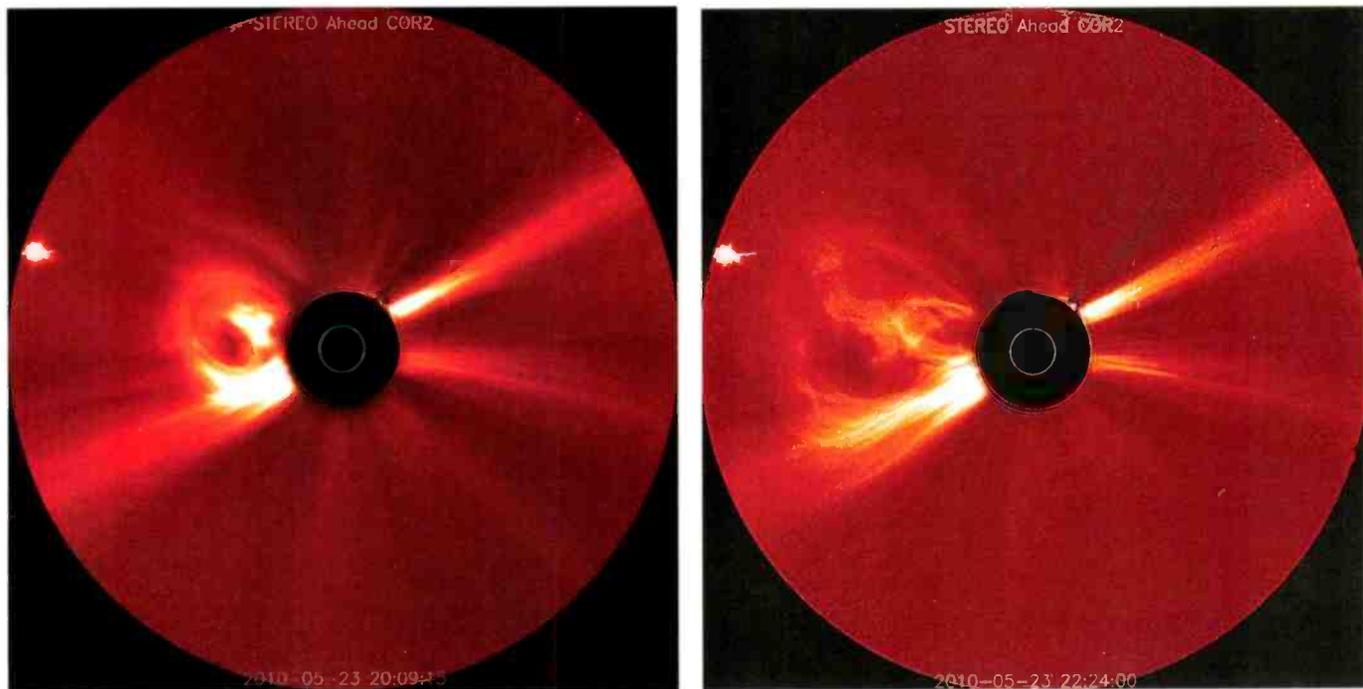


Figure 2. The sun released a series of four coronal mass ejections (CMEs) between May 22 and May 24, 2010. These images show one CME on May 23. Solar storms bombard Earth with a stream of electrons and other charged particles that interact with gases in the atmosphere to generate colorful aurora. A CME, a large solar storm, can expel a billion tons of matter at a million miles per hour or more. The strongest solar storms have the potential to interfere with communications, power grids, and satellites. Solar storms happen most frequently when the sun is in the active phase of its 11-year cycle, called solar maximum. Both images were taken by the Solar Terrestrial Relations Observations (STEREO) Ahead spacecraft. The left image is from 2009 UTC. STEREO Ahead acquired the right image just over two hours later at 2224 UTC. In the left image, a bright mass of charged particles loops from the sun's atmosphere. Two hours later, the looped mass had expanded and was moving away from the sun. The images show only the sun's corona, the outermost layer of the atmosphere. A dark disk covers the rest of the sun, and a white circle represents the sun's surface. When the charged particles from May's CMEs reached Earth, they caused no damage, but they did generate sheets of colored light dancing across polar skies. (Source: NOAA/STEREO)

southern Asia around sunset, daily morning openings from southern Asia and the Middle East, expanding to Africa. Also look for signals from the Indian Ocean region long-path over the North Pole. Afternoons will fill with South Pacific long-path, and then extend to Russia and Europe. Look for possible long-path openings on 31, 41, 49, 60, and 75 meters for an hour or so before sunrise and just before sunset.

Autumn Is Aurora Season

As we've explored in past editions of this column, the Earth has a magnetic field with a North and a South pole that is enclosed within a region surrounding the Earth known as the magnetosphere. As the Earth rotates, its hot core generates strong electric currents that produce the magnetic field, which reaches 36,000 miles into space.

The magnetosphere prevents most of the particles from the sun, carried on the solar wind, from impacting the Earth. The solar wind distorts the shape of the mag-

netosphere by compressing it at the front and causing a long tail to form on the side away from the sun. This long tail is called the magnetotail.

The speed of the solar wind fluctuates. This year, we're seeing a range of solar wind speed of between 300 km/s to around 800 km/s on average. When the solar wind picks up speed, and when the magnetic field lines that are stretched out on the solar wind pass the Earth, geomagnetic storms may be triggered. For radio signals, this could be a good thing, or a bad thing, depending on the frequency and radio path. In simple terms, for shortwave radio signals, geomagnetic storms cause the ionosphere to lose its ability to "reflect" radio signals. However, during these storms, aurora could occur, which can become an exciting opportunity for VHF weak-signal propagation off of the highly-energized E region of the ionosphere.

While aurora is generally only visible close to the poles, severe magnetic storms impacting the Earth's magnetic field can shift them toward the equator.

Figure 1 shows a striking aurora image taken from the International Space Station (ISS) during a geomagnetic storm that was most likely caused by a coronal mass ejection (CME) from the sun on May 24, 2010. The ISS was located over the southern Indian Ocean at an altitude of 350 kilometers (220 miles), with the astronaut observer most likely looking toward Antarctica (not visible) and the South Pole.

Auroras happen when ions in the solar wind collide with atoms of oxygen and nitrogen in the upper atmosphere. The atoms are excited by these collisions, and they typically emit light as they return to their original energy level. The light creates the aurora that we see. The most commonly observed color of aurora is green, caused by light emitted by excited oxygen atoms at wavelengths centered at 0.558 micrometers, or millionths of a meter. (Visible light is reflected from green plant leaves at approximately the same wavelength.) Red aurora is generated by light emitted at a longer wavelength (0.630 micrometers). Other colors,

