

Scanning - Shortwave - Ham Radio - Equipment
Internet Streaming - Computers - Antique Radio



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FIJI Monitoring in a Troubled Paradise

Also in this issue:

- **RadioonD-Day!**
- **StrykerBrigade'sHi-TechCommunications**
- **GuidetoBaseballontheRadio**
- **FirstLookatUniden'sBCD396XT
HandheldScanner**



SEE More and HEAR More!

With the SR2000A and AR8200MkIII from AOR

SR2000A Color Frequency Monitor

The SR2000A is an ultra-fast spectrum display monitor that lets you SEE received signals in FULL color.

Using the power of FFT (Fast Fourier Transform) algorithms with a sensitive receiver covering 25MHz ~ 3GHz*, the SR2000A features a color monitor that displays up to 40MHz spectrum bandwidth**, a switchable time-lapse "waterfall" display or live video in NTSC or PAL formats.

Ultra sensitive, incredibly fast, yet easy to use with a high quality internal speaker for crisp, clean audio signals. Scans 10MHz in as little as 0.2 seconds! Instantly detects, captures and displays transmitted signals. PC control through RS232C serial port or USB interface. With 12 VDC input, it's perfect for base, mobile or field use.



AR8200MkIII Handheld Receiver



From inter-agency coordination to surveillance, you can't know too much. The world-class AR8200MkIII portable receiver features a TXCO that delivers solid frequency stability and performance not found in most desktop units. With 1,000 alphanumeric memory channels, it covers 500 KHz ~ 3GHz*. Improved RF circuits combine greater sensitivity, resistance to intermod and enhanced Signal to Noise ratio. It offers increased audio frequency response and includes NiMH AA batteries that can be charged while the unit is in use.

Optional internal slot cards expand the AR8200MkIII's capabilities. Choose from Memory Expansion (up to 4,000 memories), CTCSS Squelch and Search, and Tone Eliminator.

The AR8200MkIII offers "all mode" reception that includes "super narrow" FM plus wide and narrow FM in addition to USB, LSB, CW and standard AM and FM modes. It also features true carrier reinsertion in USB and LSB modes and includes a 3KHz SSB filter. The data port can be used for computer control, memory configuration and transfer, cloning or tape recording output.

A special government version, AR8200MkIII IR features infra-red illumination (IR) of the display and operating keys. The IR illumination function is selectable, allowing operation by users wearing night vision apparatus without removing goggles and waiting for the eyes to re-adjust. Ideal for military, law enforcement and surveillance operators.



Authority on Radio
Communications

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* Government version, cellular blocked for US consumer version.
**No audio is available when the frequency span is set to 20MHz or 40MHz.
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SEE more and HEAR
more with AOR, the
serious choice in
Advanced Technology
Receivers™.

Remarkable Receivers Need Remarkable Antennas!

AX-81S Ruggedized Active HF Antenna

- ~ Antenna Type: ~ Active HF Monopole
- ~ Frequency Range: ~ 2-30 MHz
- ~ Output: IP3: ~ ~ +30 dBm
- ~ Operating Temp: ~ -20 to 80°C
- ~ Power: ~ ~ 12V DC @ 40 mA

AX-17C Minature Indoor Active HF Antenna



"It was possible to hear some weak signals on the WiNRADiO antenna that were not audible on ... [a top brand of magnetic loop antenna]." ~ ~
WRTH Review



- Antenna Type: ~ Active Ferrite Antenna
- Frequency Range: ~ 0.1-30 MHz
- Output: IP3: ~ ~ +30 dBm
- Operating Temp: ~ 0 to 50°C
- Power: ~ ~ 12V DC @50 mA

"As usual with contemporary WiNRADiO products, the AX-17C is very well designed and we have no hesitation in recommending it as a candidate for consideration by those in need of an internal antenna".
WRTH Review

WR-G313e Software-Defined Shortwave Receiver

- Type: ~ ~ Dual Conversion
- Freq Range: ~ 9 kHz to 30 (180) MHz
- Phase Noise: ~ -148 dBc/Hz @100 kHz
- Interface: ~ ~ USB
- Power: ~ ~ 12V DC @500 mA

"The WiNRADiO G313e is a splendid receiver in all respects, and an excellent example of what can be achieved in a contemporary software-defined radio."
WRTH Review





South Pacific Adventure

By John Catalano

How many of us have made an impulsive bid on an online auction and then felt chagrined when we discover ours was the winning bid?! When John and his wife bid on a “luxury vacation in Fiji” in its final minutes, they were stunned to find they were the winners. Just where in the South Pacific was Fiji?

Just in case the vacation turned out to be a dud, John brought along a couple of radios so it wouldn't be a total loss. Fortunately, they were delighted with all aspects of their dream vacation, though John discovered the radio dials in paradise are pretty quiet and life is not easy for those trying to make a living there. Still, you can listen in to air traffic during the long trip from Boston to Fiji and to Viti Levu and back with John's logs.

Turn to page 8 for the story. All photos, including the cover, are by John Catalano.

C O N T E N T S

D-DAY 12

By Eric Beheim

June 6 marks the 65th anniversary of D-Day, when Allied troops began their massive assault on the northern coast of France – the beginning of the end of World War II in Europe.

Much of that fateful broadcast day has been preserved in digital format. To give you an idea of what you can expect to hear, Eric Beheim has provided a synopsis of the CBS broadcast day, along with notations about what was actually happening on the invasion beaches.

Listen again to news broadcasts of a different era. Even this summary still has the power to convey the drama and uncertainty of the day, even though we already know “the end of the story.”

Stryker Brigade Comms Systems 17

By Roy Stevenson

Fast forwarding from World War Two to the super-high-tech communications systems of Stryker Brigade Combat Teams is like moving into science fiction. The Stryker vehicle is designed to be a fast, lightweight, highly mobile infantry platform, and it comes in a number of models depending on the mission. The communications variant is packed with special gear covering every conceivable band. But perhaps more importantly, every vehicle and every member of the brigade is able to communicate with each other – a far cry from WWII when troops had to bang on the side of a tank to get the attention of the crew.

Reviews

“The best just got better,” says Larry Van Horn of the new Uniden BCD396XT digital, trunking, handheld scanner. Uniden has been listening to its customers and building in a number of requested features, such as a bandscope display, the ability to change the IF to avoid images, quick-access search keys, and much, much more. The radio can be flash-programmed via your computer if your area is subject to rebanding. Turn to page 68 to read up on all the tricks this superb scanner can perform.

FCCinfo is a free computer program that can open your eyes to an enormous amount of information about radio towers anywhere in the U.S. – literally! Using Google-Earth, you can visually see the towers, while clicking on a box that will tell you almost everything about the station except the owner's bank account! Another computer program, ZIPSIGNAL, will tell you the signal strength of regional stations by entering your Zip Code. Both programs are free, and you can learn more about them on page 72.





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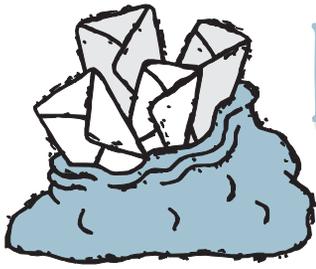
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LETTERS TO THE EDITOR

*This column is open to your considered comments. Opinions expressed here are not necessarily those of Monitoring Times. Your letters may be edited or shortened for clarity and length. Please mail to Letters to the Editor, 7540 Hwy 64 West, Brasstown, NC 28902 or email editor@monitoringtimes.com
Happy monitoring!
Rachel Baughn, Editor*

Pacific Radio

You can't get much further away from Main Street USA than Fiji. Now *that's* a vacation! As you'll note in John Catalano's feature article, the radio scene in the Pacific is also quite different from what we're used to on "Main Street."

Even though there are fewer stations on the dial, radio nonetheless is extremely important to Pacific islanders. We recommend the *Radio Heritage* website www.radioheritage.net for a wonderful window into this world of Pacific broadcasting. The founders of Radio Heritage give their goal as follows:

"Our vision is simple: We're sharing the stories of Pacific radio. More than anywhere else in the world, radio found an easy home here, conquering vast distances of ocean, and connecting the scattered islands with each other in much the same way early Polynesian seafarers used the sea itself as their main means of communication."

Their Easter contest is over now, but the question asked for the call sign of the first Fiji broadcasting station. Better luck next time... On the site we also saw mention of a new pirate movie, released in the UK, Australia and New Zealand - "The Boat That Rocked" - a comedy about the British pirate radio scene in the early 1960's.

The site is serious about sharing stories: you'll find dozens of stories about radio in the Pacific from Pacific Radio's illustrious board (Martin Hadlow, Jonathan Marks, Dr Jo Del Monaco, Dr Adrian Peterson, David Ricquis) and hobbyists just like you. Join the fun!

Dissension in Paradise

Contrary to a tourist's view of paradise, all is not easy for the local residents of Fiji, especially now. On April 10, Good Friday, Fiji's president scrapped the constitution, and the military-led interim government began enforcing censorship on local media outlets.

Australia Broadcasting Corporation correspondent Sean Dorney was expelled, and officers from Fiji's Ministry of Information, accompanied by soldiers, escorted local technicians to the ABC's transmitters in Suva and Nadi and ordered both of them to be shut down. (See <http://australianetworknews.com> for updates on Fiji; thanks to Alokesh Gupta for forwarding the story.)

Radio Australia is still transmitting to Fiji and the Pacific on its shortwave service, but with domestic media muzzled and internet connection curtailed, the government simply denies all reports of detentions or harassment. Amnesty International says the human rights situation is deteriorating, and without reliable information, the people are experiencing fear and panic. (Can

there be a better argument for maintaining reliable shortwave broadcast services and making sure the public has a way to access it?)

Mobile Scanning in Kentucky

Steve Grimes, a teacher in Kentucky, was reading the articles on state laws regarding scanning that still reside on the *Monitoring Times* website from our *Monitoring and the Law* column of 5 or more years ago. At first he was having difficulty finding the federal law which supersedes state law. But before we could help, he discovered it for himself, and wrote again:

"Later yesterday afternoon, I found the Ky law and the federal statute with the exemption. It appears that as long as the police frequencies are in the radio, everything is o.k. Kentucky and FCC rulings exclude licensed ham from having receive-only frequencies 'outside of the normal operating range.'

"However, some people on a bulletin board did comment that a lot of police don't even know about the exclusion and know little if anything about ham radio. I am certain that somewhere an overzealous officer could perhaps confiscate something. In the Kentucky law, it actually says duty to confiscate and destroy...

"I know I once had a scanner confiscated and a ticket written when I was on a rescue squad. The crystal radio did not have any police frequencies, but their radios were so strong that it overloaded my receiver and bled over. The court threw it out with a lawyer fee and a court appearance.

"The best thing to do is not to take chances in my opinion. When you are around police, turn off the radio or lock out the police frequencies, and always have your FCC license on you. One ham did get his radio confiscated out of his car on a traffic stop, because the officers knew it was capable of receiving police transmissions and he could not prove he was a ham. Later, when he provided proof, the equipment was returned.

"I'm attaching the Kentucky law, and the FCC ruling that federal law supersedes state law." (See *Reference Library, Listening and the Law*, at www.monitoringtimes.com for these documents.)

Steven Grimes, EdD, MPH, CHES

Mobile SW Listening

Thomas McKeon was interested in Ken Reitz's April *Beginner's Corner* on shortwave listening, in which he also reviewed the new in-car shortwave receiver from Sony. Ken suggested the Canadian dealer Durham Radio as the easiest source from which to acquire the radio.

Thomas reported being able to find the Sony

CDX-GT470U from ebay seller *riker71* - <http://myworld.ebay.com/riker71/> - in Australia, for about \$100 less than Durham's price, though it does not appear this item is always in stock. Here are Thomas's impressions of the Sony compared to other in-dash SW radios he has tried:

"The Sony CDX-GT470U (which I paid to have installed) works well in 70 Corvette. Previously had a Philips DC777 with direct keypad entry and the Sony runs circles around it, though it has no direct keypad entry. I was not very optimistic re the shortwave being much better than the Philips DC777 and bought it primarily for CDs. I was very pleasantly surprised!



"My reception with it in a plastic car with none of the original shielding around the ignition (and no metal body shielding such as my Gran Prix has) was as good or better on SW than the Grand Prix, which has a Sony CA 640 (a predecessor to the XRF 5100). I can pick up WBCQ 7415 broadcasts, BBC on 15400 during the US afternoon, and Cuba 5025 and not just strong stations. The mediumwave is good, too, as is FM. CD works nice as I had presumed. Audio is great - stated as 52 watts into 4 ohms for 4 speakers. I think it is around 15 watts channel RMS into 4 ohms - just educated guess, but a lot more powerful than the Philips DC 777, which has stated power of 7.5 watts/channel, which is likely around 4.

"My only complaint is that instead of 7 equalizer octaves or ranges as on the 5100, the CDX-GT470U has just high medium and low, but not really a detriment, and shortwave and MW rival desktop with outdoor antenna.

"Someone conversant in Spanish could likely get the radio from a Latin American seller at less shipping. Jackys does not list it. Anyhow I think it is worthwhile and recommend highly. Maybe Grove might consider selling this radio CD in US, as it now does not have antiquated cassette feature. I have not tried with Ipod or with USB ports, which are also options with this radio."

Tom McKeon, Indianapolis

Bob Grove wrote on behalf of Grove Enterprises that, "We have tried to find shortwave automobile replacement radios in the past with little luck. This model does not seem to be available for the U.S. market." So, it looks as though those who wish to listen to shortwave in their car will continue coming up with creative solutions of their own!

Want to SEE who is watching you?

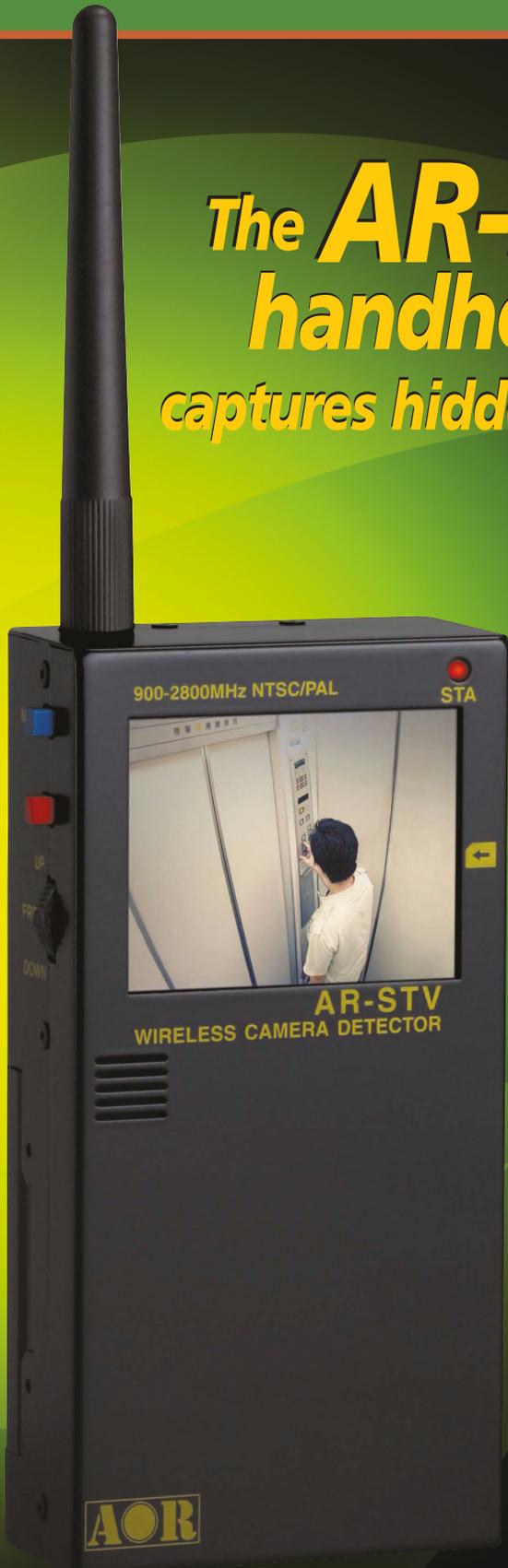
*The **AR-STV** handheld receiver captures hidden video signals!*

Now, with the AR-STV handheld wireless camera receiver from AOR, you can see who is watching you on wireless video surveillance cameras. It's a valuable addition to any security operation. This easy to operate receiver features a large 2.5 inch color LCD display, still picture recorder and sensor that captures video signals in real-time. The USB connector makes it easy to download stored images into a computer. And the AR-STV comes complete with an internal clock that allows captured images to be time-stamped. With an optional 4 GB SD memory card, the AR-STV can be used to store up to nearly 2000 images.

Add to the power of your security force with this pocket-sized video receiver from AOR!

- Receives and displays analog video signals on L-band (1.2 GHz) or S-band (2.4 GHz)
- 2.5 inch color LCD display
- Still picture recorder
- Can be set for continuous search between 900 ~ 2800 MHz
- Detects NTSC or PAL analog video signals in real-time
- Built-in clock allows captured images to be time-stamped
- USB connector makes it easy to download stored images into a computer
- Easy to operate
- Powered by four AA size batteries or external DC power
- NiMH batteries, belt clip and battery charger included
- Rubber duck antenna with SMA connector
- Optional 4 GB SD memory card can store nearly 2000 images

Available from your favorite AOR dealer!



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COMMUNICATIONS

by Ken Reitz

“Communications” is compiled by Ken Reitz KS4ZR (kenreitz@monitoringtimes.com) from news clippings and links supplied by our readers. Many thanks to this month’s fine reporters: Anonymous, Rachel Baughn, Robert Fraser, Bob Grove, Norman Hill, Brian Rogers, Doug Smith, Larry Van Horn and George Zeller.

BREAKINGNEWS

Harris Corp to Buy M/A-Com

Harris Corporation is set to purchase the Wireless Systems assets of Tyco Electronics (also known as M/A-Com) for \$675 million in cash. For background information on this very interesting sale, go to the Brasstown Monitoring Post blog at <http://monitor-post.blogspot.com/2009/04/tyco-electronics-sells-its-wireless.html>

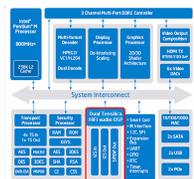
This month’s *Scanning Report* column reports on more troubles with M/A-Comm systems on page 26, and columnist Dan Veeneman tracks the company’s corporate history at <http://signalharbor.com/opensky.html#history>

Notably, “the transaction excludes the State of New York wireless network contract awarded to Wireless Systems in December 2004,” (and which is now in litigation).

SHORTWAVE/AMATEURRADIO

All-in-One Chip for DRM & HD

Tensilica, a California-based company specializing in application-specific processor cores, has announced the development of a chip said to be capable of processing data from DAB, DAB+, HD Radio and DRM digital broadcasts, dubbed the HiFi 2 DSP. The single chip could be a breakthrough for manufacturers faced with having to develop individual receivers for each type of digital platform used. The development of this chip may lead to the production of consumer receivers capable of receiving all of those digital schemes.



Tensilica’s new all-in-one chip could be the missing link for a universal DRM/HD Radio receiver. (Courtesy: Tensilica)

ARRL Skeptical of Rural Internet Proposal

During the period allowed by the FCC for public comment on the proposed development of a national rural broadband strategy, the ARRL reminded the Commission that any strategy relying on Broadband over Power line (BPL) contained a number of important issues that it felt “the FCC has yet to satisfactorily

address.” Not the least of which included “... the large number and cost of repeaters and couplers required on overhead, medium voltage power lines for what amounts to a limited number of subscribers’ homes in rural areas.” Commenting on behalf of the League, ARRL General Counsel Chris Imlay W3KD warned that “the FCC must adopt rules that provide against BPL interference to the licensed radio services.”

LA Parish to Rely on Hams

Pointe Coupee Parish is in southern Louisiana and the Mississippi River runs through it. It suffered the ravages of hurricanes Katrina and Gustav that caused a near total loss of parish-wide communications following the storms. But now, according to a report on WAFB-TV(channel 9 CBS affiliate in Baton Rouge, Louisiana), the mayor of Fordoche, in Pointe Coupee Parish, has asked hams to build a communications backup system for the parish and train a staff to be able to put it into action before the next disaster strikes. The mayor, describing ham radio as a “...life saving tool,” called for 25 Pointe Coupee citizens to join a volunteer radio emergency group which would be trained by area hams and outfitted with ham radios at no cost to the individuals participating.

TV/RADIOBROADCASTING

DTV Conversion (Finally!)

As this is written, there are still two months to go in which anything could happen to derail the final, last and ultimate deadline for the switch from analog to digital over-the-air TV signals. But, as it now stands, that switch will finally be thrown. So, what’s going to happen to that great “white space” vacated by the analog channels? Not much. The FCC has still to approve any of the proposed uses from entrepreneurs hoping to turn the territory into an Oklahoma-style land-grab.

Meanwhile, according to a report in *Radio World On-line*, one enterprising company is leasing the frequencies from low-power channel 6 stations, which are not forced to shut down during the big switch, and is programming the TV stations as radio stations.

Why not? Channel 6 audio shows up on any FM radio at 87.7 MHz.



New York’s Pulse 87. Think of it as radio with wallpaper. (Courtesy: Pulse 87)

The plan uses the video portion of the transmission to show travel and pictorial scenes while the audio portion, as in the case of New York’s “Pulse 87,” airs the latest dance music. But, the slow-moving FCC may decide to close this FM broadcast loophole for the 2,000 currently licensed and operating low power TV stations nationwide. Meanwhile, the company continues to build its coast-to-coast radio network on TV.

And, finally, one group in San Francisco knows what to do with the white space. They’ve launched their own old-fashioned, analog pirate broadcast TV station. Not content with their storefront pirate radio station/coffee shop known as Pirate Cat Radio, the Mission District group, broadcasting on channel 13, has begun airing Pirate Cat TV, according to a news report on KNTV Channel 11 NBC affiliate in San Francisco. There’s a lot of perfectly good, just out of service, broadcast quality TV gear out there and you might wonder where it could all end up.