Optimum Working Frequencies (MHz) - For September 2010 - Flux = 92, 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
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NORTHERN SOUTH AMERICA	30	30	29	26	24	22	20	19	17	16	15	15	14	15	20	22	24	26	27	28	29	30	30	30
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SOUTHERN SOUTH AMERICA	30	29	26	24	22	20	19	18	16	16	15	14	15	14	18	22	25	28	29	31	32	32	32	31
WESTERN EUROPE	10	10	10	9	9	9	10	10	9	9	9	9	14	16	18	19	19	20	19	19	18	17	15	13
EASTERN EUROPE	9	9	9	10	13	13	10	10	10	9	9	9	13	15	17	18	17	17	17	16	15	14	12	10
EASTERN NORTH AMERICA	25	24	22	18	17	15	14	14	13	12	12	11	11	18	22	24	25	26	26	27	27	27	26	26
CENTRAL NORTH AMERICA	14	14	13	12	10	9	8	8	7	7	7	6	6	8	11	12	13	14	14	15	15	15	15	15
WESTERN NORTH AMERICA	8	7	7	7	6	5	4	4	4	4	3	3	3	3	5	6	7	7	7	8	8	8	8	8
SOUTHERN NORTH AMERICA	24	23	22	20	18	17	15	14	13	12	12	11	11	11	16	19	21	23	24	24	25	25	25	24
HAWAII	21	21	21	20	19	18	17	15	14	13	12	11	11	10	10	9	12	15	17	18	19	20	21	21
NORTHERN AFRICA	12	11	10	10	10	9	10	10	9	9	9	9	15	17	18	19	20	20	20	19	17	14	13	12
CENTRAL AFRICA	15	14	14	13	12	11	10	10	9	9	9	9	14	17	18	19	20	20	20	21	21	19	18	16
SOUTH AFRICA	20	18	17	16	14	13	12	12	11	11	11	11	16	20	22	23	24	25	25	26	26	25	23	21
MIDDLE EAST	10	9	9	9	14	12	10	10	10	9	9	9	13	16	17	18	19	18	16	13	12	11	11	10
JAPAN	21	21	21	20	19	18	16	11	11	10	10	9	9	9	9	10	10	9	9	12	16	18	20	21
CENTRAL ASIA	21	21	21	20	19	18	16	11	11	10	10	9	9	9	9	12	15	14	13	13	12	13	18	21
INDIA	15	15	16	16	16	15	13	10	10	9	9	9	9	9	9	9	9	8	8	11	12	13	14	15
THAILAND	19	21	20	20	19	18	16	11	11	10	10	9	9	9	9	13	16	16	15	14	14	13	12	15
AUSTRALIA	27	28	30	30	30	28	25	23	21	19	18	17	16	15	14	14	17	16	15	14	16	20	23	25
CHINA	20	20	20	19	19	17	16	11	11	10	10	9	9	9	9	10	10	10	9	9	9	13	17	18
SOUTH PACIFIC	32	32	32	31	30	28	26	24	22	20	19	17	16	15	15	14	15	14	16	21	25	27	29	31

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
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NORTHERN SOUTH AMERICA	27	27	26	23	21	20	18	17	16	15	14	13	13	17	19	21	23	24	25	26	27	27	28	28
CENTRAL SOUTH AMERICA	29	27	24	22	20	19	18	17	16	15	14	15	17	21	24	26	27	28	29	30	30	30	30	30
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WESTERN NORTH AMERICA	14	14	13	12	10	9	8	8	7	7	6	7	11	12	13	14	15	15	15	15	15	15	15	15
SOUTHERN NORTH AMERICA	17	16	15	14	13	12	11	10	9	9	8	8	8	10	13	14	15	16	17	17	18	18	17	17
HAWAII	25	24	23	22	20	18	17	15	14	13	13	12	11	11	12	11	14	17	20	21	23	24	24	25
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MIDDLE EAST	10	10	10	9	10	10	10	9	9	9	9	15	17	19	19	20	20	19	18	14	13	12	11	11
JAPAN	21	20	19	18	16	13	11	10	10	10	10	9	9	9	9	10	10	10	9	11	16	18	20	20
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INDIA	11	12	13	13	13	10	10	10	9	9	9	9	14	14	13	13	12	10	9	9	9	9	8	8
THAILAND	18	19	19	17	16	11	11	10	10	9	9	9	9	14	17	18	18	17	15	14	14	13	12	14
AUSTRALIA	27	29	30	29	27	24	22	20	19	17	16	15	15	14	15	18	17	16	15	14	17	21	24	26
CHINA	19	19	19	17	16	11	10	10	10	9	9	9	9	11	11	10	10	9	9	9	9	12	16	18
SOUTH PACIFIC	32	32	31	30	28	25	23	21	20	18	17	16	15	15	16	15	14	14	18	23	26	29	30	31

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	21	20	18	17	15	14	13	12	11	11	10	10	13	15	17	19	20	21	21	22	22	22	22	21
NORTHERN SOUTH AMERICA	24	24	22	20	18	17	16	14	14	13	12	12	13	16	18	20	21	22	23	24	24	25	25	25
CENTRAL SOUTH AMERICA	28	26	23	21	20	18	17	16	15	15	14	16	20	22	24	26	27	28	29	29	30	30	30	30
SOUTHERN SOUTH AMERICA	30	28	25	23	21	20	18	17	16	15	15	14	18	21	24	26	27	29	30	31	31	31	31	31
WESTERN EUROPE	10	9	9	9	9	8	8	9	9	9	15	17	18	19	20	20	20	19	18	18	16	14	10	
EASTERN EUROPE	10	10	9	9	9	9	9	9	9	9	15	17	19	20	20	19	19	19	18	18	17	16	14	10
EASTERN NORTH AMERICA	8	8	7	6	6	5	5	5	4	4	4	4	6	7	8	9	9	9	9	9	9	9	9	9
CENTRAL NORTH AMERICA	19	17	16	14	13	12	11	10	10	9	9	9	12	15	17	19	19	20	20	21	21	21	20	20
WESTERN NORTH AMERICA	25	24	22	19	17	16	15	14	13	12	12	11	19	22	24	25	26	27	27	27	27	27	27	26
SOUTHERN NORTH AMERICA	21	20	18	17	15	14	13	12	11	11	10	10	11	15	17	18	20	21	21	22	22	22	22	21
HAWAII	26	25	23	21	19	17	16	15	14	13	13	12	12	13	13	12	15	19	21	23	25	26	26	27
NORTHERN AFRICA	16	15	14	13	13	12	12	12	11	18	22	24	25	26	27	27	27	26	25	23	21	19	18	16
CENTRAL AFRICA	17	15	14	14	13	12	13	12	12	11	18	22	24	25	26	27	27	27	26	25	24	21	20	18
SOUTH AFRICA	20	18	17	16	15	15	15	16	15	15	16	21	24	26	28	30	31	32	31	30	28	25	23	21
MIDDLE EAST	14	13	12	11	11	10	10	9	9	10	16	18	19	20	21	22	22	22	22	20	18	16	15	14
JAPAN	19	18	16	11	11	10	10	9	9	9	9	9	11	10	10	10	9	9	10	16	18	19	20	20
CENTRAL ASIA	19	17	15	11	11	10	10	9	9	9	9	13	17	18	17	16	15	14	13	12	12	12	17	20
INDIA	9	9	9	10	10	10	9	9	9	9	13	16	17	16	16	16	16	15	15	14	13	11	9	9
THAILAND	17	16	12	11	10	10	9	9	9	9	11	16	18	19	20	20	18	17	16	15	14	13	13	12
AUSTRALIA	28	29	28	26	23	21	20	18	17	16	15	15	14	19	19	18	17	16	15	14	18	22	24	26
CHINA	18	17	14	11	10	10	10	9	9	9	9	15	17	14	11	10	10	10	9	9	9	9	15	17
SOUTH PACIFIC	32	31	30	27	25	23	21	19	18	17	16	15												

including blue and purple, are also sometimes observed.