Pirate Cat Radio, a long-time San Francisco resident on the FM dial is keeping analog TV alive; unofficially, of course. (Courtesy: Pirate Cat Radio)

Orange Co. FL SWATs FM Pirate

An article in the Orlando area *Pine Hills News* reported that a coordinated bust involving the FCC, the Orange County Sheriff’s Office Gang Unit and SWAT team resulted in taking “Street Heat,” a pirate FM station, off the air and landing several of the station’s operators in the local jail. The report claimed that the station advertized the location of illegal drugs and solicited for prostitution.

PUBLICSERVICE

FCC Gives 1st Responders 4.9 GHz

In a press release from April 9, the FCC has granted first responders primary status for the use of 4.9 GHz for fixed links used to deliver broadband service, including fixed video surveillance links used to monitor high-risk facilities or environments. The Commission said, “The new rules will also better enable first responders to more easily share time-sensitive data and streaming video footage in emergencies or life-threatening incidents.”

The Commission stated that it would preserve paging operations in the VHF public Safety band and clarified that cross-band re-

peaters are permitted for all public safety systems. The Commission hopes that the new rules will speed deployment of new technologies in the 4.9 GHz band for the benefit of public safety users.

Brazilian Bootleggers Chased off U.S. MilSats

While U.S. hams have labored for decades pouring millions of hard-earned dollars into hand-built satellites and begging launch opportunities from NASA and the U.S. military, a group of Brazilian radio bootleggers had a better idea: Use existing U.S. military satellites for your own cross-country rag-chews.

A report first aired on Brazilian TV, and noted on *MT's Milcom* blog written by milsat expert Larry Van Horn, detailed the roundup of those involved. According to reports, the raids were coordinated with the assistance of the U.S. Department of Defense. You can view the Brazilian TV clip, which shows some of the equipment seized, here: www.radioaficionados.info/253mhz.html

According to Van Horn, the pirate activity has been going on for decades, and a number of YouTube clips prove that the scheme works even better than most of our AMSATs. You can listen to clips from various listening posts on YouTube by Googling "pirates on satcom." Since the satellites used by the pirates – Fleetsat and UHF Follow-On (UFO) – are in geostationary orbit, the pirates never have to bother with Keplerian elements sets, Doppler shift, expensive rotor-driven antenna systems or even licenses.

The Brazilian TV news report indicated that 39 people were rounded up, although only one was arrested. While initial reports identified the bootleggers as hams, a licensed Brazilian amateur radio operator, Luis Piraja Junior PS8RF who is also a lawyer, has told the world-wide ham community that was not the case. According to Piraja, they were all bootleggers.

Despite the report of the roundup, many Fleetsatcom monitors indicated that the pirate activity continued just days after the reported raid. And, now that the accessibility of these satellites is common knowledge, it's hard to imagine the bootleggers will be permanently removed.

FL DoT to Use CB for Emergency Info

The Florida Department of Transportation (FDOT) asked FCC permission to operate CB radio services systems by remote control along the Florida Turnpike to transmit emergency information. The Commission gave the go-ahead for the project on March 20, but insisted that the state follow some guidelines. According to the letter from the FCC to the head of FDOT, they will be required to ID the transmissions and provide a telephone number for interference complaints; FDOT must consider channel selection to minimize interference; transmissions will occur only during an emergency event, and they must allow an interval between transmissions long enough for other operators to use the channel.



Space Systems/Loral's 1300 series satellite is the platform for Sirius' new FM-5 satellite to be launched this month giving Sirius listeners some serious up-grade in signal strength. (Courtesy: Space Systems/Loral)

SATELLITE

U.S. Military to Track 800 Satellites by October

Caught napping by the collision of a disused Russian spy satellite and a functioning Iridium communications satellite on February 10, the U.S. Strategic Command and Air Space Command say they will make a joint effort to keep track of some 800 currently in-orbit maneuverable spacecraft by the first of October. According to a report by Reuters news agency the number now being tracked is only 300.

Sirius to Augment its Signal

XM began its service using two satellites in geostationary orbit giving coast-to-coast coverage of its signal. Sirius opted to use three satellites in a highly elliptical orbit (HEO) which made reception of Sirius programming more difficult than XM reception. Sirius has announced plans to launch a high-powered geostationary satellite this month to more than double the power of their current satellites and fill in the gaps between the three HEOs and when a fourth HEO satellite is launched next year.

FCC ENFORCEMENT

FM Pirate to FCC: "Not My Signal"

The FCC slapped a Milwaukee, Wisconsin man with a \$10,000 fine for operating an unlicensed FM radio station. According to FCC documents, FCC agents monitored broadcasts from the man's house from March 2006 to March 2007 in response to complaints of interference from neighbors.

The man responded to the NOUO (Notice of Unlicensed Operation) by claiming that the transmissions the FCC agents had traced to his home were in fact coming from some other place nearby. He argued that he had detected the signals himself, made a record of them and, with a friend and a "transmitter hunter device," determined that the transmissions were coming from "...another nearby residence on which several antennas are located."

The FCC remained unmoved by his detective efforts and, insisting that they had serious direction finding instruments and

knew how to use them, ordered the man to pay up.

FM Station Loses in Contest with FCC

Boston radio station WMJX-FM spun the wheel of misfortune at the FCC's fun fair and lost. A contestant complained to the Commission in May 2008 that the station had failed to disclose many important details about a contest the station was conducting called "Cool, Hot or Green," according to FCC documents. What he thought he might win (his choice of one of three cars to own), turned out to be a two-year lease of the selected car.

But wait, there's more! After qualifying, the contestant was then told that the grand prize was conditioned on the winner qualifying for credit with the car dealer supplying the leased car. The station admitted that it left the details out of its on-air hype, but that their website spelled it all out in detail, and asked that the Commission ditch the fine and admonish the station instead. No dice, said the Commission, and that'll be \$4,000. Better luck next time.

CONSUMER SCORNER

The Consumer Product Safety Commission has announced the recall of the following products which may be of interest to *MT* readers:

This lighted rocker switch from Radio Shack has been recalled because the wiring diagram is incorrect and may cause a shock. 18,000 were sold at Radio Shack from June, 2008 through January, 2009 for \$4 each. Call 800-843-7422 for more details. (Courtesy: CPSC)



Certain Insignia 26" at panel LCD TV sets are being recalled because the TV set's power supply can fail causing a fire. 13,300 sets were sold exclusively at Best Buy from August, 2005 through June, 2006 at about \$800 each. Call 800-233-0462 for details. (Courtesy: CPSC)



Best Buy's Rocket portable power supply has been recalled because the CPSC reported that the unit "can unexpectedly ignite" while charging. 1,400 were sold for \$100 each at Best Buy from July, 2008 through February, 2009. Call 800-233-0462 for details. (Courtesy: CPSC)





Monitoring on the Island of Fiji A South Pacific Adventure

By Dr. John F. Catalano

Although my wife and I have traveled to many lands around the world, we had not been to any islands in the South Pacific. The Hawaii islands were the closest we had come. So, when one day last year we stumbled across an Internet travel auction for a “luxury vacation in Fiji” with only minutes to its end, we impulsively typed in a bid. Quite frankly, we knew Fiji was in the South Pacific, but we didn’t know exactly where. Boy, were we surprised when we won the auction!

The country of Fiji is made up of over 300 islands and sits in the South Pacific Ocean. It is 5540 miles southeast of Los Angeles, California, 1400 miles northeast of Australia, 2168 miles from Tahiti, and 3178 Miles southwest of Hawaii. From our home in New England, Fiji is *only* 8100 miles away on the *other* side of the international dateline. See Figure 1.

Fiji’s largest island, Viti Levu, was our destination. This is where The Warwick Fiji Resort is located in the small and very rural village of Korolevu on the southern coast. Fifty-five miles to the east of Korolevu is Suva, the capitol of Fiji.

A Bit of History

The name Fiji comes from the pronunciation of the word Viti by the people from Tonga, whose island home is near Fiji. The name Fiji became popular as a result of the many English expeditions to Tonga in the 18th century.

But, long before the British arrived, people from Polynesia settled in Fiji around 1550 BC. A thousand years later saw an influx of people from islands as far away as New Guinea. The mixture of these cultures with the original Polynesians is the foundation of what is now considered native Fijian.

The Cannibal Islands

The original Fijian natives held strong superstitions. One of these was the belief that shipwreck strangers brought bad luck and bad spirits with them. Due to an abundance of coral reefs around the Fijian islands, shipwrecks were common. The early Fijian people believed that the only way to overcome the bad spirits was to eat – yes, eat – the poor shipwrecked survivors. Talk about a warm welcome! Interestingly, although the Fijians of that era ate their food without utensils, the eating of human flesh was always done with a large wooden fork.

As the exploration and colonization of the South Pacific increased, so did the shipwrecks and the cannibalism. Cannibalism was common

until Christianity, which came to Fiji in the early 1800s and became the major religion of Fiji. However, by then, Fiji had become known as the Cannibal Islands. Not a good rep.

Today, about 55% of the people are native Fijian. The next major ethnic group is Indo-Fijian. These people are the descendants of sugar cane laborers brought to Fiji from India in the late 1800s by the colonizing English.

In descending order of popularity, the Fijian religions are Christianity, Hindu and Islam. Surprisingly, the official languages in Fiji are English, Bau Fijian and Hindustani.

Getting There...Eventually

Our destination airport in Fiji was Nadi Airport. This airport, built during World War II by the Allies, is the largest and busiest airport in Fiji. Nadi (pronounced Nan-Dee since “d” in Fijian sounds like “nd”) sits on the northwest side of Viti Levu. From the airport it was a 2-hour plus taxi trip to our hotel in Korolevu.

We are seasoned travelers, with many non-stop trips to Asia under our belts. But our trip to Fiji had us, shall we say, “concerned” due to its multiple air connections (3), possible winter weather delays (snow, snow, snow), and the total travel time. The straight-line distance from Boston, Massachusetts to Nadi, Fiji is 8133 miles, or 13089 kilometers. But our outbound routing had layovers in Las Vegas and Los Angeles before we arrived Nadi, Fiji. See Figure 1. Total time en-route was over 28 hours!

Then consider the number of time zones we had to travel through. Boston is GMT –5 hours and Nadi, Fiji is GMT +12 hours. The International Date Line lies just to the east of Fiji. Therefore a common Fijian saying is that it is the country where each new day begins.

So, in addition to our travel time, our bodies had to cope with a 19-hour time zone change.



Figure 1 – Our air route from Boston, MA to Nadi, Fiji - a long way to go! Stops at Las Vegas, Los Angeles and Philadelphia (not shown).

With every travel hour that passed, I thought to myself, “Will all this be all worth it? Should we have just taken a relatively short flight to Jamaica or Puerto Rico for beach and sun as we have done in the past?”

But this was an opportunity to experience a different part of the world and its culture. A new adventure! A South Pacific island paradise ... we hoped.

The Best Use of Time

Now it just so happened that I had packed my little ICOM R10 portable receiver in my carry-on bag – by intent, not by accident. This way, I was able to do some monitoring while waiting for connecting flights in the airports. Figure 2 is a log of my airport monitoring at Las Vegas (McCarran Airport), Los Angeles (LAX) and Nadi Airport (Fiji). As expected, most of intercepts were airport/air traffic.

I hope you appreciate the number of suspicious and fearful looks I had to endure from people in the airport. I guess that a guy madly tuning a black “box” with a single earphone in his ear, while oblivious to all that was going on around him, was a bit suspicious. More than once I looked up to find security people behind me.

None of these episodes led to me being stopped or questioned. However, my wife did sit a few seats away from me during my monitoring session so as not to be considered an “accomplice.”

Los Angeles Airport (LAX)

Monitoring periods at LAX were from 2 p.m. till 9:30 p.m. (local time) due to a terrible eight hour layover on the return. LAX was the most active airport, with an abundance of aircraft communications. ACARS was heard on 129.120 MHz. Unidentified voice communication was heard on 109.110 MHz, and rhythmic pulses were monitored on 122.875 MHz. A number of strong 2-meter ham signals were also monitored at LAX (see Figure 2).

What sounded like law enforcement was heard on 158.735 and 866.410 MHz. I suspect that a digital signal found at 154.465 may have also been encrypted police. As you would expect in LA, commercial FM radio stations almost completely filled the 88-108 MHz band.

McCarran Airport (LAS)

Monitoring at Las Vegas airport was a few hours at midday, Figure 2. Of the thirteen

DATELoc	TIMELoc	DATEGMT	TimeGMT	Monitoring Loc	FREQ(MHz)	STATION	DETAILS					
2/10/2009	1200	2/19/2009	2000	McCarran Las Vegas	121.095	GND						
					116.895	VOR						
					119.400	APP						
					116.750	TWR						
					118.000	ENROUTE						
					123.820	AIR?						
					135.000	APP						
					122.000	ADVISORY						
					129.020	?	DIGITAL SIG					
					132.400	ATIS						
					132.625	?						
					133.950	APP/DEP						
					135.000	DEP						
					2/10/2009	2100	2/20/2009	0500	LAX Los Angeles	111.100	CW Beacon	"LN?"
										113.600	CW Beacon	"LAB"
120.950	AIR											
124.300	Dep											
121.650	GND											
125.270	LA Center											
133.900	TWR											
134.350	APP											
124.500	APP											
135.650	ATIS											
133.900	ATIS											
147.275	2m REPEATER											
147.495	2m REPEATER											
2/19/2009	2210	2/19/2009	1010	NADI AIRPORT, FIJI						118.100	TWR	
										119.100	APP/DEP	
					127.900	ATIS						
					126.700	Dep						
					121.900	GND/Fuel Trucks?						
					112.500	VOR						
					2/19/2009	2028	2/20/2009	0428	LAX Los Angeles	147.795	2m REPEATER	
										147.735	2m REPEATER	
										147.195	2m REPEATER	
										146.385	2m REPEATER	
										146.615	2m REPEATER	
										147.335	2m REPEATER	
										147.435	Simplex	
										145.395	2m REPEATER	
										158.735	PD	Digital Sig
154.465	?											
162.550	NOAA											
126.530	AIR											
147.465	REPEATER											
886.410	PD											
2/20/2009	0700	2/20/2009	1200	Philadelphia, PA Airpo						124.550	TWR?	
					126.080	APP						
					129.120	ACARS						
					135.100	TWR						
					109.110	?						
					122.875	?						
					121.945	GND	Rhythmic Pulse					
					135.920	ATIS DEP						
					128.500	AIR						

Figure 2 – Airport logs – McCarran (Las Vegas) and LAX (Los Angeles); and Nadi (Fiji) and Philadelphia International on the return trip.

frequencies that I found active, most were the usual tower, ground control and departure/approach. A VOR (VHF-Omnidirectional-Range) navigational aid was heard at 116.895 MHz, and aircraft advisory at 122.000, a common Unicom frequency.

Three signals remain unidentified: 123.820, 129.020 (a digital signal not ACARS) and 132.625 MHz.

Viti Levu at Last!

The eleven-hour flight from LAX to Nadi, aboard a four hundred and fifty-eight passenger Air Pacific Boeing 747-400, went quickly. See Figure 3. Air Pacific is an excellent airline and caters to passenger needs better than most US carriers. We arrived at Nadi Airport in the dark a few minutes before sunrise at 6:00a.m. local time. We were the only arriving or departing air traffic.

The first thing you notice leaving the aircraft is the humidity. Anyone who has been to Asia is familiar with that humid smell: Not bad, but heavy. The air was so humid that when I tried to take a picture of our aircraft, my lens was completely fogged up. As we entered the terminal, we were greeted with the first friendly and sincere “Bula” (hello in Fijian). We would hear, and say, *Bula* many times during our stay.

There was little time for radio monitoring at Nadi airport. After clearing customs and picking up our luggage, our ride for the two-hour trip to Korolevu was waiting. However, on our return leg, I had about an hour of monitoring time at Nadi airport, which we’ll discuss later.

Glimpses of Fiji

Although sleep deprived, we still watched with great interest as we got the first views of the Fiji countryside on our 2.5-hour road trip to



Figure 3 – Pacific Airways (Fijian Air) Boeing 747-400 decked out island style!

Korolevu. Fiji’s landscape is an interesting mixture of mountains, jungles, beaches and coral reefs. This is very different from what we have experienced in Caribbean or Greek islands. Figure 4 shows the lush vegetation in the foreground and blue-gray mountains in the distance. It was taken on the road just a few miles away from Nadi.

As we wound our way through the countryside, on the sometimes dirt main road, the views changed with every turn. Nearing our destination we came across our first “town” on the Coral Coast, Sigatoka. The Sigatoka Sugar Cane railroad bridge, located near the center of town, had recently been washed out in flooding after having stood for over 100 years. See Figure 5.

We traveled a half hour further and then turned toward the ocean. Finally, we drove into a very secluded plantation-like setting. We had arrived at our home for the next seven days, the beautiful Warwick Resort. Seemingly cut out of the jungle, the front was situated a few miles from a mountain range. The back of the three-story resort was on a South Pacific Ocean lagoon, as seen at sunset on the front cover. We knew immediately that the gamble we had taken was a winner in real life, not just the winning bid.

Fiji’s Climate

Fiji is in the Southern Hemisphere, so its

seasons are the reverse of those in the USA or Europe. Therefore, our February trip was in the dead of the Fijian summer, a welcome change from the snow that we left at home.

The average daytime temperatures throughout the year range from 79 to 86 degrees Fahrenheit (26 to 30 C). The humidity was high at times in the afternoons and the direct sun hot. However, sitting in the shade of a palm tree on the beach, the breezes from the Pacific made it very comfortable indeed.

Monitoring in Paradise

What more could a person ask for? Awake to a bright beautiful morning surrounded only by lush tropical vegetation and views of the green and blue South Pacific Ocean. Move on to a great breakfast, including fresh tropical fruits, served in an open veranda overlooking the ocean. Then walk a few steps to the lagoon beach protected by a coral reef, for some snorkeling in the 75-degree ocean (Figure 6). And finally, lie on a shaded lounge on the beach, while sipping a cool piña colada. Life does not get much better ...except for adding some radio monitoring.

The description is no exaggeration, right down to the monitoring. After drying off and “stowing” the piña, the ICOM R10 and Grundig Mini 300 were taken out of their protective ziplock bags. The Grundig is an inexpensive radio with mediocre sensitivity, with a built-in amplified whip antenna. It covers 0.5 to 30 MHz and commercial FM. It has a digital display, but is tuned via a tuning knob: coarse, but perfect for quick searches. Once a shortwave signal was found, I usually used the more sensitive and se-



Figure 4 – Mountains and lush tropical plants just a few miles from Nadi.



Figure 5 – The remains of the cane railroad bridge in Sigatoka while still busing to our final destination.

lective R10, fitted with a very long telescoping whip, to verify the frequency. Then I scanned around the active frequency for other stations using the R10.

Each monitoring session lasted about an hour in duration and occurred at various time of day. Evening and very early morning monitoring took place on our open balcony, with plenty of bug repellent. Figure 7 is a log of the results. The first two columns give the local Fiji date and time of intercept. The next two columns give the GMT date and time.

First – Lunch!

Fijian food consists primarily of fish, chicken, lamb, interesting vegetables and tropical fruits. Fruit such as mangoes, papaya and pineapples are fantastic, delicious, and common, along with a sweet form of banana.

The vegetables are a bit different. Of course, I had to try breadfruit. Gathering breadfruit plants for cultivation was the purpose of the infamous Captain Bligh and the *HMS Bounty's* trip. The breadfruit was to be used to feed English slaves. Breadfruit is common in

Fiji. When I tasted breadfruit, I thought it was bland, potato-like, and not worth a mutiny! But it made a good starchy side dish.

Taro is another strange vegetable that grows on an elephant-eared plant in freshwater catch basins. Some inventive and tasty dishes are made with taro by the Fijians. There are also giant yams that grow two feet long and weigh tens of pounds. These yams originated in South America. How they got to Fiji has been lost to history.

Local seafood is the real culinary jewel and includes mahi-mahi, reef trout, yellow-fin tuna and octopus. Simply prepared as charbroiled or cooked in palm leaves “lovo” style, all of it is scrumptious.

Back to Monitoring

I set aside time for monitoring each day that we were in Fiji. The only exceptions were on Valentine's Day (the risk to my health if I'd monitored on this day was too great), and one day when the sun finally cooked me, even with tons of sunscreen. As my wife reminded me, the important word in the tropics is “Re-apply”!



Figure 6 – The lagoon at the Warwick Fiji Resort & Spa. Notice the water breaking on coral reef.

Fijian SWLing

The shortwave spectrum was eerily quiet on Fiji. No manmade noise or atmospheric noise. Quiet.

As you can see from my shortwave logging in Figure 7, Australian Broadcasting Company (ABC), and Radio New Zealand dominated shortwave. Many of these programs were for “domestic” audiences and dealt with local Australian and New Zealand issues and politics. The aftermath of the fires in Melbourne was a major topic. However, daily program content also included a roundup of South Pacific Island news, which included news from all island countries between Hawaii and Australia.

Not surprisingly, with Australia only 1400 miles away, these signals were **very** strong. So strong, that I was concerned that some loggings may have been images generated by the radio. Most broadcasts were in English, but Chinese was heard on 13655, 15210, 15255 and 17670 kHz. Also German was heard on 17520 kHz.

She Lives!

February 16th (Fiji time) turned out to be a different kind of monitoring day. The usual Australian and New Zealand stations were in residence. However, around six in the morning I caught the end of a transmission between a commercial airliner and a ground station in single side band mode on 5634.4 kHz. This was about the time my flight arrived in Fiji. I wondered if this was the same flight closing out its oversea flight plan. Later that day I monitored another aircraft in SSB on 13261.1 kHz.

That afternoon I finally heard her: Each day during my monitoring sessions I checked the WWV Time Standard stations on 5, 10, 15 and 20 MHz, but to no avail. But on Feb 16th at 1522 (local)/0322 (UTC), finally I heard the female voice of WWVH from Hawaii! It was weak with lots of QSB (fading), but its on-the-minute announcement was clearly intelligible. I listened for about five minutes and then she was gone. I never heard WWV or WWVH again during my stay.