Low sunspot counts combined with coronal hole activity or CMEs (Figure 2) often contribute to days of very poor propagation on the high frequencies (30 MHz and below). When the solar wind speed is high (over 650 kilometers per second), when there's a release of solar plasma on that wind stream, and when the orientation of that wind stream is aligned to combine with the magnetosphere, the geomagnetic field will "open" to the incoming plasma, and aurora occurs. And that's when VHF comes alive for the exotic aurora-mode propagation.

During September, we'll see a number of days when Aurora will occur, so be ready for interesting VHF propagation well beyond line of sight. When the planetary K-index (K_p) is higher than 5, there's a good chance of aurora. Check my aurora page at <http://hfradio.org/aurora.html> for current conditions and resources about the aurora.

HF Propagation

With the 10.7-cm flux levels expected to be around 90 during September, 11 through 22 meters will now sport some F-region propagation on paths mostly near the equator. Additionally, some short-range E-region propagation may still occur. On these higher bands, conditions may be marginal during the month, but these bands are certainly coming alive as Sunspot Cycle 24 picks up energy. There will be less polar propagation as we move toward winter, though, making some parts of the world difficult to hear over these paths. To catch the openings over high latitudes, get on these bands shortly after sunrise, or watch for polar signals as they close for the evening.

Sixteen meters, used by a larger group of broadcasters, will be the most reliable higher band. This band will usually supply day-path propagation even over the polar paths. A considerable improvement is expected, with the band opening shortly after sunrise and remaining open until after sundown. However, 16 meters will not stay open late into the night like it typically does during spring. Openings should be possible from all areas of the world, with conditions best from Europe and the northeast before noon, and from the rest of the world during the afternoon hours. Openings from the South Pacific, Australia, New Zealand, and the Far East

should be possible well into the early evening, particularly when propagation conditions are High Normal or better.

The 19- and 22-meter bands compete with 16 for the best daytime DX band this month. Look for 19 and 22 to open for DX at sunrise and remain open from all directions for a few hours. It should be possible to hear many areas of the world throughout the daylight hours, with a peak in the afternoon. Nighttime conditions will favor openings from the south and tropical areas, but some openings will also be possible from other areas. Look for polar gray-line propagation from Asia. Long-path is common on 19 from southern Asia, the Middle East, and northeastern Africa as well as the Indian Ocean region via the North Polar path.

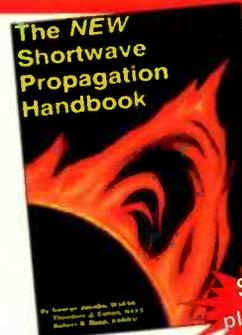
The 25- and 31-meter bands are all-season bands. Expect an incredible amount of activity on these two hot bands. Many broadcasters choose these, targeting their audiences during prime times (morning and early evenings). The conditions prevalent on 19 and 22 are more pronounced, and last much longer, on these bands. Look for exotic stations a few hours before sunrise through early morning, then again in the early evening before sunset, until around midnight.

After the Autumnal Equinox, expect ever-improving nighttime DX conditions on 41, 49, 60, 75, 90, and 120 meters into October. This is due to the gradual increase in the hours of darkness and a seasonal decrease in the static level. Forty-one meters should be best for worldwide DX from sunset to sunrise. Forty-nine and 60 meters are used by a lot of the larger, stronger broadcasting stations, so you can always depend on hearing signals from early evening (from before sunset) to a few hours after sunrise. For exotic regional signals, check 75 through 120 meters during the hours of darkness, especially for an hour or so before local sunrise.

Mediumwave Propagation

With a possible increase in geomagnetic activity this month, there's a chance for occasional weak-to-moderate geomagnetic disturbances that can attenuate mediumwave DX over northern latitudes. This can be a blessing for those trying to DX tropical AM Broadcast stations and mid-latitude medium- and low-power stations, since the interference from strong stations on signal paths crossing the higher latitudes is reduced.

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Signals below 120 meters will improve after this month as the hours of darkness increases, and because of the decline of noise-producing weather. Seasonal static, which makes it difficult to hear the weak DX signals, is decreasing little by little as we move away from the Autumnal Equinox. Stretch out those beverage antennas and start looking for signals along nighttime paths.

VHF Conditions

The sporadic-*E* (E_s) season we experienced earlier in the year is pretty much over now. There will be a few openings

late this year, but this is not the month typically associated with E_s .

Troposcatter is a real possibility, however. Look for signals on paths crossing through stalled high-pressure zones in the mid-west, or along cool, wet air masses.

Additionally, toward the end of September, transequatorial (TE) propagation will begin to occur between southern North America and northern South America. Openings will generally occur in the late afternoon to early evening. *F*-region propagation activity may occur during the day on the VHF TV bands, though the 10.7-cm flux levels are not going to support reliable propagation at

these higher frequencies. Don't expect any east-west paths to be open. Tropospheric conditions are generally very good for many of the VHF bands during September with the appearance of different weather fronts. This will be the primary mode for working up to 300 miles. Continue to expect a high number of CMEs, possibly triggering aurora during September and October. Again, look for days when the K_p index is above 5.

Current Solar Cycle Progress

The Royal Observatory of Belgium reports that the mean monthly observed sunspot number for May 2010 is 8.8, slightly up from April's 7.9. The lowest daily sunspot value during May 2010 was zero (0) on May 9 through May 20. The highest daily sunspot count for May was 32 on May 4. The 12-month running smoothed sunspot number centered on November 2009 is 7.6. A smoothed sunspot count of 34 is expected for September 2010, give or take about 8 points.

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7-cm observed monthly mean solar flux of 74 for May 2010. The 12-month smoothed 10.7-cm flux centered on November 2009 is 74.5. The predicted smoothed 10.7-cm solar flux for September 2010 is about 92, give or take about 7 points.

The observed monthly mean planetary A-Index (A_p) for May 2010 was 8. The 12-month smoothed A_p index centered on November 2009 is 4.5. Expect the overall geomagnetic activity to be unsettled to stormy during September. Refer to the Last Minute Forecast published in *CQ* magazine or on my website (<http://prop.hfradio.org>) for the outlook on what days this might occur.

I'd Like To Hear From You

I welcome your thoughts, questions, and experiences regarding this fascinating science of propagation. You may email me, write me a letter (P.O. Box 9, Stevensville, Montana 59870), or catch me on the HF amateur bands. Please come and participate in my online propagation discussion forum at <http://hfradio.org/forums/>. If you're on Facebook, check out <http://tinyurl.com/tbswx> and <http://tinyurl.com/fb-nw7us>. And speaking of Facebook—check out *Pop Comm's* fan page at <http://tinyurl.com/fb-popcomm>.

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Hamming Under The Radar

by Kirk Kleinschmidt, NTOZ
kirk@cloudnet.com

"I've even laced full-size wire Yagis and a full-size 40-meter horizontal loop in a fourth-floor walk-up attic. Where there's a will, there's a way."

I had to make a service call the other day (as a PC tech) that really opened my eyes to a previously unknown method of outsmarting the dreaded townhouse association when it comes to amateur radio activities.