A few minutes later another new intercept was heard. This time a very, very strong mystery station on 18600 kHz modulated with a pulsing sound. Modulation didn't sound like a common digital coding. A few hours later I checked the frequency and the signal was still going strong.

The next day was “Sunburn Day” with no monitoring. On the 18th the signal was gone. But a signal of similar strength appeared on 16965 kHz. Although I cannot be sure, the modulation sounded like a digital coding such used by the US or UK military. See Figure 7 for all shortwave loggings.

Hot Feet-ex

One evening, as the sun was going, we were treated to a uniquely Fijian custom. The legend goes that a hunter found a snake god in the mud disguised as an eel. This happened in a small village on an island off of Suva, about 50 miles from our location at Korolevu. The hunter spared the god and in return was given the gift of being impervious to fire.

Ever since this happened, over a thousand years ago, the people from the village have the

DATE loc	TIME loc	DATE GMT	Time GMT	Monitoring Location	FREQ (KHz)	STATION	DETAILS
2/13/2009	0510	2/12/2009	1710	KoroLevu, Fiji	6170	Radio New Zealand	
	0449		1849	KoroLevu, Fiji	7240	ABC Australia	Technology Program
				KoroLevu, Fiji	8987	Aircraft	SSB
	1309	2/13/2009	0100	KoroLevu, Fiji	17715	ABC	
	2144		0944	KoroLevu, Fiji	17610	BBC?	
				KoroLevu, Fiji	15210	China	
				KoroLevu, Fiji	15210	China	Chinese
				KoroLevu, Fiji	13655	China	Chinese
				KoroLevu, Fiji	9785	Radio New Zealand	EE
				KoroLevu, Fiji	9580	ABC Australia	
				KoroLevu, Fiji	17420	?	
	2207		1007	KoroLevu, Fiji	6020	ABC	Accordinain Music
	2100		0900	KoroLevu, Fiji	17520	German	German
				KoroLevu, Fiji	17670	Chinese	Chinese
				KoroLevu, Fiji	15265	Chinese	Chinese
				KoroLevu, Fiji	15215	?	EE US News
2/14/2009				KoroLevu, Fiji		VALENTINE'S DAY	No Monitoring!!
2/15/2009	1650	2/15/2009	0450	KoroLevu, Fiji	15720	New Zealand	
				KoroLevu, Fiji	15620	ABC Australia	
				KoroLevu, Fiji	15240	ABC Australia	
	1725		0525	KoroLevu, Fiji	927	Fiji Station	Radio Fiji One
				KoroLevu, Fiji	13630	ABC Australia	EE
				KoroLevu, Fiji	5634	Aircraft To Gnd	SSB
2/16/2009	0622	2/15/2009	1822	KoroLevu, Fiji	9580	ABC	
	0848	2/15/2009	1848	KoroLevu, Fiji	15720	Radio New Zealand	Pacific News
	1520	2/16/2009	0320	KoroLevu, Fiji	15725	ABC	Fires In Melbourne
				KoroLevu, Fiji	15000	WWV Hawaii	Woman Time Announcer
	1522		0322	KoroLevu, Fiji	13261	Aircraft	SSB
				KoroLevu, Fiji	13665	ABC	
	1525		0325	KoroLevu, Fiji	12085	ABC	
	1530		0330	KoroLevu, Fiji	17750	?	Japanese/Chinese?
				KoroLevu, Fiji	17780	ABC	EE
	1540		0340	KoroLevu, Fiji	19000	?	Strong Pulsing Noise!!
				KoroLevu, Fiji	21545	?	
	1545		0345	KoroLevu, Fiji	22605	?	CW Station
2/17/2009				KoroLevu, Fiji		BAD SUNBURN	No Monitoring!!
2/18/2009	1050	2/17/2009	2250	KoroLevu, Fiji	16965	?	Strong Digital Signal
	1051		2251	KoroLevu, Fiji	12100	?	Rat-ta-tat: Digital Signal
	1052		2252	KoroLevu, Fiji	18000	?	Rat-ta-tat: Digital Signal
	1053		2253	KoroLevu, Fiji	15720	Radio New Zealand	EE Music - VERY Strong
				KoroLevu, Fiji	15515	ABC	EE Music - VERY Strong
	1055		2255	KoroLevu, Fiji	15240	ABC	EE Music - VERY Strong
				KoroLevu, Fiji	13665	?	EE Music - VERY Strong
				KoroLevu, Fiji	12080	ABC	EE Music - VERY Strong
	1107		2307	KoroLevu, Fiji	4930	?	Unmodulated Carrier VERY STRONG!
				KoroLevu, Fiji	17785	ABC	EE News

Figure 7 – Shortwave logs from Korolevu

ability to walk and stand barefoot in a pit of burning and glowing wood. Over the years the people from this village have emigrated to Hawaii and India where they also perform the Fijian Firewalk.

There are a number of these uniquely Fijian ceremonies including the world-renowned Kava drinking ceremony, in which we also participated.

Not Even 20 Meter Hams!

Usually in North America, 14 MHz is a good place to monitor ham stations. Many of these guys are running kilowatts of power so their signals are strong. But no matter what time of day or night I listened to 20 meters in Fiji, I heard nothing. Even with a makeshift long-wire antenna from our third floor balcony ...nothing on 20 meters. Amazing.

Fijian MW & FM

The only medium wave signal that was reliably heard at my location, Korolevu, was at 927 kHz, Radio Fiji One. In contrast, the FM band was very active with at least six strong stations. The strongest on 100.7 MHz, was called Fiji Gold, which just happens to be the name of the local beer...both quite good. Each station broadcast in a different language. See Figure 8 for details.

Fijian VHF/UHF

My daily searches from 144 to 1100 MHz were very disappointing. From the Vodaphone billboards I knew cell phones were on Viti Levu. Scanning the 800 to 1100 MHz range I finally found what sounded like four cell phone control links at 935.840, 936.810, 950.430 and 951.400 MHz. A strong un-modulated carrier was found

Monitoring Location	FREQ (MHz)	STATION	DETAILS
KoroLevu, Fiji	100.600	Fiji Gold	English Rock
KoroLevu, Fiji	101.600	?	Indian ?
KoroLevu, Fiji	103.000	Bula FM	Fijian
KoroLevu, Fiji	104.000	2 Day FM?	Fijian
KoroLevu, Fiji	105.000	Radio Fiji 2?	English Rock
KoroLevu, Fiji	107.200	?	English Rock
KoroLevu, Fiji	935.840		CellPhone Control Link
KoroLevu, Fiji	936.810		CellPhone Control Link
KoroLevu, Fiji	950.430		CellPhone Control Link
KoroLevu, Fiji	951.400		CellPhone Control Link
KoroLevu, Fiji	1027.500		Strong carrier No Modulation

Figure 8 – Korolevu commerical FM (lots) and VHF/UHF loggings (almost none).

on 1027.5 MHz.

There you have it. A mid-summer week of radio monitoring as heard in Korolevu, on Viti Levu, Fiji.

Our Return Trip

If you remember, I had no time for radio monitoring when we landed in Fiji. However, I did manage to grab a hour of “tuning around” before we left Nadi airport (identified NFFN) for home. Nadi airport is the busiest Fijian airport, but the air traffic is light. Most air traffic is to Australia, New Zealand, Japan and the USA.

The usual airport communications were heard, see Figure 2. The

Nadi VOR was monitored at 112.5 MHz and what sounded like non-aircraft ground communications between fuel or baggage trucks was monitored on 121.9 MHz.

You may have noticed in Figure 2 that loggings at Philadelphia International Airport (KPHL) are included. Our return trip routing was Nadi, Fiji, Los Angeles, Philadelphia, and then Boston. From the time we woke up on the morning of departure in Fiji to the time we went to sleep at our home in New England was over 44 real hours! Total amount of naptime was less than three hours. But it was, without a doubt, worth it.

The Wonderful Fijian People

The people match the natural beauty of Fiji. We met so many genuine, friendly, happy and hard working Fijians. Joe is a senior waiter at the Wicked Walu restaurant at the Resort. He is one of the best, most professional, thoughtful, efficient and exacting restaurant staff I have encountered anywhere in the world. His knowledge of the dishes he served ranged from the details of their ingredients, preparation and the history, all of which he happily shared with his customers. And while simultaneously providing excellent service to all his tables.

Although having the culinary knowledge of both a chief and a food historian, Joe is working hard to support his wife and two children on \$3.80 (Fijian dollars) an hour. Since Fiji is an island, most things have to be imported, making the cost of all things quite expensive. Living in a typical one room concrete structure (see Figure 9), Joe openly thanked the Almighty for his family and his life.

Education is not compulsory in Fiji. But one young lady, who wanted to be a chemist, fought her way through high school chemistry and physics, both academically and monetarily. But her mother ran out of money, and at 19 years old her dream of teaching Chemistry ended. Now she is a hard-working, cheerful waitress at the resort



Figure 9 – A rural Fijian home

with no hope of ever achieving her dream.

These are just two of the gentle and genuine Fijian people we met. We met at least five more outstanding people who would be valuable contributing members of any community, in any country. (See sidebar.) No one could ever know the hard lives these people faced daily, from their warm, friendly and genuine personalities.

Re actions on a Gamble

If you travel to Fiji's Korolevu and stay at the Warwick Fiji Resort, don't expect to see rows of hotels on crowded beaches, like in Hawaii or Florida. No towering hotel after hotel commercialism here. Instead, you'll discover a world-class resort set among lush natural native beauty, a quiet coral reef lagoon beach and a great staff of professional people that the Warwick is very lucky to have. Although radio monitoring was not restricted, it was a very unique experience.

We left Fiji happy that we had taken the gamble and traveled 8100 miles to a place we knew little about. Now it brings a smile to our faces just thinking about Fiji, the Warwick, and the Fijian people. Hopefully we will be saying “Bula” again very soon.

MT

All pictures are the property of J. Catalano and cannot be used for any purpose other than this article in Monitoring Times.

Make a Difference to Someone's World

If any readers know of any societies, grants or agencies that could fund for one of these good people for a temporarily stay in the USA, to further their education and/or job experience, please email me. Better still, if a reader could personally sponsor one of these outstanding individuals for a two-year on-the-job training assignment, you would be richly rewarded by their performance. And you'll know that you have personally and positively influenced the world.

The people would gratefully welcome the educational and vocation experience that the USA can offer them. But each one sincerely expressed that they wanted to permanently return home to Fiji after two to three years. As they put it, “This is where my heart is.” If you have any suggestions on how we can help these hardworking and wonderful people (whose lives just became more uncertain with tightening of military control: see page 4 - ed.), please email me at johncatalano@monitoringtimes.com.

D-DAY (June 6, 1944)

As Reported By Radio

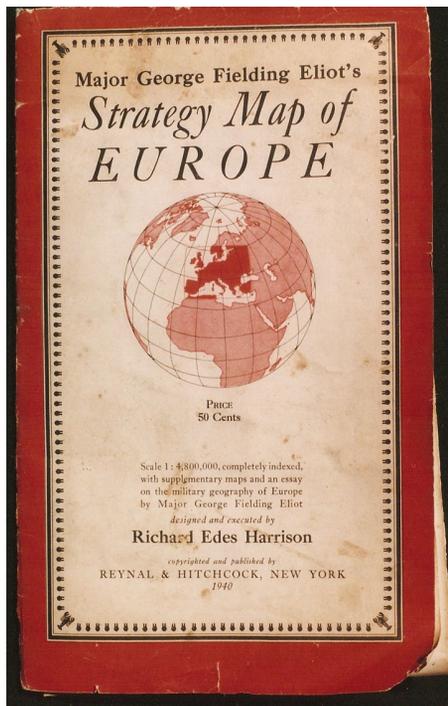
By Eric Beheim

June 6, 2009 marks the 65th Anniversary of D-Day*, the massive landing of 175,000 Allied combat troops along the northern coast of France, which marked the beginning of the end of World War II in Europe.

In an age before television and 24/7 cable news, it was radio that provided the American public (and the world) with up-to-the-minute coverage of the events that occurred on that fateful day.

The following is a summary of what was reported over the CBS radio network while D-Day was unfolding in France. Bracketed annotations have been included to provide a better understanding of what was taking place on the invasion beaches while these programs were going out over the air, and to help clarify and expand upon what was being discussed. (Please note: all times will be given in Eastern War Time which was 6 hours behind the time on the invasion beaches.)

12:00 a.m. [Beginning at 0600 local time,



Throughout World War II, many radio listeners kept Major George Fielding Eliot's Strategy Map of Europe close to their sets so they could quickly locate the places that war correspondents and military analysts were discussing.

the invasion beaches are subjected to intensive naval and air bombardments that last 30 minutes.]

12:30 a.m. [The first waves of U.S. assault troops begin landing at the beaches designated as Utah and Omaha. The troops coming ashore at Omaha Beach encounter heavy German fire.]

12:37 a.m. [Germany's International shortwave service Trans-Ocean reports that "a grand scale amphibious landing" is taking place along the northern coast of France near the Normandy Peninsula. Although this report is unverified, CBS in New York recalls its newsroom staff.]

1:00 a.m. [The first and second waves of British and Canadian troops land on their designated beaches Juno, Sword, and Gold. On Omaha Beach, the second wave of American assault troops lands. In New York, commentator Bob Trout arrives at CBS Headquarters at about 1:30 a.m.]

2:00 a.m. [On Omaha Beach, the further landing of assault troops is suspended because of the congestion caused when the first and second waves are unable to advance off of the beach due to heavy German fire. At great personal risk, Allied destroyers move in closer to the beach to provide fire support to the besieged troops. On Utah Beach, a traffic jam occurs as American engineering units work to create exits in the beach barriers and seawall. British and Canadian troops as well as French commandoes have already begun moving inland from their designated landing beaches.]

CBS New York (Bob Trout): It has been about 90 minutes since German radio first announced (at approximately 6:37 a.m. London time) that an Allied amphibious landing was taking place along the northern coast of France at Normandy. It is not known if this announcement is authentic or a trick intended to make the French underground reveal itself to the Germans. CBS' chief military analyst Major George Fielding Eliot speculates that, if the German reports are true, the objective might be the capture of the port of Cherbourg.

[This assumption was partially correct. Normandy was selected as the invasion site because of weaknesses that were known to exist

in the German coastal defenses that protected the beaches. Other considerations included capturing the important Paris-to-Cherbourg rail junction of Caen, and establishing a secure staging area that was in close proximity to Germany's Rhine-Ruhr basin.]

CBS announces to the staffs on duty at its affiliate stations that it will be continuing "overtime operations" until the invasion is officially confirmed. It has been learned that the BBC broadcasted an announcement to the Netherlands in Dutch stating that a "new phase in the air war has begun." Civilians were advised to move inland at least 22 miles from the coast, and Dutch underground members were told to report to their "trusted leaders."

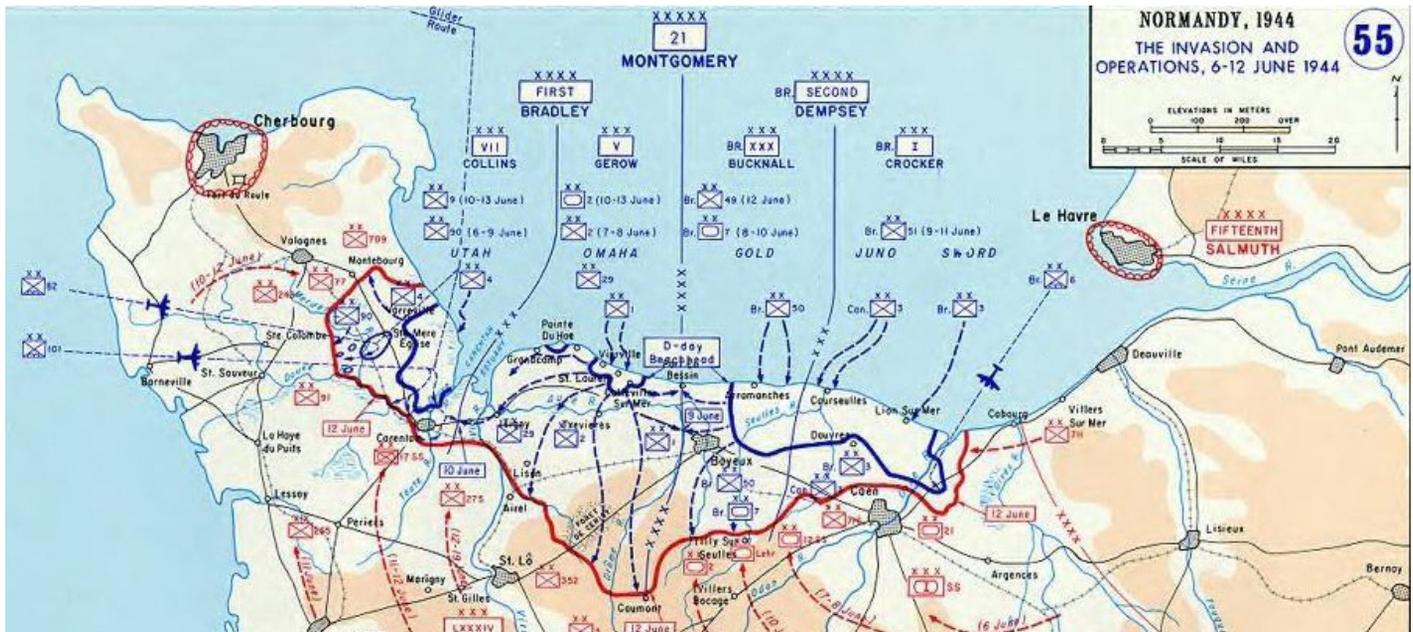
2:30 a.m. It has been almost two hours since the first German announcement was picked up, and there still has been no official confirmation from Allied Headquarters in London that the invasion has begun.

3:00 a.m. [On Omaha Beach, American troops have begun slowly advancing off of the beach and up the bluffs. At Pointe du Hoc, American Rangers have completed the destruction of five heavy guns that had threatened Utah Beach. Canadian and British troops continue to advance inland and have begun to subdue the towns of Courseulles and Bernieres.]

It has been two and a half hours since the first German announcement of the invasion was heard. Japanese radio has not yet reported that the invasion has begun. Using a microphone on a long cable, Bob Trout continues his on-air commentary while walking through the CBS newsroom. He mentions that most of the newsroom staff has now returned to work and is busy consulting maps, monitoring London shortwave circuits, etc. News bulletins from the various wire services are summarized and read as they come out of the teletype machines. Major Eliot comments that the BBC's message to the Dutch underground is "significant."

3:17 a.m. The AP wire service repeats a German announcement picked up by the BBC

* D-Day and H-Hour designate the day and hour of an operation when the day and hour have not yet been determined, or where secrecy is essential. [Wikipedia]



An official military map showing the five D-Day invasion beaches, Utah, Omaha, Gold, Juno, and Sword. The landings took place over an area approximately 60 miles in width.

about the “grand scale amphibious landing.” No additional news has been heard from German Radio or the BBC.

3:25 a.m. Bob Trout reads a BBC bulletin to the Pacific, quoting the German announcement that the invasion has begun. There has still been no official Allied confirmation.

3:32 a.m. CBS switches to the Supreme Headquarters of the Allied Expeditionary Force (SHAEF) in London for the reading of Communique #1, a brief statement to the effect that, under the command of General Eisenhower, Allied naval forces, supported by strong air forces, began landing Allied armies this morning on the northern coast of France. Via shortwave from London, Edward R. Murrow reads General Eisenhower’s Order of the Day that was read to all Allied troops before the invasion began. Major Eliot describes the various phases of an amphibious landing operation. A report from Herbert Clark, recorded onboard one of the Allied flagships before it departed for Normandy the previous evening, is played.

[D-Day combat recordings were made using special equipment that recorded audio onto movie film. A total of 16 of these recording devices were used on June 6th.] A summary of events that are known so far is given.

4:00 a.m. [On Omaha Beach, the order is given to resume landing. This cannot be carried out immediately because of congestion in the sea-lanes approaching the beach. British tank forces begin advancing on Caen. On Utah Beach, U.S. troops continue to move inland despite congestion at key exit points.]

London via shortwave (with static): General Eisenhower addresses the people of Western Europe via radio to inform them of the invasion. The King of Norway gives a radio address in Norwegian to the people of Norway (followed by an English translation.) Communique #1 is

re-read. The Prime Minister of the Netherlands speaks in Dutch (followed by an English translation.) The Belgium Prime Minister speaks to the people of Belgium (followed by an English translation.)

4:15 a.m. The known events that have occurred since first announcement came in are summarized.

Via shortwave from London, Wright Bryant (in a pool report for the Combined Allied Networks) describes riding onboard one of the transport planes that delivered airborne troops to France. This is interrupted by an announcement stating that, at 4:10 a.m. EWT, German radio had reported that fighting was going on between German and Allied troops 10 miles inland. [These actions undoubtedly involved the airborne units that had parachuted into France during the early morning hours and well before the amphibious landings got underway. Due to heavy cloud cover and intense anti-aircraft fire, many units were dropped miles from their designated landing zones. Reports of large numbers of paratroopers landing in widely scattered areas caused great confusion among the Germans.]

Major Eliot speculates on the role being played by British Field Marshal Montgomery in the invasion and on whether or not this is the main attack or the first phase of a larger operation. [The Allies had gone to elaborate lengths to convince the Germans that the main invasion would occur at Pas de Calais. Even after the landings had begun, it would be several hours before the Germans were fully convinced that Normandy was the primary invasion site. In fact, Hitler held back large reserves of men and equipment until June 22nd in anticipation of an assault on Calais.]

Major Eliot identifies the two senior German officers in France: Field-Marshal von Rundstedt and Field-Marshal Rommel. [When the invasion began, von Rundstedt was at his

headquarters in Paris and Rommel was in Germany, celebrating his wife’s birthday. In addition, many other key German officers were away in Rheims, attending a mapping exercise.]

CBS war correspondent Quinton Reynolds comments that, for invasion participants, June 6th “will always be D-Day.” He is interrupted by a shortwave report from England by John W. Vandercook who gives a stirring account of the known events that have occurred so far.