As I was parking my car at my customer's townhouse, I noticed a fellow on the other side of the driveway area who was loading stuff into his car, which sported a ham radio license plate. I quickly introduced myself and we chatted a bit about the vertical antenna mounted on the roof of his garage. The antenna wasn't *huge*—sticking up about 15 feet above the roofline—but it was plainly visible. My association's secret police would have had a collective heart attack at the mere sight of it!

This ham, an older gentleman with a pleasant demeanor and generous smile, said that he hadn't had any problems so far with his association. Drawing on my own tortured experience, that surprised me, but because I was running a few minutes late for my service appointment, I couldn't follow up.

Right after greeting me, the LOLC (little old lady customer), who had a nasty computer virus and issues related to a recent thunderstorm outbreak and tornado sideswipe, mentioned that she saw me talking to the ham guy before I came to her door. She further mentioned that the guy in question was the Chief Snooty Snoot (president) of the townhouse association, and she was surprised that His Nibs hadn't insisted that I move my car, which I had apparently parked outside the agreed-upon visitor parking area.

I told her that the guy and I were both hams, and that our fraternal association undoubtedly let me off the hook for the parking transgression. She laughed, and went to explain how the guy was in everyone else's business on a regular basis, and that no one dared mess with him about his ham antenna for fear of incurring his wrath on some other communal issue.

Was this really possible? Could a ham actually be the association's chief whiner, messing with everyone else over trivial issues while erecting a verboten ham antenna at the same time? I was initially shocked, but the more I thought about it, the more I saw the genius of such a move. What better way to stay off death row than by being chief executioner?

The previously unknown "method," then, is a new twist on "If you can't beat 'em, join 'em." If

you can't beat the secret police, *be* the secret police! Brilliant! Maybe I should run for president of my local association. I could relentlessly get after a few sacrificial residents who don't pick up their dog's poop, let their precious little darlings pee everywhere, fire up their charcoal grills too close to the building, etc., while I put up a 50-foot tower topped with a hex beam!

It's a lovely thought, but it's probably not practical for me, nor for most hams in similar situations. I'm guessing most amateurs living in apartments, townhouses, or neighborhoods with deed restrictions simply want to unobtrusively get on the air and enjoy ham radio somehow, somehow.



Center-fed dipoles are a ham radio mainstay, but routing and hiding the coaxial feed line and finding supports for the far ends of each antenna leg can be impossible for many stealthy installs. If a dipole could be fed on one end (the "house" end), finding a home for the far end would make the dipole much stealthier. The line of End-Fedz antennas from PAR Electronics does just that.

Owned and operated by Dale Parfitt, W4OZ, of Glenville, North Carolina, PAR's commercial version of the end-fed half-wave antenna (EFHWA) puts the feed point at the end of the wire, allowing you to easily conceal the coaxial feed line. Even better, EFHWAs can be mounted horizontally, vertically, or as slopers, and require no RF grounds or counterpoises! Most EFHWAs are single-band designs. For more information, see www.parelectronics.com.

The above photo of a PAR End-Fedz in action (and lots of other interesting stuff) can be found at the ham radio blog of Bob Baillargeon, VE3MPG, of Greely, Ontario, www.ve3mpg.blogspot.com.



For limited space, portable, and “no wires allowed” installs where multi-band operation is desired, it’s hard to beat a magnetic loop antenna. MFJ’s Model 1786 has been going strong for more than 20 years. The compact 36-inch-diameter loop covers 10 through 30 MHz continuously, including the WARC bands. A shack-mounted control head lets you adjust the remote loop to resonance as you tune through the bands.

As Karel, PA3GJU, owner of this particular ’1786 will undoubtedly tell you, if mounted in the clear, away from large metal objects, it performs as well as or better than a typical dipole antenna. You can see the rest of Karel’s station at www.pa3gju.nl.

For those poor sods—myself included—here are a few tips to get your “under the radar” operations underway.

On HF, It’s All About The Antenna

Whether you’re sneaking under the radar or operating out in the open in front of God and everybody, your antenna and its effectiveness will pretty much define your success with HF ham radio. Even the fanciest transceiver is useless without an antenna to act as an interface with the ionosphere. Because most stealthy ops are forced to use compromise antennas, putting up the most effective antenna for a particular situation is of the utmost importance. Focus on the antenna system before the rest of your station.

Even in a small apartment, it’s usually possible to find the space to put up a dipole for 10 and/or 15 meters (a dipole for 10 meters is only a little more than 16 feet long). You’ve probably tried this arrangement for SWL antennas a time or two. If space (and family cooperation) permits, a dipole may be the easiest way to get on the air. After all, it’s pretty much a given that you won’t be installing a full-size beam inside your apartment. (If you have access to a large, airy attic, however, a wire beam or other conventional

antenna may work fine.) To maintain some semblance of household harmony, perhaps the best way to install an indoor dipole is to run the wire elements along the wall/ceiling juncture and run the coax up the wall in a corner.

Horizontal loops are also possible. As with the dipole, run the coax up the wall in a corner. Instead of feeding the dipole, however, run a full-wavelength loop around the perimeter of the ceiling. An antenna tuner will probably be required for both antennas. With indoor installations, having a naturally resonant antenna isn’t necessary (sometimes it’s not even possible). Use an antenna tuner to “work” the antenna against a counterpoise or other ground connection (if you’re sure you have another ground connection, that is). Whatever the configuration, give it a try. You may have to experiment a bit.

Ready-made indoor antennas are available from several sources, and some work better than others, depending on your exact circumstances. MFJ makes several magnetic loops, small loop tuners, and vertical antennas designed for space-restricted and indoor operation. The units generally cover 40 through 10 (or 6) meters and have been used effectively by many stealth-mode hams. MFJ also makes an “artificial ground” that can make indoor hamming

a lot easier, depending on your specific situation. See the entire selection at www.mfjenterprises.com.

Some ops have taken to mounting mobile whip antennas—large and small—to their balcony railings, working them against a set of counterpoise wires instead of a car body (the counterpoise wires probably work better anyway!).

Other stealthy antenna solutions are limited only by your ingenuity and your situation. Over the years I’ve loaded up my apartment building’s downspout with a 1-watt QRP signal (a sunspot cycle peak helped a lot); worked the steel fire escape on my dormitory building against a counterpoise (same sunspot cycle peak); tuned up an aluminum window screen with a low-power signal; put up an outdoor “invisible” end-fed wire made from 30-gauge steel wire, shirt-button insulators, and monofilament line (it worked great, and the motel didn’t even know it was there); and I’ve even laced full-size wire Yagis and a full-size 40-meter horizontal loop in a fourth-floor walk-up attic. Where there’s a will, there’s a way.

My experience with indoor antennas is certainly not unique. Other success stories come to mind. I know of a Midwestern ham who ran a successful 40-meter DX net with 1 kW to an attic dipole (definitely not recommended under today’s RF exposure limits!), as well as a Georgia ham who has worked DXCC with 5 watts using only attic-mounted wire antennas. Even in this era of relatively crappy propagation I’m closing in on 5-watt DXCC with my own attic-mounted horizontal loop. These “hidden HFers” are out there, but they’re hard to spot because they don’t have any outdoor aluminum.