In a shortwave report from England, correspondent Richard C. Hartlett describes flying over the invasion beaches in a Marauder bomber just prior to the first troops going ashore.

Bob Trout summarizes the chronology of events, starting with the first German radio announcement at 12:37 a.m. EWT. He reads a statement just made in Washington, D.C. by retired General John J. Pershing, who led the American troops in Europe during World War I. Via shortwave, the BBC summarizes known events from a British point of view.

6:11 a.m. [At Omaha Beach, American forces move inland and assault the village of Coleville. At Utah Beach, U.S. troops moving off the beach link up with paratroopers of the 101st Airborne Division, who had landed during the early morning hours. At Juno Beach, Canadian forces penetrate more than a mile inland, and capture key bridges over the Seulles River.] Major Eliot describes the equipment and weapons being used by the invasion force. According to a Washington dispatch, Allied troops in France will be receiving hot meals by June 7th.

6:17 a.m. Bob Trout describes how New York City is reacting to news of the invasion. He remarks that he arrived at CBS in a taxi at 1:30 a.m., a little less than an hour after the first German announcement was picked up.

Via shortwave from London, Charles Shaw



U.S. forces going ashore at Omaha Beach. Of the five invasion beaches, Omaha was the best fortified, and the assault troops who landed there suffered some of D-Day's heaviest casualties. Radio commentators who rode in with the troops onboard the various landing craft took the same risks as the soldiers they accompanied.

reports his impressions of how Londoners reacted when first told of the invasion. He also describes being present for the reading of Communique #1 at 9:32 a.m. London Time.

Bob Trout in New York summarizes British Prime Minister Churchill's remarks to the House of Commons, where he first informed British lawmakers of the invasion. Ned Kalmer describes the topography of the French coast where the invasion is taking place. Bob Trout summarizes remarks made by Army Chief of Staff General George C. Marshall the previous evening at the Soviet Embassy in Washington, D.C. Marshall had left immediately afterwards, and it can now be surmised that he was already aware that the invasion was underway. German radio propaganda that has been picked up since the invasion began is commented upon.

Lieutenant Colonel Victor M. Morrison from the French Military Mission in Washington D.C. describes the invasion area and provides assurances that the French underground will be supporting the invasion troops by hindering the Germans. Major Eliot compares information given out by German radio with what is known for certain. The port of Cherbourg seems to be the target. SHAEF reports that German destroyers and "e-boats" are rushing into the invasion area and are "being dealt with." A live report from the Pentagon mentions that aerial photo-reconnaissance was used extensively to plan the invasion. CBS NY repeats the essential facts that are known so far. Photo-reconnaissance conducted since the invasion began shows that Allied troops are moving inland.

7:15 a.m. Moscow has told the Russian people about the invasion. Tokyo Radio's first announcement of the invasion came during a broadcast made to Europe in German. The Japanese people have not yet been told. Elmer Davis, director of the United States Office of War Information, warns that German radio broadcasts should not be relied upon. Richard C. Hartlett's description of flying over the invasion coast during a pre-invasion bombing

mission is repeated. Major Eliot describes the various amphibious landing craft being used during the invasion and how they function.

7:45 a.m. It is announced that French General Charles deGaulle has just arrived in England from Algiers and will speak to the French people via radio this afternoon. Quinton Reynolds (a veteran of the Allied amphibious landings in Italy) describes typical German coastal defenses.

8:00 a.m. [At Omaha Beach, German gun positions have gradually been subdued and new waves of landing boats are unloading more men onto the beach. At Juno Beach, Canadian troops are moving south towards the town of Reviars.] Richard C. Hartlett summarizes the remarks that Prime Minister Churchill made to the House of Commons earlier. Via shortwave, Stanley Richardson gives an eyewitness account of pre-invasion naval activity. (The opening of his report is marred by poor reception.) The BBC has reported that two beachheads have been secured and that troops are advancing inland. Major Eliot comments that the establishment of two beachheads is "big news." An attempt to reach two correspondents in England is unsuccessful due to "technical difficulties." Alan Jackson reads excerpts from New York City's morning newspapers telling about the invasion.

In a pool broadcast from London, Stanley Richardson repeats his eyewitness account of naval activity during the opening phase of the invasion. (The PT boat in which he was a passenger had to return to England before the bombardment began.) Merrill Mueller describes General Eisenhower as having spent the evening of June 5th visiting with airborne troops and briefing reporters. Quinton Reynolds comments that the lessons learned during previous amphibious landings were used on D-Day. He specifically refers to the [August 19] 1942 landing of Allied forces at Dieppe, France, which was a military disaster.

9:00 a.m. [At Pointe de Hoc, U.S. Rangers have assumed defensive positions and are awaiting reinforcement. The British advance towards Caen is stalled by heavy German resistance. Hitler has finally agreed to release some of the SS Panzer divisions that he had been holding in reserve.]

CBS New York (Douglas Edwards): beachheads are established and troops are moving inland. American battleships supported the invasion. Casualties among the airborne troops have been reported as "light." [In fact, the paratroopers sustained heavy losses on D-Day and in the days that followed.] Edwards summarizes what is known to have happened so far and reads excerpts from reports made earlier by CBS' London correspondents. The Liberty Bell was rung today by striking it six times.

London: a recorded report made by Charles Collingwood on board an LST [an amphibious landing ship built to carry tanks] prior to it getting underway for Normandy the previous evening is played. (It includes upbeat interviews with American soldiers who would be going ashore as part of the assault force.)

According to Paris Radio, Marshal Petain [leader of the Nazi-controlled Vichy French Government] has warned Frenchmen not to aid the Allies. Germany's morning newspapers did not tell the German people about the invasion.

Paul White in New York talks with Charles Shaw in London. Shaw describes where various CBS correspondents are currently located and paraphrases his earlier report on how Londoners initially reacted to news of the invasion. From Washington, D.C., Bill Henry reports that Pentagon strategists are now pondering over the effect that news of the invasion will have on the German people and on German troops fighting in Italy. Congress is just assembling. President Roosevelt is reported to have slept peacefully last night. A London bulletin reports that German radio has acknowledged that Allied tanks have penetrated a few miles inland.

Major Eliot describes the typical naval support that is given to an amphibious landing. Quinton Reynolds assures the anxious parents of U.S. military personnel serving in Europe that their sons are going into battle with the best weapons and equipment in history. Ned Kalmer describes how the French underground movement is structured. Alan Jackson reports that the invasion armada is the largest in history. [More than 5,300 vessels of all kinds were involved.] Quinton Reynolds talks about General Eisenhower's invasion broadcast to the people of Western Europe.

10:00 a.m. [At Omaha Beach, German resistance in Coleville is subdued. At Sword Beach, British forces moving inland encounter the German 21st Panzer Division and a pitched battle begins.] (CBS resumes its regular program schedule, which it frequently interrupts with news updates and special bulletins.)

1:00 p.m. [At Omaha Beach, engineers are clearing a path for vehicles through the Coleville Draw. At Gold Beach, British troops

have advanced to the outskirts of Bayeaux. At Sword Beach, the German 21st Panzer Division is forced to withdraw for lack of reinforcements.] CBS World News: Quincy Howe speculates as to how much support General deGaulle and the French underground will be able to give to the Allies. John Daly in New York repeats a bulletin that troops have penetrated several miles inland. He then reads some of the first-hand accounts given earlier by correspondents in England.

The U.S. military's high command [Army Chief of Staff General George C. Marshall, Chief of Naval Operations Admiral Ernest J. King and Commanding General of the Army Air Corps General Henry "Hap" Arnold] recently emerged from the White House after briefing the President. The American people took the news of the invasion quietly. Many churches are holding special services.

Joan Ellis, a 22-year old English teletype operator accidentally sent out a false announcement of the invasion three days earlier. [This might have been done deliberately so that the Germans would discount initial reports of the real invasion.] The Japanese people have been informed of the invasion via German reports. A "flash" from London is read: it has been reported that "many secret weapons" were used for the first time during the invasion.

1:30p.m. Crisco Radio Newspaper (which is immediately preempted by CBS News): following a summary of previous reports, there is an announcement that "casualties are light."

[It would be years before the American public was told the truth about the number of battle casualties that occurred on D-Day. While the exact total will never be known for certain, it is estimated that between 3,000 and 5,000 Allied soldiers were killed that day, with many more wounded.]

President Roosevelt spent the morning writing the prayer that he will broadcast to the nation this evening. (This prayer has been read to the Congress.) Bernardine Flynn talks about the French underground movement. CBS' New York newsroom announces that the invasion front has widened.

1:45 p.m. Military music played by a dance band.

1:50p.m. CBS Washington reports on how official Washington reacted to news of the invasion.

3:00 p.m. [At Omaha Beach, the sight of 100 British gliders arriving at Landing Zone W, west of the Orne River causes panic among the troops of the German 21st Panzer Division. At Juno Beach, Canadian troops moving towards Caen are halted by stiff German resistance.] King George VI's radio broadcast to the British people is heard via shortwave.

3:09 p.m. CBS NY: The pre-invasion air bombardment of the landing beaches involving 11,000 aircraft is briefly described. The German Air Force gave little resistance and



During World War II, commentators from the major U.S. radio networks wore this special patch to identify them and the work they were doing.

only about 50 planes were seen. [By 1944, most of the German Air Force in France had either been destroyed or reassigned back to Germany to protect German cities from Allied bombings.]

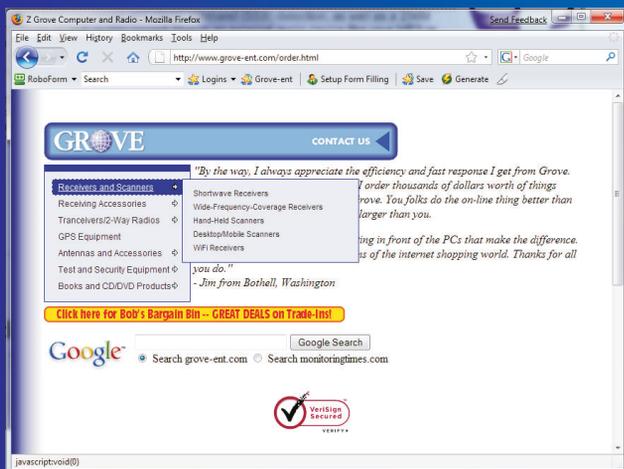
CBS World News, Alan Jackson filling in for Bob Trout (who is home resting after being up all night): It is reported that invasion forces are now nine and a half miles inland and near the city of Caen. German opposition and Allied casualties have been "less than expected." Some of the propaganda being broadcast by German radio about the invasion is described. There is commentary on the how various countries – Russia, Italy, the U.S., etc., reacted to news of the invasion.

3:30p.m. From the Allied Headquarters in

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Zenith's Trans-Oceanic "Clipper," the first portable radio with shortwave bands, was very popular with U.S. military personnel who took them into combat zones around the world. It is probably safe to say that at least one soldier's personal Clipper came ashore at Normandy on D-Day.

Minister Churchill and Russian Premier Stalin in Teheran in November 1943. *[The Russians had been fighting the Germans since 1941 and were anxious for the Allies open a "second front" that would force Hitler to divide his forces between two widely separated geographical areas within Europe.]* At the Teheran Conference, it was also agreed that the Allies' strategy for fighting the war would be to "beat Germany first" and then deal with Japan.

Epilogue

Rommel had predicted that if the Allied invasion wasn't defeated on the beaches within the first 24 hours, a strategic advantage would be gained that would ultimately determine the outcome of the war. In the days following June 6th, tens of thousands of additional Allied soldiers flooded into Normandy along with seemingly unlimited quantities of tanks, trucks, jeeps, aircraft, ammunition, food, medical supplies, communications equipment, fuel, and other materiel needed to fight a war.

Cherbourg fell to American troops on June 27th, providing a deepwater port that allowed the Allies to land even more troops and equipment in France. Paris was liberated on August 25th. Less than a year later, on April 30, 1945, with Germany's major cities in ruins and the Allies closing in on his Berlin bunker, Hitler committed suicide. Germany surrendered unconditionally on May 7th and all hostilities in Europe officially came to an end on May 9th.

The complete CBS June 6, 1944 broadcast day (available inexpensively in the MP3 digital audio format) provides a unique opportunity to relive one of the most profound events of the 20th Century as it was taking place. Sixty-five years after they aired, the news reports, commentaries, and eye witness accounts from that day still have the power to convey a sense of the here and now, while providing many fine examples of radio news reporting at its finest. Whether you're a military buff, a fan of "golden age" radio, or just curious as to how a major event was covered back before television and 24/7 cable news, the CBS June 6, 1944 broadcast day will provide a listening experience that is every bit as memorable as anything you're ever likely to encounter on radio.

Additional Reading

Those interested in learning more about the history of D-Day should read Stephen E. Ambrose's *D-Day June 6, 1944: The Climactic Battle of World War II*, which provides one of the best over-all accounts of "The Longest Day."

MT

ABOUT THE AUTHOR:

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England: British Admiral Ramsey is quoted as saying that losses among naval craft were light and that there had been a noticeable lack of German reconnaissance. (This report is cut short.)

CBS Washington: From the House radio gallery in the Capitol, Bill Henry interviews various U.S. lawmakers. Congressman Al Gore from Tennessee [*father of the future vice president*] mentions that he first heard about the invasion while listening to a portable radio in his office during the early morning hours. He then spent the rest of the night, following the continuing radio coverage. John Daly reports that fighting is taking place in and around the city of Caen. A Frenchwoman who lived in Caen describes the city and the surrounding countryside.

London: A report is heard from Howard Marshall who saw the first assault troops land on one of the beaches. (During this report, the shortwave signal is lost.) CBS NY: The latest dispatches are read. British General Montgomery [*Eisenhower's second-in-command*] is reported as being pleased with the invasion's progress so far. German-controlled Vichy French Radio has admitted that invasion beachheads have been established and are expanding as reinforcements come ashore.

4:00 p.m. *[At Omaha Beach, engineers continue clearing a vehicle route through the Coleville draw. At Gold Beach, British troops stop short of Caen and dig in for the night.]* A program of recorded music (including "Pomp and Circumstance" and various Sousa marches) is heard while waiting for a shortwave report from London. German broadcasts, giving the locations where fighting is taking place, are summarized.

4:15 p.m. Music (*The Raymond Scott Show* is joined in progress.)

5:00 p.m. *[By 2300 hours local time in France, 175,000 Allied troops have already come ashore and are assuming defensive positions for the night. The Germans are consolidating their forces in the city of Caen.]* John Daly relates that, at his press conference, President Roosevelt reported that the invasion was "up to schedule" and that news from the front is "favorable." The invasion date was determined by the fact that June is the time for "small boat weather" in the English Channel.

[This did not prove to be the case in 1944. Originally scheduled for June 5th, the invasion had to be postponed 24 hours because of bad weather. Even on June 6th, conditions were barely adequate for conducting a large-scale amphibious operation. Then, on June 19th, the worst storm in 50 years hit the English Channel, sinking, beaching, or seriously damaging 800 Allied ships. Ironically, June 19th was to have been the "fall back" day for the invasion, had it not occurred on June 6th. Normandy didn't experience its first "small boat weather" until June 25th!]

German radio has admitted that German air resistance to the invasion was light. William L. Shirer analyzes claims made by German radio. It was the first to report news of the invasion in order to establish itself as a reliable source of information. Once the Germans determine if this is the main invasion, it is expected that they will launch a major counter attack. Quincy Howe reports that the decision as to when to begin the invasion was determined at the meeting that took place between President Roosevelt, Prime

The Super-High-Tech Communications Systems of the Stryker Brigade

By Roy Stevenson



What's big and green, weighs 20 tons, runs 60 mph, and has serious attitude? No, it's not a rampaging dinosaur, although you might be forgiven for making that analogy if you were to see a Stryker combat vehicle bearing down on you with all guns blazing.

The Stryker medium armored vehicle is the new mainstay of the army's high tech Stryker Brigade Combat Teams (SBCT). Named after two unrelated medal of honor infantrymen who were killed in action in World War II and the Viet Nam War, the SBCT's can rapidly deploy anywhere in the world within 96 hours, and a full division in 120 hours. USAF C-130s, C-5 and C-17 cargo planes do the hauling. In short, the Stryker vehicle provides rapid response for the new face of 21st century warfare.

The Stryker Brigade Combat Teams

Fully integrated into the modern, newly reorganized U.S. Army division, the Stryker Brigade Combat teams comprise 4,000-5,000 soldiers. A Brigade combat team in World War Two would secure a lodgment of 50 kilometers square. With the exceptional mobility of the Stryker vehicles, they can now secure an area three times that size. However, these days, most of their work comprises patrolling in Iraq and Afghanistan.

The Fort Lewis Stryker Brigade Combat Teams were the first in the US Army to be equipped with Stryker vehicles – about 300 per brigade. The U.S. Army's seven Stryker Brigade Combat teams have received more than 2,100 Stryker vehicles in the past 6 years at a cost of \$4 billion from GM General Dynamics Land Systems Defense Group.

I've driven down to Fort Lewis, Washington, from Seattle to meet some of the Stryker communications specialists and have a look at these high-tech machines, because I've heard interesting things about their communications systems. I'm visiting the 3rd Stryker (Arrowhead) Brigade Combat Team, 2nd Infantry Division (3/2 SBCT) communications Headquarters at Fort Lewis.

As I park and walk across to the Stryker communications workshop, I can't help but notice Stryker vehicles quietly gliding past

me every few minutes along the Ft. Lewis road, the young olive drab battle dressed commanders standing tall out of their turret. These soldiers, most in their 20's, try to maintain a stern military demeanor – obviously a façade for commanding officers – but they can't quite suppress that youthful look of sheer joy that comes with goosing a \$2.5 million light armored vehicle just a tad over the base's speed limit when no one is looking. When they drop the façade and smile, they're more like happy Labradors sticking their heads out of a car window on a hot summer day, than commanders of the elite Stryker Brigade Combat Team.

But the Stryker vehicle commanders know their training is serious business – lives are at stake. A glance through the Special Historical Edition of the Arrowhead Brigade annual of the 3rd Stryker Brigade Combat Team is sobering – death has struck 69 of their compatriots while the brigade has served two tours in Iraq. The three communications specialists I interview, Major Glenn Mellor, Sergeant First Class Fortenberry, and Sergeant Baldwin, have all lost good friends there.



Comm specialists from the 1st Stryker Brigade Combat Team. Left to right: Sergeant First Class Fortenberry, Sergeant Baldwin, Major Glenn Mellor.

The Stryker Vehicle

Stryker vehicles are not tanks – far from it, in fact. They weigh in between 19 and 26 tons, about a third of the weight of the M1A1 Abrams Tank, the U.S. Army's current Main Battle Tank. Designed to be a fast, lightweight, highly mobile infantry platform, the Stryker

BCT packs more punch than a standard light unit.

And these green machines' top speed is listed as 60 mph. One communications specialist tells me he was in one that flew 80 mph downhill in Iraq – not bad for a glorified diesel caterpillar tractor power train. Riding on 8 giant rubber wheels, the behemoth Stryker stands 10 feet high, 9.5 feet wide, 24 feet long, and carries up to 11 soldiers and their weapons. Known for its quiet approach, whether on the road or in urban streets, the Stryker's adaptability has made it the U.S. Army's preferred vehicle.

Science Fiction or Real?

But, after spending an hour or two talking with the Stryker comms specialists, the incredible technological sophistication of its comms and weapons systems impress me over all the vehicle's cool gadgets and weapons. Stryker Brigade communications are so high tech they're scary. "Where," I wonder, "did this technology come from?"

The comms systems used by the Stryker Brigade Combat Teams have changed the face of the modern battlefield. Stryker Brigades see more of the battlespace on their equipment from the ground than any other unit in theater. I can't help comparing the primitive World War Two tank communications with the Stryker's high tech systems that border on science fiction.



Front/side view of Stryker LAV Communications Variant

SBCT Signals Architecture

The Stryker Brigade Combat Team signals architecture is a self-contained structure,

built on Wide Area and Local Area Network protocols. This enables individual Stryker battalions to deploy anywhere and stay in touch with Brigade central command at all times. The Force XXI Battlefield Command Brigade and Below (FBCB2) hardware/software system – 713 per brigade – links satellites, sensors, communications devices, vehicles, aircraft and weapons in a digital network.



FBCB2 Display

On small TV screens inside every Stryker vehicle, blue icons on the digital map of the FBCB2 tactical system can, for example, show the location of friendly vehicles, reducing the possibility of friendly fire. Red icons show the location of enemy forces on the battlefield. This graphic display saves the soldiers from having to collect and interpret verbal reports. Soldiers communicate with commanders and one another via on screen e-mail while on patrol.

The Stryker Variants

This sort of sophistication comes at a price – the basic Stryker vehicle costs 1.5 million, and up to 2.5 million dollars with upgrades and variant specialties. While Infantry Carrier Vehicles and Mobile Gun Systems are the most common variants, Stryker vehicles have been adapted as mortar carriers, reconnaissance vehicles, anti-tank guided missile vehicles, fire-support vehicles, engineer support vehicles, medical evacuation vehicles, Nuclear Biological Chemical (NBC) reconnaissance vehicles, self-propelled 105 mm

ABOUT FORT LEWIS

Named after Meriwether Lewis, leader of the famous Lewis and Clark Expedition to the Pacific Northwest from 1804-1806, it was founded during World War One as Camp Lewis. Since becoming a permanent Army post in 1927, it's served as a major training and personnel center for many divisions during World War Two, the Korean War and the Vietnam War. Lt. Col. Dwight D. Eisenhower served at Fort Lewis from November 1940 to June 1941, as chief of staff of the IX Army corps.

The fort is enormous. Consider these facts: 86,721 acres, 115 live fire ammunition ranges, 29,660 military personnel, 10,900 civilian employees, a Reservist and National Guard component of 15,000, and 50,000 personnel from other government agencies. There are a staggering 691 miles of roads, restaurants, stores, banks, taxis, a bus service, schools, libraries, a hospital, and recreational facilities. It is in effect, a mid-size city.