And speaking about outdoor aluminum, if there’s *any way* to run a wire or two outside, even if it’s only a thin steel strand running from a window sill or a balcony railing, it will usually outperform indoor antennas that are more compromising in nature.

As a general rule, when it comes to antennas, higher is better than lower, bigger is better than smaller, and outside is better than inside.

Low Power, Low Profile

When operating indoors, low-power operating is *strongly* encouraged (and often legally required to comply with FCC RF exposure rules). Potential interference is minimized, as is your exposure to nearby RF energy fields. As mentioned, I (and

many other stealth-mode ops) have had success running only 5 watts to various indoor (or "just a few inches outdoors") antennas. RF exposure issues aside, if you run more than about 50 watts output, you're asking for trouble.

Fifty watts indoors will likely couple into the AC power mains and dim everyone's lights in time to your Morse code or speech modulation, not to mention messing with TV sets, A/V equipment, and PCs.

Because apartments or condos are often several stories up in the air, away from dependable RF grounds, an alternative grounding technique is often needed for HF operation. An effective substitute "RF ground" can be obtained by using a counterpoise. Simply connect a quarter-wavelength piece of insulated wire to the ground terminal of your transceiver—one for each band of operation—and run the counterpoise wire(s) along the floor moldings, out of the way. Make sure the far end of each counterpoise wire is insulated (wrapped with electrical tape). Hint: Counterpoise wires for 80 meters may be unmanageable in small spaces.

Don't ground your gear to water pipes, telephone lines, or telephone company grounds. They may be at DC ground potential, but will probably not provide a good RF ground and may cause interference. Nowadays, most residential plumbing contains at least one run of nonconductive PVC tubing, effectively insulating the upper-level plumbing from a direct connection with the earth below. Think "counterpoise" instead.

To minimize RF grounding issues use balanced antennas (such as dipoles and loops) instead of unbalanced antennas (such as verticals and end-fed wires) whenever practical. Dipoles and loops don't need any RF ground and tend to be much better behaved in compromise situations when compared to end-fed wires (end-fed half-wave wires with 5000-ohm feed-point tuners excepted). "random" wires, and some verticals.

VHF And UHF

For many space-restricted hams, VHF/UHF bands are prime territory. At these frequencies antennas are physically small. Putting up a small beam antenna isn't out of the question. When I was getting acquainted with 440-MHz FM, I simply aimed a small beam out my third-floor window. I hit several area repeaters with no trouble and had many simplex QSOs, too. In many metro areas, the rubber-ducky antenna that comes with VHF/UHF

handhelds will be more than enough to access several local machines. Here, indoor antennas may be no sacrifice at all.

Thinking Outside The Box

If you have high-speed Internet but no way to put up even a decent stealth antenna, setting up a remote station is easier than ever before. Previously, hams running remote stations had to maintain Internet-connected computers at each end of the circuit: one on the shack and one at the remote transceiver site. The software and switching requirements were somewhat exotic, and expense and complexity limited adoption by deed-restricted hams.

New systems still require high-speed Internet at each end of the link, but the computers have been replaced by small net-connected interface boxes—no computers necessary. The easiest and most affordable systems require a mobile radio with a removable control head. The control head stays at your home shack and "talks" to one interface box, while the radio itself is at the remote site with a second interface box. The Internet-connected boxes essentially replace the remote-mount cable that would normally connect the control head to the radio when mounted in your vehicle.

With a setup like this you could build a station in the country (at a friend or relative's house) that consists of the mobile radio, an interface box, and a big, beautiful outdoor antenna (with a feed-point-mounted autotuner, perhaps). No more deed restrictions!

If you can't get out *any* signal—or you don't even have a radio—"Internet-to-radio" linking systems, such as Echolink (www.echolink.org), can provide hours of fascinating QSOs, propagated not by the ionosphere, but through the Internet. You still have to be a licensed ham to use the system, so it's not like Internet chatting, and the whole operation is managed by hams in an orderly fashion.

You can also have a lot of fun using the Internet-based ham radio simulators (QSONet and HamSphere) we discussed in the April issue. See www.hamsphere.com and www.qsonet.com for more info.

What's Your Radar Avoidance Technique?

You can still enjoy ham radio if you live in a less-than-ideal situation. Ingenuity, inspiration, and experimentation may be required, but that's what ham radio is all about. Drop us a line and let us know what worked for you.

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by Shannon Huniwell
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“He screamed and grabbed onto his brother, who assured him that WTIC’s radio antenna system was no cause for fright.”

For as long as his family can remember—as the tale was outlined to me, and my imagination filled in somewhat—James Rexford has been a complete radio nut, with little interest in anything but audio electronics. That’s why his kid sister predicted Jim would have “a horribly miserable summer” working with a cranky old aunt and uncle on their small Central New York farm. The mere thought of forced servitude doing smelly bucolic chores from sunup to sundown made Jim consider running away from home on the last afternoon of school, just two days before he was slated to be put on the train to Syracuse.

But his folks prevailed, urging him with advance thanks for being the type of unselfish 12-year-old who would be kind enough to help out some elderly relatives he barely knew. His mom had already packed a small suitcase for him. “Jimmy, I wish there were room for you to take your radio,” she admitted, “but I seem to recall

that Aunt Jane and Uncle Richard don’t like a lot of noise in the house and are pretty careful with the electric bill.”

He glanced over to the dresser where he kept the colorful model 480TFM Arvin AM/FM. The 1950 set not only meant something special to him because it was manufactured the same year he was born, it also possessed extra significance because his grandmother had given it to him as a birthday gift. She’d found it in the window of a fix-it shop and told the proprietor she had been looking for an affordable radio with FM because her grandson, the radio bug, had been wishing for an AM/FM set so he could hear what was on the air on that band.

What Jim was really wishing for *now*, though, was a reprieve that would let him enjoy July and August in Philadelphia with Grammie. She was always fascinated by his enthusiasm for broadcasting and, if he could visit her instead, she’d no



Jim Rexford hadn’t seen the WSYR transmitter shack since August 1962, but he felt like a kid again as he snapped this photo 48 years later. He recalls there being a formal front door, which now appears filled in, and always a car or two parked in the little side lot. Originally, the building had sleeping quarters and modest cooking facilities in case the engineer on duty got stranded during blizzards that could pop-up in the Syracuse area anytime between November and April.



Here's the WSYR dual directional antenna array with slightly different northeasterly and northwesterly lobes of 5000-watt radiation day and night. Though his vantage point was from the other side, this beautiful line of towers greeted young Jimmy Rexford on the first morning of his "horrible" summer at his Aunt and Uncle's farm. Needless to say, the surprise view changed his mind about what he'd figured would be a "radio-less" summer.

doubt treat him to a tour of a station or two, or at least encourage him to report on his DXing. No such luck.

His train pulled into Syracuse just past 11 p.m. As the conductor announced the stop, Jimmy nervously looked out the window and saw a lanky old man who reminded him of some penniless guy from one of those Great Depression photos in U.S. history textbooks. He sure hoped that wasn't Uncle Richard. It was.

"I suppose you're James Rexford," he said without any trace of a smile.

"Yes Sir, and I've already got my suitcase."

"My truck is over that way," Uncle Richard said, pointing tentatively, as if his arm hurt.