Howitzer vehicles, and command-and-control vehicles.

Comms Training

All this technology, as you can imagine, requires serious training. And these guys are highly trained. Very highly trained. Considered the most sophisticated in the world, the Stryker vehicle comms systems are described by one weapons expert as “arguably the best-resourced, best-trained and most technically proficient brigade in the history of the Army.”

How long does it take to train the Stryker Brigade soldiers to operate the multi-faceted Stryker comms systems? Soldiers are pre-selected for one of the dozens of Military Occupational Specialty (MOS) areas based on score results from tests taken before basic training. The tests examine the candidates' general knowledge and familiarity with electronics. Then, after 8 weeks of basic training, they face up to 20 weeks of Advanced Individual Training (AIT) in specialty areas including computer classes, where they learn

how all radios in the Stryker net are tied into the computers and signals system. More sophisticated systems such as satellite training can take up to one year.

But that's only the beginning of their training. Once through their MOS/AIT classes, they enter classes of 5 to 15 soldiers, taught by the squad leaders, on the basic operation of the Stryker FM system.

What happens, I ask, if their radio specialist in a Stryker vehicle is incapacitated through enemy action? Not a problem. “Every soldier can load and operate the FM short-range radio system. We're always doing some kind of training,” Sergeant Baldwin tells me. “Most of the officers and NCO's will do most of their training in the Mission Support Training Facility (MSTF).”



Front FM Stack

The MSTF

The Operations Center in the MSTF permits the Fort Lewis Stryker Brigade officers who are waiting to deploy to Iraq, to take a “right seat ride” – in other words, watch actual missions in Iraq in real time. They can talk by videoconference to the soldiers in action, use emails or phones.

Four Stryker driver simulation stations (much like flight simulators) in the MSTF enable the drivers to practice their trade, while the rest of the squad can simulate being on convoy, practicing communicating with each other. The soldiers I'm interviewing call this immersion practice “good experience.” Other drills are practiced using the joint conflict and Tactical Simulations (JCATS), where

Commander's Vehicle

Key Characteristics: (CV Variant)	
Configuration: Combat (inches)	103.65
Height:	122.8
Width:	116.43
Length:	290
Weight:	38,412
Shipping (inches)	112.80
Engine:	350 hp JP-8/Diesel (Caterpillar) (vs. LAV III 275hp)
Transmission:	Allison
Brakes:	5 inch ABS (Common with FMTV 5-Ton)
Other:	8 Wheel Drive; 4 Wheel Steering
Crew:	2 + 3



Design: GM-London Lower: Lin
Assembly: GDLS-ANAD Upper: Lin

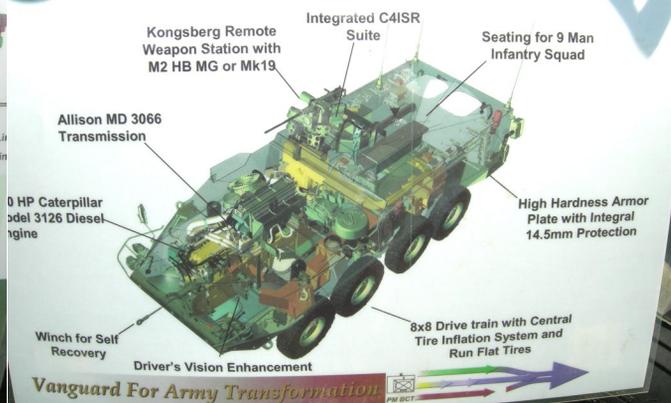
C2	Mobility	Armament
ABCs (MCS, FOS, ASAS) SINCOARS, EPLRS, FBCB2 NTDR (UTRS 2C BCT3) SATCOM w/SOTM HF Radio	Top Speed – 60 mph 50m Dash – 9 sec. Wheel Clearance – 21 in Vertical Climb – 23 in Gap Crossing – 78 in Range – 330 miles (Cbt Ops) Winch: Self Recovery	RWS (50 Cal) Smoke

Survivability
High Hard Steel Structure
Protection: 14.5mm
RPG w/ add on armor
Spall Liner



Specs for the Stryker Commander's Vehicle variant.

STRYKER ICV Technical Characteristics



Technical characteristics of Stryker Commanders Vehicle.

the soldiers learn how to react to unexpected situations.

EPLRS

Each brigade has 735 Enhanced Position Locating and Reporting Systems (EPLRS) to distribute near real-time tactical information by radio. Coordinated by a Network Control Station, EPLRS is a jam-resistant, computer-controlled network that locates and reports the troops' positions. It stays secure by hopping across frequencies, and spreads its spectrum waveform in UHF band. The Enhanced Network Manager (ENM) keeps the EPLRS signals in time with each other.



EPLRS Connection

SINGGARS

But wait, there's more. The SBCT's Single Channel Ground and Airborne Radio System (SINGGARS), a combat net radio, transmits voice and data between ground and airborne forces sometimes used by the Stryker Brigade to contact aircraft when they find themselves in a hotspot. They come in two forms: mounted in the Strykers or in backpack form for the brigade. The SBCT has 1200 of these units, and they use 25 kHz channels in the VHF military radio band from 30 to 88 MHz.

Personal Radio Communications

Each Stryker Brigade has 78 Personal Radio Communications (PRC) "Man Packs," small man portable units used on reconnaissance patrols (119 model), supply convoys, for combat support, and to establish satellite communications (117 model) with supporting units and higher HQ, should the need arise for



Sergeant Baldwin at work maintaining the radio equipment.

air cover or extraction. These PRCs can operate on the SINGGARS net and do not depend on line-of-sight.

The AN/PRC-148 is a highly capable "ruggedized" Multiband Inter/Intra Team Radio (MBITR) that weighs less than 2 pounds. Each SBCT has 450 of these units, designed to operate with the SINGGARS system and all other Stryker PRCs on the ground. Also available, but not used much, are 44 Near Term Digital short-range radios.

Relay/Transmission Vehicles

Something's got to keep all of these signals moving and in synch – this falls on the Brigade's 15 Relay/Transmission Vehicles, now a special Stryker variant. It can operate three different FM frequencies on three separate networks. Two AN/TYC-25 Brigade Subscriber Nodes (BSN) provide switching, routing transmission and network management and security services within one single shelter. One BSN supports the brigade main command; the other supports the brigade support battalion.

With similar capabilities to the Brigade Subscriber Nodes, the Network Operations Center Vehicle provides the hub that controls everything, including piped out signals to satellites, under the SMART T and WIN T systems. These systems are beyond the purview of this article.

Land Warrior System

Then there's the Land Warrior system – a wearable computer system that allows the soldiers in the fields to communicate via the Internet. They can track their Stryker vehicle location and their comrades, via a drop down eyepiece mounted on their helmet. Relatively new, the Land Warrior system is still being integrated into the Stryker array.

In old black and white World War II photos, you'll often see an infantryman walking behind a tank, talking into an old telephone headset connected by wire to the tank commander inside. It was considered sophisticated if World War II tanks could communicate by radio with each other – and even then mostly one-way, so the tank commanders couldn't talk back to their CO. Sometimes infantrymen had to bang on the side of the tank to get the attention of the tank crew inside – back then they did it the hard way, or did without.

World War II veterans would stare in disbelief at the sophistication of the Stryker Brigade's multiple layers of inter vehicle,



Inside view of troop carrying cabin. Most of the comms equipment is lined up along the right side, at about head height.



Full functioning crew station - change frequencies and listen to other nets

Brigade, and Army command and control communications systems.

Clearly, the intent of the Stryker communications systems is to allow for every contingency and emergency. They're designed so that all Stryker commanders know the location of vehicles and personnel in real time – not to mention being able to rustle up all sorts of air and ground support at the drop of a hat. Above all, I leave with a healthy respect for the knowledge, training, and commitment of Major Mellor, Sergeant First Class Fortenberry and Sergeant Baldwin – these are fine young men.

I'm stuck in a rush-hour traffic jam as I exit Fort Lewis. Several Blackhawk helicopters buzz the length of the road at about 50 meters, practicing strafing missions on the stationary line of cars below. I wonder if the Stryker guys have called up the chopper pilots, asking them to give me a farewell demonstration. The zooming choppers remind me of pterodactyls looking for prey, and my mind flashes back to the Stryker vehicles – prehistoric dinosaurs they are not.

MT

ABOUT THE AUTHOR

Roy Stevenson is a freelance writer based in Seattle, Washington. He writes on military vehicles, military history, communications, travel, running, fitness and health.

Beginner's Guide to Baseball on the Radio

As this column is being written, it is Major League Baseball's opening day and the start of a grueling 162 game ordeal that provides plenty of AM band DXing for baseball fans who also happen to be radio fans. The long season stretches over some perfect listening months in the spring and fall and offers some pretty tough conditions for the months in between.

For the price, you can't beat following your favorite local team via their radio broadcasts. An inexpensive AM band radio and a tunable loop antenna are about all you need. But, if your favorite team is not in your market area, you may have to go to extraordinary lengths to tune in for free. Luckily, you have two other options if you don't mind shelling out a little money.

Major League Baseball offers the best deal via its Internet service GameDay Audio for \$14.95 for the entire season. Or, you can sign up for XM/Sirius and get the games via satellite radio for about \$14/month. The MLB GameDay Audio price usually goes down as the season progresses. You can expect to pay half by the time the All Star break arrives in mid-July. Of course, XM/Sirius subscriptions don't go down, since you get all the other XM/Sirius channels, too, for the price.

Tuning in on the National Pastime

Below is a chart of all the Major League ball clubs in both leagues with their flagship English and Spanish language stations. To help ID the stations, I've listed the call sign and frequencies of the flagship stations, along with notes about their nighttime transmitter/antenna configuration, which might help you know what you're up against when you're trying to tune in a particular station. Some – Orioles and Pirates, for example – have FM stations as their flagship and, unless you're in a line of sight of their antenna, you have no hope of hearing them. Most flagship stations are 50 kW powerhouses, but some – Kansas City's KCSG-AM, for instance – operate at 5 kW or less and will be much harder to catch.

Each team maintains a list of all of their English and Spanish affiliates. To find the one you're looking for, go to www.mlb.com and click on "team sites" in the upper left-hand corner of the main page. This is a drop down list that lets you link to any one of the 30 Major League teams.

Once on the individual team's web site, click on "schedule" and that brings another drop down list. Click on "broadcast schedule" or any other item on that list. That takes you to

the schedule page. On the left hand side of that page you'll see a category called "broadcast information." Click on that and you'll be given a list of options, one of which will be something

MAJORLEAGUEBASEBALLFLAGSHIPSTATIONS

AMERICAN LEAGUE

Team	Call Sign	Freq.	Nighttime Con guration
Baltimore Orioles	WJZ-FM	105.7 MHz	
Boston Red Sox	WEEI-AM	850 kHz	50 kW 3 tower directional array
	*WWDJ-AM	1150 kHz	5 kW 3 tower directional array
Chicago White Sox	WSCR-AM	670 kHz	50 kW non-directional tower
Cleveland Indians	WTAM-AM	1100 kHz	50 kW non-directional tower
Detroit Tigers	WXYZ-AM	1270 kHz	50 kW 9 tower directional array
	WXYZ-FM	97.1 MHz	
Kansas City Royals	KCSG-AM	610 kHz	5 kW non-directional tower
	*KMBZ-AM	980 kHz	5 kW 2 tower directional array
Los Angeles Angels	KLAA-AM	830 kHz	20 kW non-directional tower
	*KWKW-AM	1330 kHz	5 kW 2 tower directional array
Minnesota Twins	KSTP-AM	1500 kHz	50 kW 3 tower directional array
	*KMNV-AM	1400 kHz	1 kW non-directional tower
New York Yankees	WCBS-AM	880 kHz	50 kW non-directional tower
	*WQBU-FM	92.7 MHz	
Oakland A's	KTRB-AM	860 kHz	50 kW 4 tower directional array
	*KDIA-AM	1640 kHz	10 kW 4 tower directional array
Seattle Mariners	KIRO-AM	710 kHz	50 kW 2 tower directional array
Tampa Bay Rays	WDAE-AM (Tampa)	620 kHz	5.5 kW 2 tower directional array
	WHNZ-AM (St. Pete)	1250 kHz	5.9 kW 5 tower directional array
	*WGES-AM	680 kHz	.125 kW non-directional tower
Texas Rangers	KRLD-AM	1080 kHz	50 kW 2 directional tower
	KRLD-FM	105.3 MHz	
	*KFLC-AM	1270 kHz	5 kW 6 tower directional array
Toronto Blue Jays	CJCL-AM	590 kHz	50 kW 9 tower directional array

NATIONAL LEAGUE

Team	Call Sign	Freq.	Nighttime Con guration
Arizona D-Backs	KTAR-AM	620 kHz	5 kW 2 tower directional array
	*KSUN-AM	1400 kHz	1 kW non-directional tower
Atlanta Braves	WGST-AM	640 kHz	1 kW 2 tower directional array
	*WVVA-FM	105.7 MHz	
Chicago Cubs	WGN-AM	720 kHz	50 kW non-directional tower
Cincinnati Reds	WLW-AM	700 kHz	50 kW non-directional tower
Colorado Rockies	KOA-AM	850 kHz	50 kW non-directional tower
Houston Astros	KTRH-AM	740 kHz	50 kW 4 tower directional array
	*KLAT-AM	1010 kHz	5 kW 6 tower directional array
Philadelphia Phillies	WPHT-AM	1210 kHz	50 kW non-directional tower
	*WUBA-AM	1480 kHz	1 kW 4 tower directional array
Pittsburgh Pirates	WPGB-FM	104.7 MHz	
Los Angeles Dodgers	KABC-AM	790 kHz	5 kW 2 tower directional array
	KHJ-AM	930 kHz	5 kW 2 tower directional array
	WAXY-AM	790 kHz	5 kW 4 tower directional array
Miami Marlins	*WAQI-AM	710 kHz	50 kW 6 tower directional array
	WTMJ-AM	620 kHz	10 kW 6 tower directional array
Milwaukee Brewers	WFAN-AM	660 kHz	50 kW non-directional tower
New York Mets	*WADO-AM	1280 kHz	7.2 kW 4 tower directional array
	KNBR-AM	680 kHz	50 kW non-directional tower
	*KLOK-AM	1170 kHz	5 kW 3 tower directional array
San Diego Padres	XEPRS-AM	1090 kHz	50 kW 3 tower directional array
	*XEMO-AM	860 kHz	5 kW non-directional tower
St. Louis Cardinals	KTRS-AM	550 kHz	5 kW 4 tower directional array
Washington Nationals	WFED-AM	1500 kHz	50 kW 3 tower directional array
	*WZHF-AM	1390 kHz	5 kW 4 tower directional array

*Spanish language flagship station

like “TV/radio affiliates.” Click on that and you’ll have the complete list.

Some teams – the Braves, Reds and Royals, for example – have amazingly long affiliate lists covering dozens of stations in as many as seven states. A few, such as the Padres and Nationals, have very few affiliates.

Catch a Future Star

Until they make the Major League, players knock around in the minor leagues. Each major league team can have three or more minor league teams ranging in importance from Rookie League to Triple A (the minor league just below the Major League level). Many of the better financed Major League teams have extensive farm clubs, and most of these carry their games live on local radio stations. For example, the Baltimore Orioles AAA team is the Rochester Red Wings and their regular season games air on WHTK 1280 kHz except for weekday afternoon games which are broadcast on WYSL 1040 kHz. It’s rare for a minor league team to have more than one station, their flagship station.

Triple A league schedules are nearly as long as the majors, but Rookie League may only last a few weeks. To find out where to tune for your favorite team’s minor league affiliates, go to www.minorleaguebaseball.com and do the same procedure for finding the broadcast affiliates with the big league teams. Remember, not all Minor League teams will have radio affiliates.

Many players find their way into professional baseball directly out of high school, but others opt to take the college route. Most Division I universities carry many of their baseball games live in the local market. But, by the time you read this, the college season will be over. June 13 marks the beginning of an exhaustive College World Series tournament that takes the top 12 teams from around the country and pits them against each other until a national champion is crowned on June 24th. Those games are carried on the ESPN Radio network. A list of all ESPN Radio affiliates is found here: <http://espnradio.espn.go.com/espnradio/affiliate>

Tips on Better Reception

The best thing you can do to improve AM band reception at your location is to improve your antenna. The greatest aid in listening to Major League Baseball is using a tunable loop AM antenna. These are small, highly directional, sensitive and relatively cheap. There are several available from a wide range of retailers priced from \$30-60. Simply by placing a tunable AM loop near the built-in ferrite rod AM antenna in your radio, you can use the loop to peak the signal. And, by rotating the loop one way or the other, you can null out strong signals on or near the target frequency. It’s a concept as old as AM radio and still works today.

If your radio doesn’t have a built-in ferrite rod antenna, most loops come with a wire that connects the loop to the AM antenna terminals on the back of the radio. This is particularly useful when tuning in on a regular stereo amplifier for your AM band listening. Plug in the loop, turn



Kaito's AN100 AM tunable loop antenna (\$30) positioned near the built-in AM antenna of your radio can really improve reception. The tuning knob peaks the loop to the frequency you're tuning and rotating the whole loop can null out strong signals on the same frequency from another direction. (Courtesy: Kaito U.S.A.)

the loop’s tuning knob for strongest signal and rotate the loop for best signal or to null out the competition on the frequency; that’s all there is to it.

If you’ve got the room on your property, consider setting up a Beverage antenna. A Beverage is simply a very long wire antenna (the longer the better), that doesn’t have to be more than 5 or 8 feet above ground in the direction of the target station you want to hear. Shorter versions of the Beverage (as short as 500 feet) can work well and will hear stations off either end of the antenna.

There’s little you can do to cut down on static crashes (especially as the summer wears on) or the typical fading that occurs on the band. But, you can improve your noise environment. If there is a loud buzz across the whole AM band, there is probably a dimmer switch somewhere in your house that needs to be turned off. Other electrical appliances, transformers, lights and any number of other things can introduce noise to your immediate listening environment. If you live in a city, you’ll have neighbors, street lights, power line transformers and who knows what else causing a hash of interfering sounds.

Yet another take on the AM tunable loop. This from Select-A-Tenna (\$60 from Universal Radio or Grove Enterprises)



Kaito's AN200 offers a different take on the same design at the same price. (Courtesy: Kaito U.S.A.)

To lessen the effect of such interference, you can try powering your receiver by battery, thus getting it



Another take on the AM tunable loop this time from Terk (\$40 from Universal Radio). (Courtesy: Universal Radio)

off the noise-polluting grid. You can also use an outdoor antenna pointed away from the direction of the offending noise source. You might even get some relief using a tunable Digital Signal Processor/filter.

Play Ball!

This season, see how many different Major League teams you can hear over the course of the season. Being located on the edge of the east coast, I’ve only been able to hear half of the total number of teams. Let me know if you fare any better. Can anyone QSL all Major League teams in the course of one season? It’s possible, and would be quite an AM band achievement.



The **Microtecom Perseus** is a cutting-edge, multimode, software defined receiver covering 10 kHz to 30 MHz. Enjoy world class performance: 3rd order IP: +31 dBm, Sensitivity: -131 dBm, Dynamic Range: 104 dB (BW 500 Hz CW). An impressive full span lab-grade spectrum display function is featured. An almost magical spectrum record feature allows you to record up to an 800 kHz portion of radio spectrum for later tuning and decoding. The audio source is via your PC soundcard. The Perseus operates from 5 VDC and comes with an international AC power supply, AC plug converter, SO239 to BNC RF adapter, USB cable and CD with software and detailed manual. Made in Italy. Visit www.universal-radio.com for details!



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Sounds from the “Emerald Isle”

I recently had the pleasure of working with someone who originally hails from the western coast of Ireland and through our conversations, I found my lifelong fascination with Ireland and England being renewed. In an effort to surround myself with culture and music from these areas, I have turned to my Internet radio. In addition to the many local commercial options, Ireland’s main broadcasting source is RTE.

Like its counterpart in England, the BBC, RTE is the national public broadcasting service for Ireland, with both radio and television broadcasts. RTE, Radio Telefis Éireann, offers several options for Internet radio surfers, ranging from current hits to traditional Irish music with Irish-speaking announcers, to an in-depth look into Irish life with news and commentary.

RTE Radio 1

The original RTE station (and first Irish radio station, with broadcasts beginning as 2RN in 1926), Radio 1 might be a familiar catch for those that have tuned in to Radio 1’s longwave broadcast (252 kHz). Radio 1 is the main radio news source for the whole of Ireland. In addition to news, listeners to Radio 1 can also hear sports, music (a very wide range of genres), commentary, the arts, and dramatic readings.

During one recent listening session, I tuned into a news program with interviews from Irish farmers discussing the effect of the global recession on the Irish agriculture industry – complete with the sound of cows and sheep in the background. It was a fascinating glimpse into the everyday issues that are affecting citizens in Ireland.

Some of the featured programming includes Radio 1’s morning show, *Morning Ireland*,



Morning Ireland’s Cian McCormack (left) with Chris Corlett (right) as they arrive to the ‘Gos-san Stones’ high above the village of Laragh in County Wicklow. Pic: Cian McCormack.

which is one of the most listened-to radio programs in the country. Another highly popular program is the controversial *Liveline* which is broadcast weekdays from 1:45 to 3 p.m. IST. The program hosts target particular current events or issues and invite listeners to weigh in on the topics.

RTE Radio 1 Extra

Radio 1 Extra broadcasts sporting events and religious programming and, at least on one listening session, spoken word literary readings.

RTE 2fm

The longtime popular music source in the RTE lineup, Radio 2fm was originally brought to the air in the late ‘70s to counteract the fiercely popular pirate radio stations that had popped up in Dublin and the surrounding areas. The station is famous for live in-studio broadcasts from bands and artists. It is particularly noted for often being the first radio station in the world to broadcast new music from the rock band U2. The most recent example of this was in February 2009, when the band released its latest album.

For a dose of Radio 2fm’s morning crew, check out *The Colm and Jim-Jim Breakfast Show*, 6 to 9 a.m. IST each weekday. Dave Fanning, the person who first brought U2 in-studio so many years ago and who still maintains a friendship with the band, can be heard Mondays from noon to 2 p.m. IST.

RTE Lyric fm

Lyric FM, a relatively new station for RTE, is the home of the arts for Ireland. Listeners to Lyric FM will get a healthy dose of classical, drama, jazz, and world music. The station is celebrating its 10th year of operation throughout 2009, but some of their programs stretch back to the 1980s. The station aired a number of special program events to commemorate their 10th anniversary last month.

Trish Taylor begins the weekday programming with the *Lyric Breakfast* program each morning, with the daily *Culture File* segment being a particularly popular feature. Each day at 8:40 a.m. IST, presenter Maura Eaton discusses upcoming art festivals, theater and music performances in Ireland.

As with many RTE stations, a complete programming schedule can be found on the Lyric fm Web site to give listeners a view of upcoming programming, as it can sometimes vary from day-to-day.

RTE Raidió na Gaeltachta

RTE’s Irish-language service began broadcasts in 1972 and is the longest running station in Ireland, after Radio 1.

RnaG features spoken word programming in addition to traditional Irish music. The station’s presenters speak entirely in Irish and even their Web site is written in Irish. The station is a fantastic choice, though, for those interested in hearing authentic Irish music or even immersing themselves in the Irish language to learn it.

In addition to the terrestrial broadcast stations operated by RTE, there are an assortment of digital-only stations that provide a wide variety of programming content to listeners. In Ireland, these stations are accessible through DAB, but the world can listen in anytime via the Web.

RTE 2XM

A spin-off station to 2fm, 2XM not only uses some of the 2fm presenters, but also what the station calls “up and coming” DJs. A complete schedule of presenters and their various programming niches can be found on the 2XM Web site listed in the table below.

The format of the music carried on 2XM is



directed at a younger audience than that of 2fm’s and calls itself Ireland’s “new music alternative.” The station will often carry uninterrupted coverage of music festivals in Ireland, including the Oxegen festival, which is Ireland’s answer to the large festivals in England and Scotland, held near the same time each year.

RTE Chill / RTE Junior

RTE Junior provides programming specifically aimed at children and broadcasts each day from 7 a.m. to 9 p.m. Children’s music, poetry readings and stories can be found with popular programs such as Louise Foxe’s *Pop Pop* headlining the station’s programming content.

When RTE Junior’s programming day ends at 9 p.m., RTE Chill’s day begins on the same DAB channel and same Internet stream. RTE Chill’s programming consists of lower energy ambient and electronic music (often called “chilled out” music). The station, like several of RTE’s other digital-only stations, is a “playlist service” with no presenters, just non-stop music.

RTE Choice

The talk radio station of RTE, RTE Choice broadcasts news type documentaries, long-format talk programming, comedy programs, and programming through various sources such as the BBC and World Radio Network.

RTE Gold

If you are looking for "classic hits" (the new way "oldies" are now being packaged, since the format now incorporates the album-oriented rock format of the 1970s), RTE Gold is where you want to go. One point of pride for RTE's programmers is that in addition to the "hits" one would normally hear on the radio, RTE Gold also will include deeper album cuts that are not normally heard on "classic hit" stations. The station's Web site boasts artists from Frank Sinatra to Pink Floyd.



During a recent listening session, RTE Gold pumped out "Sweet Dreams" by The Eurythmics, Elton John's cover of The Who's "Pinball Wizard" and The Doobie Brothers' "What a Fool Believes," to give a brief sampling of the mix that can be found on RTE Gold.

RTE Pulse

For those wanting a bit more up-tempo and energetic dance music than can be found on RTE Chill, RTE Pulse presents music straight from the clubs and raves. Unlike RTE Chill, RTE Pulse operates on a 24-hour schedule and features live presenters in the evenings, some that play their own electronic music live in studio.

In addition to the traditional songs and artists that can be found traditionally in the electronic music format, RTE Pulse also includes disco and dance music from '80s and '90s in their programming mix.

RTE Worldwide

In addition to the stations above, RTE also offers their programming content to World Radio Network. RTE programming for North America on World Radio Network can be heard for a total of two hours a day: from 9 to 10 a.m., from 2 to 2:30 p.m., and from 5 to 5:30 p.m. RTE also offers programming on WRN for other regions of the globe, a complete and current schedule (program times can change) can be found at the Web site listed in the table below.

For more of the Emerald Isle

If you realize that you missed your favorite RTE program, many of the stations listed above also include links on their Web sites to download podcasts of popular station programs and presenters. For more information, just browse the Web sites listed in the tables below.

For those wanting a one-stop source for everything RTE Radio is streaming, RTE has a media player, much like the BBC's, with links

to both Real Audio and Windows Media Player streams of each of their stations.

Also, RTE, much like the BBC, has a television division with several stations serving Ireland. While many are unable to stream their content (especially for those outside of Ireland), many of the programs that can be found on each station do have a Web site where program-specific content can be found.

In addition to RTE's stations and programming options, there are several other terrestrial broadcast stations in Ireland that stream online. For those of you with a Wi-Fi radio in your home, a quick glance at the Irish stations it offers will turn up a large assortment of stations to suit your individual taste.

For those without a Wi-Fi radio, Web sites like www.reciva.com can also provide excellent lists of stations from a particular area. As of press time, a simple search of stations tagged for Ireland on Reciva alone produced 225 stations!

In the meantime, if you are looking for a distinctively Irish viewpoint on the world, yearn for traditional Irish folk music, or even want to hear current or classic hits presented by Irish DJs, RTE should have an option that will suit whatever programming content you are searching the Web for!

GLOBALNETLINKS

RTE Media Player -
www.rte.ie/radio/liveplayer_av.html?1,null,200,http://dynamic.rte.ie/av/live/radio/radio1.smil
RTE Worldwide - North America -
www.rte.ie/radio/namerica.html
World Radio Network RTE -
<http://wrn.org/listeners/stations/station.php?StationID=33>
RTE Radio -
www.rte.ie/radio/
RTE Radio 1 -
www.rte.ie/radio1/index.html
RTE Radio 1 Extra -
www.rte.ie/radio1/sport/
RTE 2fm -
<http://2fm.rte.ie/>
RTE Lyric FM -
www.rte.ie/lyricfm/index.html
RTÉ Raidió na Gaeltachta -
www.rte.ie/rnag/index.html
RTE 2XM -
www.rte.ie/digitalradio/twoxm/index.html
RTE Junior -
www.rte.ie/digitalradio/junior/index.html
RTE Chill -
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Finding Frequencies

Finding active frequencies for your local area can often be a challenge, especially when a favorite channel suddenly goes silent. In other cases you'd simply like to know what's out there to hear. This month we assist readers in tracking down public safety frequencies in North Carolina and Texas.

Gaston County, North Carolina

Dan,
In the last two weeks Gaston County, Gastonia City, Mt. Holly City, all in North Carolina, are switching to the 800 MHz frequency. We have searched, and tried to find where they have gone, with no luck. Can you help us find out where they are, the control, and primary frequency for this, what I guess is a trunked system. We know that this system is patched to a 400 MHz system, but we still cannot find the 800 MHz system.

Thank you for your help.
Ronnie via the Internet



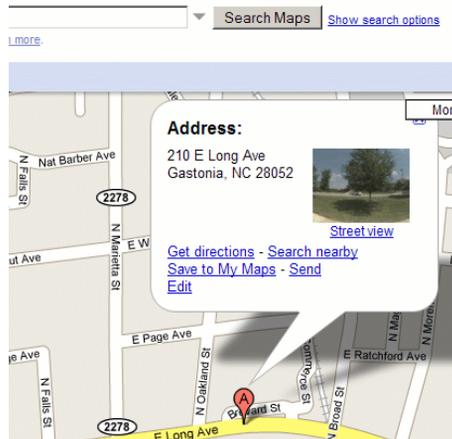
Gaston County is located in southern Piedmont area of North Carolina, west of Charlotte, and is home to just over 190,000 people. The city of Gastonia is located in the center of the county, while Mt. Holly is at the eastern edge of the county along the Catawba River.

Gaston County Public Safety is being absorbed into the larger Charlotte/Mecklenburg ("Charmeck") trunked radio system. The city of Charlotte and the county of Mecklenburg have operated a Motorola Type II analog SmartZone system for more than a decade and are expanding to form a regional network. Gaston County is moving from their old conventional frequencies and has set up a maintenance fee payment plan to Mecklenburg County for service.

Street View

A repeater connected to the Charmeck system is located in Gastonia on East Long Avenue and is serving central Gaston County. If you are local to the area you can drive by and take a look for yourself.

If have access to the Internet, you can see



the tower from anywhere by using a mapping service from Google called "Street View." Go to <http://maps.google.com> and enter "210 E Long Avenue, Gastonia, NC" into the search box.

Google will return a street map with a balloon pointing to the address location. Inside the balloon, directly under the photograph, will be a selection for Street View. Clicking on that link will bring up a street-level view of the address with pan, tilt and zoom controls. By panning to the northeast, you can see the 90-meter antenna structure next to the Police Department building.

Gaston County Frequencies

The Gastonia site is licensed to transmit on three frequencies: 854.0875, 855.1125, and 856.0625 MHz. It is controlled remotely from the Charlotte Radio Communications Division in Mecklenburg County. You should find the control channel on 854.0875 MHz.

There is also a pending license in the FCC database for that same repeater site that authorizes four additional frequencies: 856.5875, 858.1875, 859.1875 and 859.5375 MHz. You may find control channel activity on 856.5875 MHz.

Talkgroups for activity in Gaston County include:

Decimal	Hex	Description
80	005	Belmont Police (Dispatch)
272	011	Mount Holly Police (Dispatch)
2384	095	State Highway Patrol
21424	53B	Gastonia Police (Dispatch)
21456	53D	Gastonia Police Channel 2
21488	53F	Gastonia Police (Investigations)
65040	FE1	Gastonia Police Vice (Encrypted)



Based on the topography of the county, additional repeater sites will be needed to provide adequate coverage. These locations should become evident as the transition to Charmeck continues.

Some of the old VHF and UHF frequencies may remain active during and after the transition via a *simulcast* ("simultaneous broadcast") where the transmission is patched between the old frequency and the trunked radio system.

Frequency	Description
151.250	County Fire Fireground
151.400	County Fire Dispatch and Fireground
153.830	Gastonia Fireground
154.235	Gastonia Fire Dispatch and Fireground
154.280	Fire Mutual Aid
155.235	County Emergency Medical Services Dispatch and Operations
155.280	Statewide Emergency Medical Services Mutual Aid
155.340	County Emergency Medical Services HEAR Network
155.400	County Emergency Medical Services Channel 2
158.745	County Fire (Command)
453.3500	Gastonia Police Investigations
453.5750	County Jail
453.6000	Gastonia Police
453.7000	County Law Enforcement Mutual Aid
453.7250	County Police Dispatch
453.8250	County Sheriff Patrol
453.8750	Cherryville, Ranlo, and Dallas Police
460.0750	County Police Tactical
460.1500	Gastonia Police Information

Collin County, Texas

You give police and fire frequencies for different areas across the USA but they are usually in some area that is out of the reach of my scanner. I live in McKinney, Collin County, Texas, and would like to see a report on frequencies in my county.

C.E. in Texas

Collin County is located in northeast Texas and is part of the Dallas-Fort Worth Metroplex. It is one the fastest growing locations in the country, going from 491,000 residents in 2000 to more than 762,000 in 2008. McKinney is the county seat.

Collin County operates a Motorola Type II analog Smartnet system on six frequencies: 860.4625, 866.2250, 866.7250, 867.2250, 867.7250 and





868.1250 MHz. The system includes county sheriff and fire as well as local fire departments.

Four repeater sites provide coverage across the county. They are located in Blueridge, Celina, Farmersville, and McKinney. The McKinney site is also licensed to transmit on 866.0125, 866.5125, 867.0125, 867.5125 and 868.0125 MHz.

Talkgroups on the system include:

Decimal	Hex	Description
16	001	County Common 1
48	003	County Common 2
80	005	County Emergency
112	007	Allen Fire
144	009	Blue Ridge Fire
176	00B	Branch Fire
208	00D	Fairview Fire
240	00F	Farmersville Fireground
272	011	Frisco Fire (Backup)
304	013	Josephine Fire
336	015	Lavon Fire
368	017	Lowry Crossing Fire
400	019	Lucas
432	01B	Jail Booking Offices
528	021	Minimum Security Jail
560	023	Jail Dispatch
592	025	County Courthouse Operations
624	027	County Facilities Maintenance
656	029	County Roads and Bridges
784	031	County Public Works
816	033	County Road Construction
848	035	County Fire Marshals
880	037	Fire Investigations
912	039	County Fire (Dispatch)
944	03B	Anna Fire
976	03D	Celina Emergency Medical Service
1008	03F	Weston Fire
1040	041	Prosper Fire
1072	043	Sheriff Dispatch
1104	045	Sheriff Inquiry
1136	047	Sheriff Field Investigations
1168	049	Sheriff Field Operations
1200	04B	Sheriff Emergency Response Team
1232	04D	Constable Precinct 1
1264	04F	Constables (Warrant Service)
1296	051	Jail Operations 1
1328	053	Sheriff Channel 1
1360	055	Sheriff Channel 2
1424	059	Sheriff Vice and Narcotics (Encrypted)
1456	05B	Sheriff Negotiators
1680	069	McKinney Fire (Backup)
1712	06B	Murphy Fire (Backup to Plano TRS)
1744	06D	Nevada Fire
1776	06F	Parker Fire
1808	071	Plano Fire
1840	073	Princeton Fire
1872	075	Royse City Fire
1904	077	Westminster Fire
1936	079	Wylie Fire

2000	07D	Frisco Police (Backup)
2096	083	Jail Operations 2
2192	089	Melissa Fire
2224	08B	McKinney Police (Backup Dispatch)
2256	08D	McKinney Public Works (Backup)
2352	093	Constable Precinct 2
2384	095	Constable Precinct 3
2416	097	Constable Precinct 4
2736	0AB	Sheriff Traffic Operations
2768	0AD	Sheriff Fairview/Melissa/Parker Police
5000	138	Sheriff Tactical

McKinney, Texas

The city of McKinney operates their own Motorola Type II analog system on five frequencies: 856.3625, 857.3625, 858.3625, 859.3625 and 860.3625 MHz. Talkgroups on the system cover police, fire and other city services.

Decimal	Hex	Description
48	003	Police Patrol 1 (Dispatch)
112	007	Police Patrol 2
176	00B	Texas Law Enforcement Telecommunications System
208	00D	Narcotics
240	00F	Police (Tactical)
336	015	Police Special Operations 1
368	017	Police Special Operations 2
432	01B	Police Criminal Investigation Division
528	021	Police Motor Units
688	02B	Police Talk-about
720	02D	Radio Shop
848	035	Fire (Dispatch)
912	039	Fire Fireground 1
944	03B	Fire Fireground 2
976	03D	Fire Fireground 3
1040	041	Emergency Medical Services (Dispatch)
1136	047	Office of Emergency Management
1200	04B	Emergency Medical Services 1
1264	04F	Emergency Medical Services 2
1296	051	Fire Training
1360	055	Fire Inspectors
1712	06B	City Engineering
1776	06F	Animal Control
1840	073	Fleet Maintenance
1872	075	Health Department
1936	079	Parks and Recreation
2000	07D	Solid Waste Department
2032	07F	Street Department
2096	083	Water Department 1
2128	085	Water Department 2
2192	089	Oak Hollow Municipal Golf Course
2224	08B	Traffic Signals

To the south, the city of Plano also operates their own Motorola Type II trunked radio system. Frequencies are: 866.0625, 866.1500, 866.1750, 866.6500, 866.6750, 866.9625, 867.0625, 867.1500, 867.1750, 867.6500, 867.6750, 867.9625, 868.0625, 868.2750 and 868.3000 MHz.

As you can see from the number of talkgroups listed below, the system provides public safety and city services radio communication for Plano and several nearby communities.

Decimal	Hex	Description
16	001	Plano Fire Emergency Announcements
48	003	Plano Police Emergency Announcements
80	005	Plano Pub Works Announcements
112	007	Plano Parks and Recreation Announcements
144	009	Plano Fire 2 (Status Updates)

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176	00B	Plano Fire 3 (Medical Response)	16272	3F9	Allen Police Investigation 1
208	00D	Plano Fire 4 (Investigations and Assists)	16336	3FD	Allen Police Tactical
			16368	3FF	Allen Police Traf c
240	00F	Plano Fire 5 (Fireground)	16400	401	Allen Special Events
272	011	Plano Fire 12 (Patch to Richardson Fire)	16432	403	Allen Fire 1 Dispatch
			16464	405	Allen Fire 2 Incident Command
304	013	Plano Fire 11 (Frisco Fire)	16496	407	Allen Fire 3 Operations
336	015	Plano Fire 13 (Training)	16528	409	Allen Fire 4 Operations
368	017	Plano Fire 1 (Dispatch)	16560	40B	Allen Fire 5 Operations
400	019	Plano Police Supervisors	16592	40D	Allen PW Primary
432	01B	Plano Police Warrants	16624	40F	Allen Utility Billing and Metering
464	01D	Plano Police (East Dispatch)	16656	411	Allen PW Water Utilities
496	01F	Plano Police Talk (A Sector)	16688	413	Allen Streets and Maintenance
528	021	Plano Police Talk (B Sector)	16720	415	Allen Public Works Administration
560	023	Plano Police Talk (C Sector)	16816	41B	Allen Parks Maint Ch-1
592	025	Plano Police Operations 1	16848	41D	Allen Parks Maint Ch-2
624	027	Plano Police Operations 2	16880	41F	Allen City Events
656	029	Plano Police Operations 3	16912	421	Allen Building Inspections
688	02B	Plano Police Investigations	16944	423	Allen Code Enforcement
720	02D	Plano Police CAPERS	16976	425	Allen Health Department
752	02F	Plano Police Narcotics 1	17008	427	Allen City Planning
784	031	Plano Police Narcotics 2	17040	429	Allen Citywide
816	033	Plano Police Information	17104	42D	Allen Police Canine
848	035	Plano Jail	17136	42F	Allen Police Dispatch 2
880	037	Plano Police Crime Scene Investigation	17168	431	Allen Police Narcotics 1
			17200	433	Allen Fire 6 Training
912	039	Plano Police Crime Prevent Unit	17232	435	Allen Fire 7 Training
944	03B	Plano Police Technicians	17264	437	Allen Police/Fire Uni ed Command
976	03D	Plano Police Emergency Response Team 1	17296	439	Allen Police Events 1
1008	03F	Plano Police Emergency Response Team 2	17328	43B	Allen Police to Fire (Interoperability)
				43D	Allen Jail
1040	041	Plano Police Talk (D Sector)	17360	43F	Allen Animal Control
1072	043	Plano Fire 14 (Training)	17392	441	Allen Police Talk
1104	045	Plano Fire 15 (Administration)	17424	443	Allen Police System-wide Tactical
1136	047	Plano Police General	17456	445	Allen Police Investigators 2
1392	057	Plano Streets	17488	447	Allen Police Events 2
1424	059	Plano Streets (Supervisor)	17520	449	Allen Police Narcotics 2
1456	05B	Plano Water Utilities 1	17552	44B	Allen Police Tactical 2
1488	05D	Plano Water Utilities 2	17584	4B1	Frisco Police Announcements
1520	05F	Plano Utilities (Supervisor)	19216	4B3	Frisco Fire 5
1648	067	Plano Solid Waste Collection	19248	4B5	Frisco Public Works Announcements
1840	073	Plano Citywide Channel	19280	4B9	Frisco Police Operations 1 (Dispatch)
1872	075	Plano Citywide Supervisor		4BB	Frisco Police Operations 2
1904	077	Plano Building Inspectors	19344	4BD	Frisco Police Investigators
1936	079	Plano Building Inspectors		4BF	Frisco Police Narcotics
1968	07B	Plano City Plant	19376	4C3	Frisco Fire 1 (Dispatch)
2000	07D	Plano City Manager	19408	4C5	Frisco Fire 2
2416	097	Plano Fire 6 (Fireground)	19440	4C7	Frisco Fire 3
2640	0A5	Allen Fire 8	19504	4C9	Frisco Fire Administration
2736	0AB	Plano Police Canine 1	19536	4CB	Frisco Fire 4
2768	0AD	Plano Police Traf c Unit	19568	4CD	Frisco Public Works (Dispatch)
2800	0AF	Plano Police to Plano Fire (Interoperability)	19600	4CF	Frisco Utility Billing
			19632	4D1	Frisco Water Utilities 1
2864	0B3	Plano Police Negotiators	19664	4D3	Frisco Water Utilities 2
2992	0BB	Plano Police Neighborhood Officers	19696	4D5	Frisco Streets 1
			19728	4D7	Frisco Streets 2
3024	0BD	Plano Police Public Safety Officers	19760	4D9	Frisco Pub Works Administration
3056	0BF	Plano Police to Plano Fire and Schools (Interoperability)	19792	4DB	Frisco Parks 1
			19824	4DD	Frisco Parks 2
3088	0C1	Plano Police Canine 2	19856	4DF	Frisco Events
3152	0C5	Plano Police Events	19888	4E1	Frisco Code Enforcement
3184	0C7	Plano Fire Events	19920	4E3	Frisco Planning
3312	0CF	Plano Police Training	19952	4E5	Frisco Vehicle Services
3504	0DB	Lucas Fire 1 (Dispatched by Plano)	19984	4E7	Frisco Citywide
			20016	4E9	Frisco Police Operations 3
3536	0DD	Lucas Fire 2	20048	4EB	Frisco Police Operations 4
3568	0DF	Lucas Citywide	20080	4ED	Frisco Police Operations 5
3600	0E1	Plano Police (West Dispatch)	20112	4F1	Frisco Police Events 1
3760	0EB	Parker Fire 1 (Dispatched by Plano)	20144	4F3	Frisco Police Events 2
			20176	4F5	Frisco Police Events 3
3792	0ED	Parker Fire 2	20240	4F7	Frisco Police Events 4
4080	0FF	Plano Police Operations 4	20272	4F9	Frisco Police Events 5
4112	101	Plano Police Investigations 2	20304	4FD	Frisco Fire 9
4144	103	Plano Police Investigations 3	20336	4FF	Frisco Fire 10
16016	3E9	Allen PD Announcements	20368	501	Frisco Fire 11
16048	3EB	Allen Fire Announcements	20432	503	Frisco Fire 12
16080	3ED	Allen Public Works Announcements	20464	505	Frisco Fire 13
			20496	531	Plano Police School Liaison Officers
16112	3EF	Allen Police Dispatch	20528		
16144	3F1	Allen Police Inquiries	20560		
16176	3F3	Allen Police Operations 1	21264		
16208	3F5	Allen Police Operations 2			
16240	3F7	Allen Police Operations 3			

21296	533	Lucas Fire Ch-3
21328	535	Plano Police Equipment Support Services
21360	537	Lucas Public Works
21392	539	Prosper Police
21424	53B	Prosper Fire
21616	547	Frisco Police Traf c
21680	54B	Frisco Fire 6
21744	54F	Frisco Fire Training
21776	551	Murphy Police Dispatch
21808	553	Murphy Police Inquiry
21840	555	Murphy Police Investigators
21872	557	Murphy Police Operations
21904	559	Murphy Fire Dispatch
21936	55B	Murphy Fire Operations
21968	55D	Murphy Public Works

York County, Pennsylvania

It may seem like this column has become a complaint forum for M/A-COM radio systems, but the trouble reports just keep coming in.