The two walked quietly toward the weathered green pick-up. Uncle Richard took Jimmy's luggage and placed it in the back. Jimmy heard it slide to the tailgate as they headed out of the city. More tired



"I'm pretty sure those little white tuning houses—or 'dog houses,' as the WSYR technicians dubbed them—have been upgraded since the 1960s," says Jim Rexford. "And I think the fences around the towers back then were wooden." He figures that even though it would have been easier for someone to gain access to the sticks in the old days, folks in the neighborhood were well aware that coming in contact with the tower and the ground was certainly not advised!

than he imagined, the boy dozed off under the influence of the gently bouncing vehicle. He was dead to the world until Aunt Jane poked him awake.

"Young man," she said, "Uncle Richard put your bag in the spare room. I'll show you there. You best get some more sleep. Our day starts mighty early around here. A lot earlier than in Chicago, I'm sure." She pulled down the quilted comforter. "Well, get in. Get in," Aunt Jane directed, saw to it that he complied, and then firmly closed the door on her way down the creaky hall.

According to the wind-up alarm clock—which sounded like a metronome—staring at him from a small oak nightstand by his featherbed, it was 4:15 a.m. when he was startled into consciousness. That gave him a full 45 minutes before breakfast to wallow in the misery of what lay ahead for the next two whole months. Sure enough, Uncle Richard knocked on his door at five. "Rise 'n' shine, boy," he mumbled. "Day's a-wasting."

The kitchen window revealed a field filled with rows and rows of plants one would expect to see on a small farm. Jim also noticed a couple of cows and a bunch of chickens. He wondered if the milk and plate full of scrambled eggs he was considering had anything to do with them. *No Frosted Flakes*, Jimmy mournfully

thought to himself. *Nobody to talk to. No radio. I'm done for!*

"Eat up, Son," Aunt Jane chided. "You'll need your strength if you want to survive on a farm."

I don't think I'd care if I didn't last till noon, he thought. But that was all about to change.

Three Friendly Giants To The Rescue

Uncle Richard got up from the table and headed for the side door. "Let's go," he said, nodding to Jimmy.

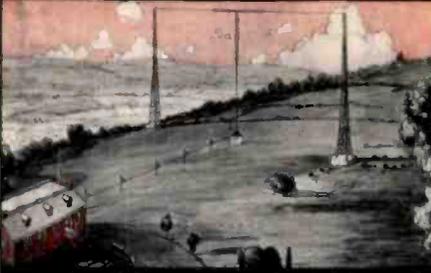
Without expecting to see anything but more greenery, the boy trudged towards his pensive relative who'd just opened the door. Jimmy didn't look up until they were out on the swaybacked gray porch. For a few seconds, he couldn't believe that the red and white forms in front of him could possibly be real. But it was no mirage. "WOW! I Can't believe it!" he exclaimed. "WOW! Radio towers!"

"From the tone of your voice, I take it they don't have such things in the Chicago area," Uncle Richard deadpanned.

"Yes, we do, but I've never seen any up so close before, and I'm pretty keen on radio."

"Your Pop did mention something about that to me when he asked if we needed an extra hand on the farm," the old

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In This Issue

OCTOBER, 1929 **25¢**

Even though its focus was on amateur radio activity, Connecticut-based American Radio Relay League gave great press to a commercial operation in its home state. The October 1929 issue of ARRL's *QST* magazine touted the mountaintop transmitter site of WTIC Hartford as "America's most modern broadcasting station." While the center-fed wire antenna is long gone, WTIC 1080 kHz still sends its 50,000 watts from this high vantage point—one that would seem better suited for FM and TV. No matter the unlikely mediumwave venue, WTIC delivers one of the finest AM signals in the northeast.

fellow said, then matter-of-factly shifted attention towards chores.

The youngster worked hard all morning. Apparently, he accomplished much more than Uncle Richard had expected from a kid from the suburbs. At lunch—or dinnertime as Aunt Jane called it—Uncle Richard managed a mild smile when telling his wife that he was having quite a time keeping up with Jimmy. "Our Illinois nephew is real helpful and learns quick, too. I guess if he continues being so industrious, maybe we'll have time for him to meet some of Mr. Eicholzer's boys over at the shack."

Jimmy figured that his Uncle's coded promise probably related to some farm kids holding court in a tar paper clubhouse. They'd likely tease him for being a city slicker. The following afternoon, though, his relatives walked him up the dirt driveway that merged into the small



We could call the gear shown in this 1940s publicity photo, "The Clean Machine." No wonder WTIC engineers wore a coat and tie when they had a date with the transmitter! And with that spotless floor, the big Westinghouse transmitter's home could hardly be termed a "shack." (Image courtesy Jeff Hugabone, Chief Engineer of WTIC AM/FM)

parking lot for a brick structure Jimmy had supposed to be part of the farm, or maybe a substation for the power company. As soon as they came around to the front, however, the youngster found himself again almost dumbfounded. There, on the little building's rounded facade were stainless steel letters announcing that this place was a radio broadcasting facility.

"W-S-Y-R," Uncle Richard recited, "570 kilocycles on the dial. It's just the transmitter shack," he seemed to apologize, "but Aunt Jane arranged with Chief Engineer, Mr. Eicholzer, for you to get the nickel tour of their shop."

The boy could hardly believe how, within about 36 hours of arriving in the Valley section of Syracuse, his fortunes changed so much for the positive. Almost every evening after supper, Uncle Richard—who actually began seeming kinder—suggested that Jimmy "run along to the transmitter shack. Maybe you can teach those fellows a thing or two about radio," he'd quip.

Whoever was on duty at the dials appeared genuinely pleased to have some company. Jimmy especially enjoyed assisting with the quarter-hourly transmitter meter readings and being present for the day-to-night antenna pattern change. He loved the electronic aroma mixed with cigarettes that the indulging technicians puffed as they advised him

never to smoke. Sometimes the engineer might let him ride gain on the master control board. Typically, though, the limiter/compressor in the equipment rack made such manual adjustments academic. And then there was the constant background of the ventilation blower, assurance that the 5,000-watt transmitter was running at proper temperature.

On weekends, a 20-something, part-time tech liked to regale Jimmy with tales of broadcast history. The guy's "real" job involved repairing two-way radios at a shop closer to downtown, but it was using his First Phone FCC ticket at a bona fide broadcast outlet that provided him recreation. "There's nothing quite like being "on the log"—the operator on duty," he said, smiling. "Especially when you're sending out the signal of a fine old legacy lady like WSYR!"

And with that the young engineer launched into the station's history, which he'd prefaced with the callsign WMAC. The fellow held up a forefinger, asked Jimmy to keep an eye on the "old clock on the wall," and authorized the boy to interrupt him in case he got carried away "babbling on" when he was supposed to be tending to the audio and RF outputs. He cited September 15, 1922, as "a date that will—shall we say—live in Central New York radio history." That was when publisher Clive Meredith fired up a 100-watt broadcast station (WMAC on 1090



Engineer Augie Santana relaxes in the WPOP transmitter shack circa 1958. Who cared if 'POP's technical headquarters were not as swanky as cross-town competitor WTIC's? At least it had all the basic amenities, a Collins tape cartridge machine, and a phone with which to call somebody if the place caught on fire. And with such "man cave" decor, few management types would ever venture in to bother anybody in the shack. Ah, that's when a smoke was a smoke and radio was radio!

kilocycles) from his country estate in Cazenovia, New York, about 25 miles from Syracuse.

What's In A Name? Or Call?

In addition to that station, Meredith also possessed an experimental license, and both ventures—most notably WMAC—were hobby enterprises for the gentleman. Cazenovia, especially in those days, was certainly no cosmopolitan center able to support a serious commercial broadcast operation.

Nobody seems to recall what emanated from the little broadcast station's longwire. Perhaps phonograph music, informal speeches, or an occasional guest singer provided programming. WMAC's initial license period was only a couple of years, and it appears that Meredith wasn't completely focused on maintaining the authorization.

The engineer told Jimmy he'd seen a WSYR scrapbook that contained a tattered letter of October 27, 1924, in which a Detroit-based Department of Commerce official in charge of northeastern radio activity notified his Washington colleagues that he'd tried, without success, contacting Cazenovia, New York resident, Clive Meredith, regarding the September 1924 expiration of Meredith's experimental authorization for station 8XH and broadcast station WMAC (both at Cazenovia). The communiqué berated Meredith, thusly: "He has failed to apply for renewal of licenses and also failed to reply to our many letters of inquiry regarding renewal." With obvious exasperation, the writer recommended that the agency "rescind his call letters."

It appears that word of the drastic action sparked Meredith to seek procedural forgiveness in the form of appropriate attention to official detail. Station directories from 1925–1927 show WMAC still operational in Cazenovia. I'd question this as a



When *PopComm* subscriber Neil Fitzgerald was WPOP's Teenage Engineer, he took this shot of the 5-kW Hartford, Connecticut, operation's trusty old Westinghouse transmitter. Note the box's classy Art Deco accents curving around the tube window. And how about that meter reader tailgate where engineers could stow their pens and pencils and have something on which to rest their clipboards whilst scribbling the numbers. Looks like a vintage Magnecorder PT-6 reel-to-reel recorder at right.

mere clerical carry-over, except for the fact that the 1926 booklet in my files (*Stevenson's Bulletin of Radio Broadcasting Stations*, Early Winter) has a check mark penciled in next to WMAC, indicating a reception catch. Jumping ahead to 1928, records note Meredith having founded 250-watt WSYR in Syracuse at 570 kilocycles.

One would assume that Meredith would have simply asked the Feds to let him swap the rural Cazenovia—and presumably seldom-used—WMAC license for the new Syracuse authorization, but he managed to hang onto the old WMAC calls and move them to Syracuse, too. They appear in period listing (as late as 1931) as WSYR's sister, WSYR-WMAC.

Who knows what might prompt staff announcers to utter the WMAC calls, as opposed to the WSYR designation. A case can be made that WMAC somehow eventually morphed into Syracuse University's WSYU, which shared airtime with WSYR. Perhaps Meredith's 11th hour revival plan to save his Cazenovia callsign included a promise to give WMAC to the school. And, if so, maybe university bigwigs later flipped the calls to the more mnemonic WSYU.

In any event, Meredith had greater cause to pay attention to a Syracuse-based outlet than to the earlier dalliance on his country estate. Like the Syracuse incarnation of WMAC, WSYU was a de-facto "paper station," as it was really just a callsign switch whenever WSYR broadcast programming produced by Syracuse University.

Not until about 1948 when General Electric helped Syracuse University pioneer the Class "D" 10-watt educational FM genre (via the school's WAER), did the WSYU phantom finally vanish.

During its first dozen years or so, WSYR originated its signal from an antenna atop a Syracuse hotel. It's probable that the original long-wire was dropped in favor of vertical rooftop radiation in the mid-1930s when the FCC granted a boost to 1 kW at 570 kilocycles. In order to activate a subsequent Commission

OK for 5000-watt directional operation, WSYR officials bought some acreage next to Uncle Richard's and Aunt Jane's farm on Valley Road (well south of Syracuse's downtown), and after completing an Art Deco-style transmitter building, erected three towers tuned to aim primarily in a wide northerly RF shower. This facility and impressive self-supporting array became operational during the early years of World War II and has been nicely maintained ever since.

"That's No Giant, It's WTIC!"

My father looked over the rough draft of this column and, of course, offered a related tale. Dad told me of a friend of his, a 94-year-old ham from Connecticut, who as a child hiked up Avon Mountain with an adventurous older sibling. They packed a couple of sandwiches and set out for their destination in a thick fog. This soup didn't deter big brother, but unnerved the little kid a bit, causing him to imagine wild animals and other monsters lurking between the trees.

By the time they reached the top and came to a large clearing, the fog dissipated just enough reveal the outline of what looked to the younger brother like three

metallic giants. He screamed and grabbed onto his brother, who assured him that WTIC's radio antenna system was no cause for fright.

"That's why I wanted you to hike up here with me," the older boy said. "I thought we could see if any radiomen in the transmitter building over there might be willing to show two brothers the WTIC transmitting equipment." They were, and both boys became lifelong radio buffs.

The Teenage Engineer

Pop'Comm subscriber Neil Fitzgerald served as a transmitter engineer at WPOP, which like WTIC, is licensed to Hartford, Connecticut. He helped work WPOP's gear from 1956 to 1958, and after a stint in the Coast Guard, returned to the early-adopting Top-40/pop music outlet from 1962 to 1964. Because he got hired at 19, Neil was often referred to on-air by the DJ staff as the Teenage Engineer. Now 73, he graciously shares the following memories:

We used to play religious tapes on Sunday mornings on WPOP. The ministers from some of the local churches would bring their tapes down to the transmitter shack on Cedar Street in Newington. One windy morning when I was on duty, a minister delivering a tape opened the front door and the wind caught it and slammed it hard. Well, that was just enough vibration to short one of the modulator tubes grid to cathode! The monitor lights on the 5-kW Westinghouse transmitter started flashing wildly and relays were clattering and the xmtr went off the air.

Luckily in those days we had an RCA 1-kW box as a backup unit. I had to flip the antennas over to the RCA, turn on the filaments, wait about 30 seconds, and turn on the plate voltage. All the while the minister was standing there with his mouth and eyes wide open. It turned out that this particular tube (891R) had about 10,000 hours on it so it was about ready to go anyway.

It took about 20 minutes to change the tube. We were only on low power for a little while. Hopefully, no one tuned to the 1-kW church service broadcast had weak batteries.

Our WPOP reel-to-reel tape recorders were equipped with full track heads. Most of the people who recorded their own tapes used half track recorders, so I warned everybody who supplied us with their own recorded religious programming to make sure that there was nothing lurking on the other track. Well, one morning it happened.

As you may know, 1/2-hour tapes are actually about 35 minutes long. So, when I played the tape back, the minister started his sermon and everything was OK for the first five minutes, until the track from the other side of the tape appeared. It drifted in, sounding like a

group of people singing. A little strange, but they could have been missionaries from behind the Iron Curtain.

Anyway, I figured they were singing in a foreign language. It took a while, but I eventually realized that it was the other track playing backwards. Luckily, the church had made a generic backup tape, which I quickly threaded on the other machine.

One day I was working the afternoon shift and a Federal Communications Commission inspector dropped by. Quite fortunately, I had the transmitter log up to date. WPOP has long employed a directional array. As such, the two antenna base current meters had to be read twice a day—once on day pattern and once on night pattern.