An investigation is underway to determine the cause of a fire department paging failure that occurred on April 15, 2009. That night at least two fire companies never received an alert informing them of a house fire in York County, Pennsylvania.

Although at least one company did receive the alarm and responded to the fire; firefighters from at least two other companies found out about the fire through other means, including their old paging system and listening to scanner activity. At one station, the on-duty supervisor resorted to calling firefighters directly on their cellular telephones.

Records at the York County 911 center show that a text message was transmitted out to fire companies that night, but many of the intended recipients did not receive it.

The paging system is part of a \$36 million 911 county radio network purchased from M/A-COM.

Radio Refund

Meanwhile, the Eureka Volunteer Fire Company, which serves Stewartstown and the surrounding area in York County, PA, is demanding their money be returned and has threatened to sue the county to get it back. More than a year ago they paid a total of \$39,500 for portable radios which turned out to have faulty batteries and chargers. The radios cost up to \$2,300 each, depending on features, but could not hold a charge for more than an hour. Even if the replacement batteries and chargers work, their advertised eight-hour rating is not sufficient for a normal 12-hour shift. More significantly, because the new network has not been completed for firefighters, Eureka has been unable to use the radios.

If they actually file suit, it will be the second legal action taken against the county related to the M/A-COM system. Back in February, three police unions filed a lawsuit demanding the county return to the old system due to problems with the new network.

That's all for this month. More information, links and frequencies can be found on my web site at www.signalharbor.com. I also welcome your questions, comments and activity reports via electronic mail to dan.veeneman@monitoringtimes.com. Until next month, happy scanning!

Q. *I would like to use a hand-held scanner to pick up NOAA weather broadcasts 150 or more miles away. Can I do it with an outside antenna? (George Hamer, Brooklyn, NY)*

A. Reliable reception of a NOAA 162 MHz weather station 150 miles or more away is a virtual impossibility with conventional consumer radios and antennas. I am located on a mountain top with a large beam antenna and an AOR 5000+3 receiver, and I can't do it. About 100 miles is tops even with the best equipment.

Q. *Every now and then **Outer Limits** reports on radio pirates getting busted, but does the FCC ever go after those CB operators using linear amplifiers? (Mark Burns, Terre Haute, IN)*

A. Enforcement of the provisions set by the FCC regarding the CB radio service was essentially abandoned by the FCC some years ago, due to lack of manpower and the enormous volume of complaints from irate citizens.

A Congressional Bill was signed into law by President Bill Clinton November 29, 2000, permitting state and local governments to set enforcement regulations for violations of FCC rules and regulations of the CB radio service. Details may be read at: www.arrl.org/news/stories/2000/11/29/3/cbbill.html

Q. *Other than adding more elements to an antenna, how best can I improve my HDTV reception? (Henry Kahuma, Kampala, Uganda).*

A. If your HDTV frequencies are the same as your analog TV frequencies, there is absolutely no difference in antenna design; however, signals that are weak but receivable on analog are not received at all on HDTV. That is because, in order for a digital picture to be made, there can't be any noise interfering with the digital stream.

In such a case, you need higher system gain, and there's no difference in the requirements for TV reception than for VHF/UHF communications signals. Here are the options:

1. Replace the antenna with one of higher gain for the frequencies you want to receive;
2. Raise the antenna higher so that it can "see" further over the horizon, and that you avoid obstructions like buildings, hills or trees;
3. Be sure it's pointed in the proper direction;

4. For multiple targets, it needs to be rotated;
5. Replace the lead-in cable, especially if it's old, with low-loss cable like RG-6/U or ladder line;
6. Except for a few extra feet, don't use longer cable than necessary;
7. If you use twin-lead, be sure it doesn't run against metal surfaces;
8. Install a preamplifier, preferably at the antenna rather than at the TV.

Q. *After years of service, I replaced my scanner battery pack for my BC245XLT hand-held scanner. I disassembled the old one out of curiosity and found a small, square sandwich of thin sheet metal connected in series between two cells. I suspected that it was thermal overload protection, so I connected my ohmmeter and heated it with my soldering iron. Indeed, it broke the circuit, and then reset itself. I triggered it multiple times. Can you tell me what this component is called, and how it works? (Judy May, W1ORO, Union, Kentucky)*

A. Yes, Uniden does employ such thermal switches to prevent explosive damage, injury, or even fire from overheating a battery while attempting to charge it; they're used in hair dryers and thermostats, too.

Several years ago I had the experience of trying to charge a third-party replacement battery in my Bearcat scanner; since it wasn't an original Uniden battery, it didn't have the thermal protection. I was driving down the road with the charge cord plugged into the cigarette lighter, when suddenly smoke started pouring out of the scanner. I threw it out the window, then retrieved it after it had cooled down!

The device is known as a bimetallic (two metals) thermal switch; it may be a snap spring or snap disk. The two dissimilar metals – traditionally brass and steel – are bonded together as a single, sandwiched piece of metal. They remain flat against the electrical contact when cool, but when heated, they bend away, because each metal has a different coefficient of expansion, thus breaking the circuit.

Q. *While living in England during the 1950s I recall hearing an American voice reading a series of numbers while tuning my TV set*

through the 40-60 MHz channels. At first I thought these were police transmissions with license plate registrations. Any idea what they might have been? (Brian Jagger, Calgary, CAN)

A. The 1950s witnessed a blitz of sunspots which created enormous skip conditions worldwide in the shortwave spectrum. My best guess is that you had stumbled across a harmonic of one of the mysterious (though solved years ago by MT radio enthusiasts) "spy numbers" stations sending encrypted messages to agents abroad.

It's even possible that you were located near one of these unobvious transmitting stations and the overload was being detected by your TV set.

Q. *If I can get a lift to the next Space Shuttle going to the moon and take along my communications receiver and enough wire for a 2000 foot Beverage antenna pointed at the earth, would I pick up anything besides frost bite? (Alvin Dattner, email)*

A. Good question, Alvin. Since you don't have a true ground plane reference for the Beverage, it's going to become a trailing longwire with significant lobing favoring the ends; thus the trailing end would be facing earth.

Yes, I think you will do fine over a wide spectrum from shortwave upwards in frequency. Naturally, the only thing stopping the waves between Earth and you would be the condition of the ionosphere, and that would change from day to night.

Q. *In WWII movies, we often hear the radio operator respond "Roger, wilco." What is the derivation of this? (G. Riggelman, email)*

A. "Roger" is the phonetic for the letter R, a hold-over from the Morse code abbreviation for "Received."

"Wilco" is the voice contraction for "Will comply."

Questions or tips sent to Ask Bob, c/o MT are printed in this column as space permits. Mail your questions along with a self-addressed stamped envelope in care of MT, or e-mail to bobgrove@monitoringtimes.com. (Please include your name and address.)

XSL: Beating the “Slot Machines”

Steve Harlow, a California ham and programmer, recently e-mailed this column with what he’s learned about those mysterious Japanese “Slot Machine” stations. This very strange operation was first discovered late in 2000 by Chinese listeners. The weird, semi-musical tunes it repeats 24/7 are so bizarre, and so unlike anything else on the air, that utility fans have been drawn to it ever since.

ENIGMA 2000, the online incarnation of the authoritative European Numbers Intelligence Gathering and Monitoring Association, has designated this one XSL on its “control list.” This list really did bring order from chaos in the numbers racket. “X” is the prefix for “oddties,” and the “SL” is of course “slot.”

Why Slot Machine? Thank this editor for that one. Far too late one night, while I was still totally weirded out by this station, it suddenly hit me that it sounded unsettlingly like a certain gambling machine that I’d played in Lake Tahoe. From then on, it was the Slot Machine, and I’m glad the rest of the hobby agrees with me.

What We Knew Before

Intelligence came fairly quickly on this signal. It was obviously phase-shift keying (PSK), from transmitters almost immediately traced to Japan. While the people who knew for sure couldn’t tell, it was almost certainly military. The Japan Maritime Self-Defense Force (“Japanese Navy”) was suspected.



The Japanese naval ensign. It would appear they didn’t change it after WWII.

It was also obvious that the electronic-music noise was the idler, not the message. That came in short, hissy data bursts.

For various technical reasons, the traffic was surely a deeply encrypted broadcast from multiple land-based transmitters to units in the field.

People who know about such things assured me that the “music” was indeed a channel-testing and decryption-synchronizing system. It enabled the receiving stations, whoever they are, to properly configure for successful copy.

The first six frequencies to be discovered are still the loudest by far in the United States, but eighteen frequencies have now been logged. These tend to come in pairs, and some are audible only in Japan. It’s interesting that none are above 9 megahertz. This suggests that the designers never needed a truly global reach. All

frequencies are listed in the table below.

While the frequencies lack atomic accuracy, and the signals are kind of grungy sounding, the time sync between audible channels is very tight. Evidently, timing is important to XSL’s unique mode. In fact, as we are about to find out, it’s everything.

What We Know Now

At least for me, this was pretty much all we knew until the week I wrote this. That’s when I found out that Steve Harlow had identified XSL as quadrature phase-shift keying (QPSK), with a symbol speed of 1600 baud. He’d also cracked the structure of its idler, and added the mode to version 1r4 of his free Windows multimode program named Sigmira.

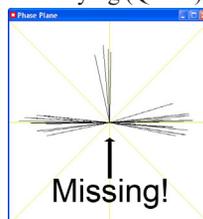
Sigmira was designed primarily for use with the SDR-IQ and SDR-14 software defined radios made by RFSpace. Complete specs and screen shots for these units are at www.rfspace.com/ However, it also works nicely with conventional radios, and with wave files. It’s a neat little program, available at www.saharlow.com/technology/sigmira/index.htm

In fact, Sigmira had already become part of the hard-core utility arsenal, due to its superior performance on another digital mode called STANAG 4285. STANAG stands for “Standardization Agreement” and is the military specification for an 8-state PSK mode used by members of the North Atlantic Treaty Organization (NATO).

In XSL’s case, Steve has analyzed its structure into a continuous series of distinct data frames, each containing 140 QPSK symbols. Each one begins with the same channel probe/decoding sync sequence, the hard keying of which accounts for the 11.4-hertz ticking. These frames cycle relentlessly through a complete superframe of 64 every 5.6 seconds.



The RFSpace SDR-IQ, a software-defined radio that works with Sigmira.



Sigmira phase plane display showing how states can disappear entirely.

There’s a lot more in the Sigmira manual, available at Steve’s site mentioned above. It’s way too detailed to discuss here.

Beating the Slots

I learned a lot, watching Sigmira attack the XSL transmissions. He calls the mode JSM, for Japanese Slot Machine, which seems as good a name as any. He’s included a nice clean sound file for practice. That’s a great idea, given our current solar conditions.

The real revelation comes from looking at Sigmira’s “phase plane” display. A very strong and stable QPSK signal should settle down into a cross pattern. XSL doesn’t do that. The idler’s repetition of phase states, rather than characters, causes parts of the cross to disappear in sync with the audible notes. This “music” is obviously an artifact of XSL’s unique keying.

When everything is going well, the decoded marker frames scroll madly up the receiving window. Data intervals, which typically start around frame 32, are easy to pick out. Most often, we see a 4-frame structure with two control frames and two data frames. There’s also a longer payload that appears to link frames into a continuous bit stream. While it’s not STANAG 4285, the lack of clear data framing gives it that same jet-plane fading noise. While it retains XSL’s tight timing, there’s usually a re-sync after one of these.

Since the messages in these transmissions are still carefully hidden from the public, one can justifiably ask what we get in the way of real-world information from this whole exercise. The answer, of course, is nothing at all. The real content is a better understanding of modern military communications. It’s also the fun of being able to participate in the technical ingenuity which makes radio so compelling.

Good decoding!

XSLFREQUENCIES

The six long-range, continuous frequencies in the original discovery are still your best bets, and I’ve marked these with a star (*). Right now, in April, 6445 and 8588 kHz are strongest in Southern California. They peak around sunrise and hold up into early morning.

All frequencies are tuned in upper sideband (USB). These are dial/window readings. With Sigmira configured per the manual, your channel center is 1 kHz higher. Not all frequencies broadcast continuously.

The full list is as follows:

3058	3075	4153	4231.5*		
4280.5	4291*	5643	6250	6417*	
6445*	6500	6693	6714	6768	
8255	8313	8588*	8703.5*		

ABBREVIATIONSUSEDINTHISCOLUMN

AFB.....Air Force Base
 ALE.....Automatic Link Establishment
 AM.....Amplitude Modulation
 AWACS.....Airborne Warning And Control System
 CAMSLANT.....Communications Area Master Station, Atlantic
 COTHEN.....Customs Over-The-Horizon Enforcement Network
 CW.....On-off keyed "Continuous Wave" Morse telegraphy
 DSC.....Digital Selective Calling
 E10.....Israeli female phonetic letters, callup and message
 EAM.....Emergency Action Message
 EOC.....Emergency Operations Center
 FAX.....Radiofacsimile
 FEMA.....US Federal Emergency Management Agency
 HFDL.....High-Frequency Data Link
 HF-GCS.....High-Frequency Global Communication System
 LSB.....Lower Sideband
 MARS.....Military Afloat Radio System
 MCW.....Modulated CW, keyed or audio with carrier
 Meteo.....Meteorological (weather of ce)
 Navtex.....Navigational Telex, in SITOR-B
 NDB.....Non-Directional Beacon
 NPHRN.....US National Public Health Radio Network
 PACTOR.....Packet Teleprinting Over Radio, modes I-III
 RTTY.....Radio Teletype
 Selcal.....Selective Calling
 SITOR-A.....Simplex Telex Over Radio, mode A
 SITOR-B.....Simplex Telex Over Radio, mode B
 UK.....United Kingdom
 Unid.....Unidentified
 US.....United States
 USAF.....US Air Force
 USCG.....US Coast Guard
 V02a.....Cuban numbers female, 5-figure callup/groups

All transmissions are USB (upper sideband) unless otherwise indicated. All frequencies are in kHz (kilohertz) and all times are UTC (Coordinated Universal Time). "Numbers" stations have their ENIGMA (European Numbers Information Gathering and Monitoring Association) designators in ().

60.0 MSF-UK National Physical Laboratory, standard CW time signals at 0850. (Ary Boender-Netherlands)
 66.6 RBU-Russian CW standard time station, Moscow, at 0850. (Boender-Netherlands)
 75.0 HBG-Swiss federal meteo of ce, Pragins, standard CW time signals at 0850. (Boender-Netherlands)
 77.5 DCF77-German national physics laboratory, Main ingen, time signals in various modulations at 0850. (Boender-Netherlands)
 419.0 RD-NDB, Vasteras, Sweden, MCW identifier at 2320. (Boender-Netherlands)
 421.0 BL-NDB, Borlange, Sweden, MCW at 2321. (Boender-Netherlands)
 422.0 UR-NDB, Hradec Kralové, Czech Republic, MCW at 2324. (Boender-Netherlands)
 518.0 "X"-VOK Navtex, Labrador, Canada, stepped on at 0000 by unknown station with Greenland weather, SITOR-B at 2357. (MPJ-UK)
 1743.0 Stornoway-UK Coast Guard, weather at 0718. (Michel Lacroix-France)
 1764.0 La Coruna-Spanish Coast Guard, messages in Spanish and English, at 0714. (Lacroix-France)
 2070.4 BP26-German Water Police patrol boat Eschwege, calling LEZSEE, Cuxhaven, also on 2151.5, 2503.5, 3200, 3850, 4537, and 5258; ALE at 1853. (MPJ-UK)
 2493.5 TZAVGL-US Army or National Guard, ALE sounding at 0330. (Jack Metcalfe-KY)
 2810.0 OFK-Finnish Maritime Administration, Turku, identifying at 0652. (Lacroix-France)
 3137.0 500341-USAF KC-135R, calling HIK (Hickam AFB, HI), ALE at 0003. (Mark Cleary-SC)
 3193.5 DKB-US Army Special Operations Forces, ALE sounding at 1600. (Metcalfe-KY)
 3290.5 COROPS-US Army or National Guard, ALE sounding at 0320. (Metcalfe-KY)
 3299.0 AFD4FL-USAF MARS, 4S1 Net control at 0026. (Cleary-SC)
 3315.0 AFF3WV-USAF MARS, NE2S1 Net at 2355. (Cleary-SC)
 3320.5 NNN0JKI-US Navy/ Marine Corps MARS, net at 0041. (Cleary-

SC)
 3382.5 FDI22-French Air Force, Narbonne, RTTY marker, also on 4557, at 0233. (ALF-Germany)
 3455.0 New York Radio-North Atlantic air traf c control, selcal check KM-BG with bizjet N500J, at 2244. (Allan Stern-FL)
 3745.0 ZT50-Algerian military, working QX4x and QX5x calls, ALE at 2315. (ALF-Germany)
 4003.0 AAR4FF-US Army MARS, net in LSB with AAM4TS, at 0046. (Cleary-SC)
 4060.0 "O-E-F"-Unknown unit in multi-national exercise tracking net, also 4144.5, 4930.5, 5095, and 5725, at 2214. (ALF-Germany)
 4079.0 RMP-Russian Navy Baltic Sea Fleet, Kaliningrad, CW traf c for RKZ, at 2217. (ALF-Germany)
 4149.0 WBN 3022-Crowley Maritime Tug Centurion, checking in with WPE Jacksonville at 1200. (Cleary-SC)
 4271.0 CFH-Canadian Forces, Halifax, NS, RTTY weather at 0753. (Lacroix-France)
 4304.0 RGR66-Russian Navy, encrypted CW messages for RJE65, at 2153. (ALF-Germany)
 4391.0 Unid-Possible Russian Air Defense, CW local time strings at 2153. (MPJ-UK)
 4469.0 Florida CAP 204-US Civil Air Patrol, Florida, Net control at 1242. (Cleary-SC)
 4515.0 "9-R-M"-US military, exercise EAMs at 0454. (Jeff Haverlah-TX)
 4603.0 TX6-Texas State EOC, Austin, working FC6, FEMA Region 6, TX, in ALE, then voice as WGY956 and WGY906, at 1314. (Metcalfe-KY)
 4721.0 UKE303-UK Royal Air Force E-3D, ALE sounding, also on 13215, at 1638. (MPJ-UK)
 4780.0 "Russian Counting Station"-Several unknown male voices counting from 1 to 5 in Russian, at 2200. (Mike-West Sussex, UK)
 4845.0 "3-N-H"-US military, exercise EAM at 0310. (Haverlah-TX)
 4924.5 TZAVGL-US Army or National Guard, with R24593, ALE at 1950. (Metcalfe-KY)
 5155.0 RIT-Russian Navy Northern Fleet, Severomorsk, CW weather at 0402. (ALF-Germany)
 5192.0 MA1NC-NH EOC, Manchester, ALE sound, also 7805, at 1244. (MDMonitor-MD)
 5377.0 QL1-Swedish Army, working VL1 and VL97, ALE at 1306. (ALF-Germany)
 5379.0 TZSJ1-Spanish Guardia Civil, Jaen, calling TXX1 (Madrid) and TZSU2 (Ceuta), ALE at 2252. (ALF-Germany)
 5383.0 NNN0ASA-US Navy/ Marine Corps MARS, message from Secretary of the Navy in 32-tone 1-kHz Olivia, at 2207. (Metcalfe-KY)
 5399.5 AAR5HF-US Army MARS net control, at 2209. (Metcalfe-KY)
 5400.5 Russian Navy Caspian Sea Flotilla, Astrakhan, CW ash traf c at 0445. (ALF-Germany)
 5415.0 GQ-UK Royal Navy, RTTY testing with GXQ, Forest Moor, at 1407. (ALF-Germany)
 5456.0 RMM89-Russian Navy, calling RCV (Black Sea Fleet headquarters), CW at 0522. (ALF-Germany)
 5541.0 Stockholm-Swedish long-distance operational control, selcalling MR-EJ, Atlas Air Boeing 747 freighter, registration N522MC, at 1715. (Lacroix-France)
 5550.0 New York Radio, position check with British Airways Speedbird 21MA, at 2315. (Stern-FL)
 5652.0 LA0621-LAN Chile airliner, HFDL position at 0615 and 0635. (Patrice Privat-France)
 5680.0 Rescue 11-UK Royal Air Force Nimrod MR2, working Kinloss Rescue and Aberdeen Coast Guard, Scotland, searching for downed chopper at 1806. (MPJ-UK)
 5690.0 Charlie 252-Irish Air Corps patrol aircraft, working 0A, Dublin, went to 3927, at 1117. (ALF-Germany)
 5696.0 Coast Guard 2003-USCG, ops-normal for CAMSLANT, VA, at 0310. (Stern-FL)
 5699.0 Grey Knight 803-US Navy P-3C, calling Habitat (USN, Whidbey Island, WA), at 0248. (Metcalfe-KY)
 5702.0 FVW-French Navy, Nîmes-Garons, coordinating RTTY on 5404 with "V-5-T" at 1705. (ALF-Germany)
 5708.0 CRO-USAF, Croughton, UK, calling 266166 (a C-17A), ALE at 0240. (Cleary-SC)
 5720.0 VQ-BAZ-Aero ot A320, ight SU0715, HFDL log-on at 2128. (MPJ-UK)
 5898.0 Cuban Spanish AM "numbers" (V02a), 5-figure groups in progress at 0819, cut suddenly to a digital mode at 0829. (PPA-Netherlands)
 6321.5 Unid-Russian Air Defense, time stamped 14-character CW track-