Instead of reading the actual RF current meters located at the base of the towers, though, we had a set of meters in the control room which we had to calibrate against the tower meters once a week. The inspector wanted to check the calibration. I couldn't leave the building, so he said that he would go out to the towers. There is a brook that you have to cross to get to the southeast tower. The inspector fell in the brook. He came back to the control room soaking wet. It was a good thing he had a sense of humor!

Epilogs

Neil reports that about five years ago he was driving by the WPOP transmitter shack and the gate was open. He drove in, introduced himself to the engineer pulling maintenance there, and the fellow showed him around. Much of the equipment Neil recalled was long gone, but the old 5-kW Westinghouse was still there, though none of the tubes were able to light up. The former Teenage Engineer left WPOP's shack musing, "It was kind of sad, but as the old saying goes, time marches on."

Jim Rexford had occasion to stop by his old haunt, too. Early this spring, he found himself passing through the Syracuse area on Interstate 81, when he spotted WSYR's three sticks down in the Valley and made a split-second decision to try finding the site again. Twenty minutes later, Jim parked his car at the end of the driveway that once led to his relatives' farm and bordered the radio facility.

Though nobody he'd known was around anymore, Jim felt transported back to that serendipitous summer of 1962 when a surprise connection to the broadcasting world awaited him in the WSYR transmitter shack.

His kid sister had been wrong: young Jimmy had a wonderful summer that year.

And so ends another day of radio history on *Pop'Comm*...

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Who Is That Man With The HPJIE?

by Bill Price, N3AVY
chrodoc@gmail.com

“...this guy could design a circuit for you, then build it, then operate it, all while playing ‘Sabre Dance’ or some other difficult piece on the chromatic harmonica.”

OK, loyal readers, a real challenge for you this month. I and a handful of strange friends have several overlapping hobbies, which include (but are not limited to) ham radio, SWL, scanners, just about anything that shoots projectiles, a handful of normal (and not so normal) musical instruments, and pet rodents. Norm does *not* share my love for pet rodents.

I got into SWL and ham/CB radio early in my life, and music too, but it took me multiple attempts at getting started plus about 51 years until I could play the #S%! chromatic harmonica. That’s the one with the button on the end. I’m not going to make this into a harmonica column, but over the years I must have bought a dozen of the things (and they’re not cheap), and each time I discovered that they were each defective, which is to say that I could not sound certain notes on them, not matter how hard I tried. So I would buy a new one every five years or so, try again, and give up. When I was about 51, I figured the secret, which I share at harmonica conventions, but won’t waste your time here.

At those harmonica conventions, as well as at rifle ranges and air gun get-togethers, I always seem to find a more-than-representative-of-the-general-population percentage of hams. If you think it’s strange for grown (sometimes very grown) men and woman to hang around the lobby of a hotel for three days honking on harmonicas with each other, just imagine a small gathering of them standing in a corner sending Morse code on the things!

And in both the shooting and the harmonica gatherings, I don’t only find hams, but I find people employed in the electronics industry as well, which brings me to the tough question for this month. (It would be a contest, but I don’t have anything to offer except that I’ll talk about you in future columns, unless you’re in a witness relocation program and have documentation to prove it.)

Back before Dayton this year (ham radio is the only hobby where the name of a town refers to a time as well as a place), a nice person asked me to speak there and talk about getting and keeping an HPJIE.* Unfortunately, I was not able to get there and asked a friend (the subject of this

month’s mystery) if he might go there and speak in my stead, because not only is he an entertainer with a gift for speaking in front of large groups of people, but he is a ham and has a genuine HPJIE, which he has managed to hold on to for quite some time now. He has much more talent in both the amateur and professional communication fields than I do, as well as some talent that those of you with Internet access will soon be able to see and hear.

Of course, my own personal computer (which runs on charcoal, much like some of the older vehicles in Cuba) has failed, so I was fortunate to receive this link while I was at my HPJIE (and from which computer I am stealthily writing these words long after everyone else has gone home from the office).

I should probably throw in a few hints, because even after I saw this video, I did not recognize the performer as my ham and broadcast engineer friend. If you type in the link (it’s a long one, unfortunately), you’ll soon see Henny Youngman—yes, the video is that old—introducing the Harmonikings, just keep your eye on the extremely tall, extremely hairy lead player in the center of the group (that’s his dad to his left).

And know that this guy could design a circuit for you, then build it, then operate it, all while playing “Sabre Dance” or some other difficult piece on the chromatic harmonica.

There will also be extra credit for anyone who can run up to the suspect with the magazine and say “Hey! You’re famous!” because I haven’t told him that he’s featured in this column (though he reads it every month).

Too many hints would make it too easy for anyone who might work in his industry. Let’s say television, lets say East Coast.

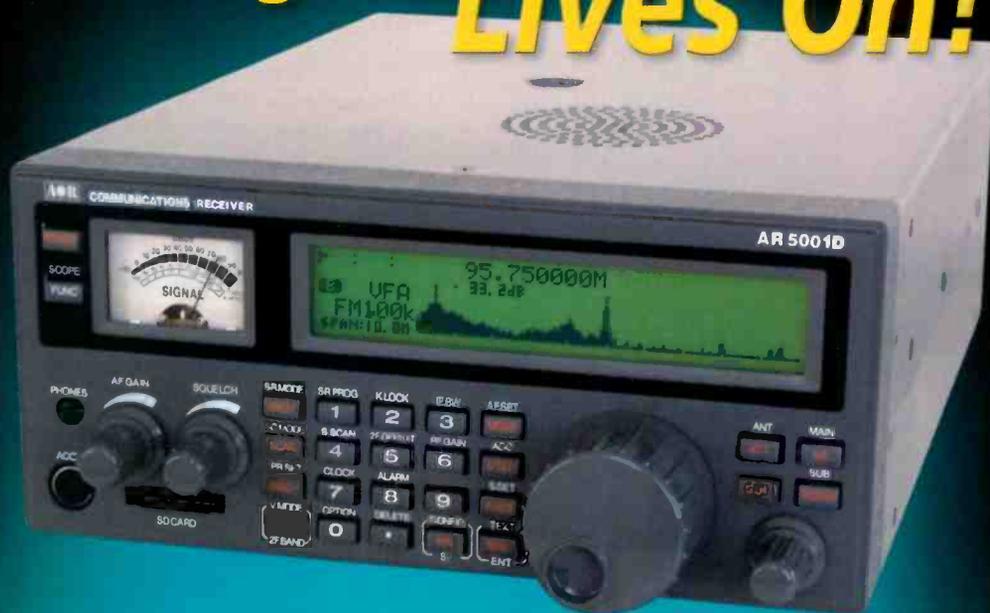
He’s also a really nice guy who will probably get a chuckle out of being famous among those in the communication hobbies. If you ask nicely, I bet he’d give you a discount on one of his CDs.

Oh, yes, the link: www.youtube.com/watch?v=ODQP0a9-n7s&feature=related. Now, let’s hear those guesses.

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 - 1000 Memory Channels
 - Optional D-STAR (UT-118)
 - Optional P25 (UT-122)
 - Optional DSP (UT-106)



All Icom "black box" mobiles come bundled with Bonito's RadioCom 4.5 software!

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*Frequency coverage may vary. Refer to owner's manual for exact specifications.
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