- ing strings, at 1923. (MPJ-UK)
- 6389.0 CTP-Oieras Naval Radio, Lisbon, Portugal, RTTY marker at 0237. (Ken Maltz-NY)
- 6428.0 ABC-Israeli intelligence test identifier (E10), at 1922. (Boender-Netherlands)
- 6483.0 9MR-Royal Malaysian Navy, Johore Bahru, RTTY markers at 1724. (MPJ-UK)
- 6514.5 IGELIT37-Polish Army, working WATFORD87, ALE at 0854. (PPA-Netherlands)
- 6586.0 New York Radio, sending airliner Delta 500 to 6577 and then 3455, at 2108. (Stern-FL) New York, selcal check MP-HQ with American 1044, a Boeing 757-223 registration N656AA, at 2257. (Stern-FL)
- 6661.0 G-VEL-Virgin Atlantic A340, flight VS0011, HFDL position for Riverdale, NY, at 2145. (MPJ-UK)
- 6699.9 Cyrano 204-French Air Force E-3F, calling Veilleur, at 1129. (ALF-Germany)
- 6715.0 Pathfinder 34-Canadian Forces CP-140, message relay via Trenton Military, ONT, to Atlantic operations and Goldenhawk (US Navy, ME), at 1256. (Cleary-SC)
- 6739.0 Equality-USAF, probably an E-6. patch via Lajes HF-GCS, at 2222. (Cleary-SC)
- 6755.5 Unid-Possible Spanish station working EAR2D2 and EA8GRG, PACTOR-I and II, at 1102. (ALF-Germany)
- 6761.0 Moose 71-USAF C-17A, coordinating aerial refueling with KC-135 HOSR 11, at 2253. (Cleary-SC)
- 6761.7 EURI-Algerian Customs, Algiers, PACTOR-I messages to various stations in French and Arabic, CW identifier a kHz lower, at 1900. (ALF-Germany)
- 6778.0 2016-Turkish Red Crescent, raised 2014 in ALE, then voice in Turkish, at 1519. (ALF-Germany)
- 6807.0 "T-6-Z"-US military, exercise EAMs at 2349. (Haverlah-TX)
- 6833.0 "Z-0-E"-Likely US military, exercise EAMs at 0125. (ALF-Germany)
- 6840.0 YHF2-E10 identifier only, then EZI identifier and message, starting at 2230. (Mike-UK)
- 7527.0 719-USCG HC-130H Coast Guard 1719, calling TSC (COTHEN Service Center, FL), ALE at 0642 and 0652. TWLC2-Spanish Guardia Civil, calling TXX1, ALE at 0729. (PPA-Netherlands)
- 7535.0 VMW-Wiluna Meteo, Australia, FAX weather chart at 1019. (Lacroix-France)
- 7795.0 JMH2-Tokyo Meteo, FAX weather chart at 1821. (PPA-Netherlands)
- 7811.0 "American Forces Radio"-US Navy retransmission of US Armed Forces Radio and Television Service, Key West, FL, at 0737. (PPA-Netherlands)
- 7918.0 YHF2-E10, identifier only at 05:33. (PPA-Netherlands)
- 7949.5 FDI 22-French Air Force, Narbonne, RTTY testing at 2021. (PPA-Netherlands)
- 7994.0 Unid-Russian Air Defense, time stamped CW strings at 0517. (PPA-Netherlands)
- 8023.0 119CDCS05-US Centers for Disease Control on the NPHRN, ALE sounding at 2305. (MDMonitor-MD)
- 8050.0 DKB-US Joint Special Operations Command, Ft. Bragg, NC, sounding at 2234. (Maltz-NY)
- 8104.0 WCY-Marine Weather and Communications, FL; weather reports at 1305. (Metcalfe-KY)
- 8113.0 Unknown-Possibly Wiluna Meteo, Australia, weather observations at 1305. (Metcalfe-KY)
- 8136.0 TNS-Algerian Embassy, Tunis, calling RBT, Rabat, ALE at 1006. (Lacroix-France)
- 8156.0 C6DR-Royal Bahamas Defence Force, ops report to Coral Harbour Base, at 2107. (Cleary-SC)
- 8176.0 VMC-Charleville Meteo, Australia, weather at 1645. (Lacroix-France)
- 8250.2 EBDC-Spanish Navy Frigate Blas de Lezo (F-103), RTTY marker at 1656. (MPJ-UK)
- 8414.5 HPFW-Panama registry bulk carrier Navios Cielo, DSC to Madrid at 1044. (Lacroix-France)
- 8626.0 VTP6-Indian Navy, Vishakhapatnam, CW marker and messages, at 2058. (Boender-Netherlands)
- 8912.0 Juliet 14-USCG MH-60J helo, position for CAMSLANT at 2348. (Cleary-SC)
- 8992.0 Yule Tide-US military, working Sandwich and simulcasting an EAM on 4724, then raised Young 21 and 22, all at 0310. (Haverlah-TX)
- 9025.0 ADW-USAF, Andrews AFB, MD, calling E30001 (E-3B AWACS), at 2059. SATURNO47-Mexican military, ALE sounding at 2335. (MDMonitor-MD)
- 9068.6 AAT3BF-US Army MARS, ALE sounding at 1958. (Metcalfe-KY)
- 9121.0 R23573-US Army or National Guard helicopter, calling ground station P171AA, ALE at 1951. (Metcalfe-KY)
- 9360.0 OXT-Copenhagen Meteo, Denmark, FAX ice chart at 1257. (Lacroix-France)
- 9871.5 NMCB21NCR22IN-US Navy Construction Battalion (Seabees), ALE net with NCR22NCR22IN, also using 4883, 6939.5, 7945.5, 9871.5, and 11504.5, at 2355. (Metcalfe-KY)
- 10000.0 BPM-Chinese National Time Service Center, CW pips and identifier, then Chinese female voice, at 1559. (PPA-Netherlands)
- 10087.0 G-VFIZ-Virgin Atlantic A340, flight VS0900, HFDL position for Krasnoyarsk, Russia, at 1411. (MPJ-UK)
- 10100.7 DDK9-Pinneberg Meteo, Germany, RTTY weather at 0905. (PPA-Netherlands)
- 10202.0 KEY798-Unknown NPHRN, ALE sounding at 1936. (MDMonitor-MD) 119CDCS05-US Centers for Disease Control, ALE sounding at 2241. (Cleary-SC)
- 10240.0 RHI-Saudi Arabian Air Force, calling AAI in ALE, at 0550. (PPA-Netherlands)
- 10242.0 CAMSLANT-USCG, working Falcon Jet Foxtrot 40, at 0054. (Cleary-SC)
- 10388.0 RIW-Russian Navy headquarters, Moscow, CW traffic for vessel RMSB, at 1518. (MPJ-UK)
- 10538.6 Raptor 03-USAF, working USCG joint task force assets Shark 27, Swordfish 14, and Sector Key West, at 2227. (Cleary-SC)
- 10588.0 WGY901-FEMA Region 1, MA, radio checks and data with WGY908 (Region 8, CO), and WGY911, at 1402. (Cleary-SC)
- 10780.0 Cape Radio-USAF, Cape Canaveral Air Force Station, FL, working BH 700, a US Navy NP-3D photographing the space shuttle landing, at 1239. (Stern-FL)
- 10796.0 RJD85-Russian Navy, CW 5-gure group traffic for RJE56, at 0838. (PPA-Netherlands)
- 10835.0 FDI22-French Air Force, Narbonne, RTTY test loop at 1323. (MPJ-UK)
- 11130.0 E4-Moroccan Army, working C3, ALE at 1615. (MPJ-UK)
- 11175.0 Courland-US military, two 28-character EAMs simulcast on 8992, at 0329 and 0500. (Haverlah-TX) Reach 133-USAF Air Mobility Command C-5A, patch via McClellan HF-GCS to Stewart Air National Guard Base, at 1859. (Cleary-SC)
- 11181.0 C2O-Unknown USAF, working CRO, Croughton, UK, ALE at 1440. (MPJ-UK)
- 11184.0 VT-VJK-Kingsher Air A330, HFDL log on with Reykjavik, at 1405. (MPJ-UK)
- 11217.0 German Air Force 491-Aircraft working German ground station, at 2016. (Metcalfe-KY)
- 11220.0 Convoy 3241-USAF C-130T, patch via Offutt to Davis Monthan AFB Metro at 2235. (Cleary-SC)
- 11232.0 Canforce 85-Canadian Forces CC-130, ops-normal for Trenton Military, at 1430. (Cleary-SC) Trenton Military, patching E-3 AWACS Sentry 47 to ops, who gives frequency 6714 kHz to back end crew Goliath Alpha, at 1918. (Stern-FL)
- 11300.0 Tripoli-Air traffic control, Libya, working KLM 571, a Boeing 777-200, at 1321. (PPA-Netherlands)
- 11330.0 New York Radio, position check with JetBlue 718, at 2045, and Cactus 968 (USAir) at 2104. (Stern-FL)
- 11348.0 SU0194-Aero of A320 registration VP-BWM, HFDL position at 1344. (Lacroix-France)
- 11402.0 201SERCAP-US Civil Air Patrol, possible Southeast Region, ALE sounding at 1715. 0004WI-CAP, WI, sounding at 1730. RIC-CAP, Richmond, VA, sounding at 2150. (Maltz-NY)
- 11418.5 OEY51-Austrian Army, Vienna, working OEY71, Austrian contingent in UN force, Golan Heights, Syria, also on 14609.5 and 14438.5, at 1239. (MPJ)
- 11456.0 BB7-Israeli Air Force, ALE sounding at 1442. (PPA-Netherlands)
- 11485.0 KGD825-US Environmental Protection Agency, MA, ALE sounding at 1222. (Cleary-SC)
- 11494.0 November 02-USCG HC-144A Ocean Sentry, position for CAMSLANT at 2049. (Cleary-SC)
- 12197.0 LCR154-Polish Military, working SPF219 in ALE, at 1315. (MPJ-UK)
- 12577.0 3EDI6-Panama registry vessel BW Arctic, DSC to Cape Town, at 1429. (Lacroix-France)
- 13050.0 UDK2-Murmansk Radio, Russia, SITOR-A telex in Russian, then idle marker, at 1128. (MPJ-UK)
- 13200.0 Offutt-USAF, Offutt AFB, NE, working Convoy 3241, at 2228. (Cleary-SC)
- 13306.0 Arke y 329-Arke y Airlines, working New York at 1214. (Boender-Netherlands)
- 13510.0 CFH-Canadian Forces, Halifax, NS, RTTY weather at 1135. (MPJ-UK)
- 13927.0 AFA9PF-USAF MARS, CA, patching B-52H Skull 20 to Barksdale AFB regarding air refueling, at 1745. (Stern-FL)
- 14900.0 SPT-Polish Military SPT434, working SNB (SNB831), ALE at 1101. (MPJ-UK)
- 17967.0 IGO211-IndiGo Airlines flight IGO211, HFDL position for Muharraq, at 1416. (MPJ-UK)
- 19606.0 AAA-Israeli Air Force, ALE sounding at 1056. (MPJ-UK)

Listening in on the National Guard's Civil Support Teams

In May 1998, President Bill Clinton announced that the government would do more to protect the country against a perceived increased threat of chemical and biological terrorism. As part of this effort, the Department of Defense was asked to form 10 teams to support state and local authorities in the event of an incident involving weapons of mass destruction.

The Weapons of Mass Destruction Civil Support Teams or WMD-CSTs, as they came to be known, are designed to be deployed quickly to assist the local authorities of the area under attack, and to determine the nature and extent of the incident. In addition, they are to provide expert technical advice on the most appropriate response to an attack and how those operations should best be carried out.

The WMD-CSTs usually combine both Army National Guard and Air National Guard personnel, with each team consisting of 22 full-time members who are federally resourced, trained and exercised, but the teams essentially act as state-controlled resources.

Although their name may suggest it, WMD-CSTs have no role in counter-terrorism operations and are focused purely on emergency management activities. Their main equipment is a large mobile analytical laboratory and a highly flexible communications suite.

The initial 10 teams were based in Colorado, Georgia, Illinois, California, Massachusetts,

Missouri, New York, Pennsylvania, Texas and Washington, placing a team in each of the 10 Federal Emergency Management Agency (FEMA) regions. These states were carefully chosen to provide maximum coverage of the largest US population centers and to minimize response times to other areas.

An additional 17 teams were announced in January 2000, to be based in Alaska, Arizona, Arkansas, California, Florida, Hawaii, Idaho, Iowa, Kentucky, Louisiana, Maine, Minnesota, New Mexico, Ohio, Oklahoma, South Carolina and Virginia. A further three phases over the next few years brought the number of teams to the present-day level. The final unit to be certified was the Puerto Rican team, on the 18th December 2007.

Where to find the Teams on HF?

First active on HF in 2005, and reported initially in Larry Van Horn's April 2007 *Milcom* column, you can hear this network and other National Guard stations in operation on a daily basis on the following frequencies:

4724, 4745, 4860, 4867, 4924.5, 5205, 5217, 5777, 5817, 5847, 5878.5, 6318.5, 6766, 7648.5, 8037, 8047, 8093, 8622, 9121, 9141, 9141.5, 9143.5, 9357, 10233.5, 10816.5, 12057, 12087, 12087.5, 13568, 13722, 14350,

14653, 16338.5, 17458.5, 17485.5 and 20906 kHz USB

The ALE identifiers used by the CST National Guard teams heard so far are as follows:

ALC46NG (AL) 46th WMD CST Montgomery, AL
 AZC91NG (AZ) 91st WMD-CST Phoenix, AZ
 GAC04NG (GA) 4th WMD-CST Unknown, GA
 LAC62NG (LA) 62nd WMD CST Carville, LA
 MEC11NG (ME) 11th WMD CST Waterville, ME
 NJC21NG (NJ) 21st WMD-CST Fort Dix, NJ
 OHC52NG (OH) 52nd WMD-CST Columbus, OH
 OKC63NG (OK) 63rd WMD-CST Oklahoma City, OK
 SCC43NG (SC) 43rd WMD CST Eastover, SC
 TNC45NG (TN) 45th WMD CST Smyrna, TN
 WAC10NG (WA) 10th WMD CST Tacoma, WA

A smaller sub-net appears to support the National Guard stations located at state HQs, on the following channels:

4924.5, 5847, 6809, 8047, 9121, 10816.5, 12087, 13568, 13722, 14653, 16338.5, 17458.5, 19233.5, 20890, 20906 and 26697 kHz USB

The stations employ frequent link checks using the standard MIL-188-141A ALE LQA process, orchestrated by the network control center in Arlington HQ703N. The following identifiers are used by the state HQs:

A040LN Montgomery, AL
 A060RN Little Rock, AR
 A090ZN Phoenix, AZ
 A100KN Anchorage, AK
 C010TN Windsorlock, CT
 C090AN Sacramento, CA
 C080ON Centennial, CO
 D030CN Washington, DC
 D030EN Wilmington, DE
 F040LN St Augustine, FL
 G040AN Ellenwood, GA
 G090UN Tamuning, Guam
 H090IN Honolulu, HI
 I505LN Spring eld, IL
 I050NN Indianapolis, IN
 I050ON Bartonville, IO
 I100DN Boise, ID
 K040YN Lexington, KY
 K070SN Topeka, KS
 L060AN New Orleans, LA
 M010AN Milford, MA
 M010EN Augusta, ME
 M030DN Baltimore, MD
 M040SN Jackson, MS
 M050IN Lansing, MI
 M050NN St Paul, MN
 M070ON Jefferson City, MO
 M080TN Helena, MT
 N010HN Concord, NH
 N020JN Fort Dix, NJ

WMD CST Locations (Weapons of Mass Destruction Civil Support Teams)



continued on page 71

Language Lessons Revisited

In 2006, we shone the *Programming Spotlight* on Language Lessons by radio. Over the years, many radio stations have offered these “classes.”

The programs serve many purposes. Sometimes it is an altruistic desire on behalf of a broadcaster to facilitate the learning of their language. Sometimes it may just be a way to fill in a schedule or demonstrate a wide variety of programming. But more often than not, the programs are used as a “hook” to lure in regular listeners. A listener who is invested in learning a language that may take weeks, months or years to learn, will probably stick around for other programming offered by the station.

In recent weeks, I have noted that many of these programs have changed and thought that perhaps it was time to revisit them.

Radio Taiwan International—

Let's Learn Chinese becomes Chinese to Go

When this topic was first visited in October 2006, *Let's Learn Chinese* was “heard at the end of Monday transmissions from RTI,” and it was “based around a printed textbook (which may or may not be available from RTI). While checking for more information about this broadcast, it was noted that the web page for the program was blank. Hopefully by the time you read this it will be updated. The host was Carlson Wong, who suggested that individual lesson details were available on the website.” (October 2006 *Programming Spotlight*)

A recent check of RTI indicates that *Let's Learn Chinese* has become *Chinese to Go*, with a different host.

“*Chinese to Go* is a brand-new series in which you learn authentic Chinese as spoken in real life. No traditional textbooks are used, only conversations recorded (or eavesdropped?) on location. Together with the main course, the Chinese language, Shih-han also brings you a side dish of history and culture behind the language.



“*Chinese to Go* broadcasts worldwide every Monday and Thursday (Taiwan Time). And don't forget to check out the weekly list of vocabulary on our website!”

The program is hosted by Huang Shih-han who “graduated from National Taiwan University with a BA in foreign languages and literatures. She then went on to France and the UK for studies and received her MA in Comparative Literature from the University of London.



“She worked as research assistant at Academia Sinica before joining RTI.” <http://english.rti.org.tw/Program/ProgramSingle.aspx?UnitID=630>

Shih-han also hosts *Time Traveller* on UTC Wednesdays. *Chinese to Go* can be heard, according to the website, on 5950 kHz at 02 and 03 UTC Mondays and Thursdays. These broadcasts are also available online for seven days. The two most recent lessons are posted on the main RTI website, as of this writing. You can access them at

☞ <http://english.rti.org.tw/default.aspx>

Radio Prague –

SoundCzech

Radio Prague has also updated its introduction to the Czech language. Replacing *The ABC of Czech* is *SoundCzech* (clever name!). This version, like its predecessor, is not a formal language course. This time, one can learn Czech phrases through song lyrics. It's a fun approach.

On April 4, 2009 (the most recent edition as this is written) the theme was “Travelling on the Black,” which is a Czech idiom for travelling without a ticket.

“Today's song is one of my favourites, and indeed a former Czech learning-aid of my own – it's called ‘Černej pasažér’ by the folk group Traband. Listen out for the Czech ‘dechovka’ or ‘brass band music’ being played in a strangely mariachi way, and also the song's title: ‘Černej pasažér’.”

☞ www.radio.cz/en/current/soundczech

Note that Radio Prague, which has perhaps the most user friendly website of any international broadcaster, also archives these programs, along with their audio. You can access past *SoundCzech* episodes by scrolling to the bottom of the *SoundCzech* page.



Radio France Internationale –

Mission Paris

As I pointed out in 2006, at that time RFI had the most unusual language course of any international broadcaster, in the form of a bilingual crime serial. Fast forward to 2009 and RFI maintains this quirky tradition. In *Mission Paris*, “Eva finds herself in a race against time and an enemy who wants to return France to the era of Napoleon III and restore the Second Empire. Her goal: to save the French Republic from its downfall.”

The heroine finds herself in the midst of a huge explosion in the “Gare de l'Est” in Paris. A wounded man gives her the first clue: a series of numbers. Eva finds a message on a piece of paper saying, “La statue domine le mort mais la fertilité est retrouvée.”

Eva embarks on an adventure to solve the riddle. Luckily, she has a magic taxi that can take her anywhere very quickly. And Eva can really use the help, because she is constantly running away from the mysterious men in black hats who are chasing her all across Paris.

Mission Paris can be heard via RFI English broadcasts UTC Mondays at 07, 12, 14 and 16 UTC, via the live stream on the RFI website, and on demand at the *Mission Paris* website

☞ www.mission-europe.eu/index.php?option=com_content&task=view&id=13&Itemid=27

A little more digging revealed that *Mission Europe* is a co-production of three international broadcasters:

“Three broadcasters: Deutsche Welle, Polskie Radio and Radio France Internationale have teamed up to create *Mission Europe* – and give young Europeans a taste of the French, German and Polish languages.

“All information on who's broadcasting *Mission Europe*, listen on demand for the three series, along with other services, will be available on these pages.

“Mission Europe is innovative and:

“Fun. Follow our three heroines on their adventures and get to grips with the basics in French, German or Polish.

“Unique. Soak up the sights and sounds of a country with audio snapshots and scenarios that make you feel as though you're really there.

“Adventurous: Travel with *Mission Europe*, and then Montmartre, the Brandenburg Gate and Wawel Castle will no longer be just places in a tourist brochure.” www.mission-europe.eu/index.php?option=com_content&task=view&id=175&Itemid=60

There is no sign of the *Mission Krakow* program on the Polish Radio External Service website. However, there are links to all three *Mission Europe* programs on the Deutsche Welle website. The programs can be heard on a number of regional radio stations in Europe, and of course online via the *Mission Europe* website. It appears to be a work in progress: Something to keep an eye and an ear on.

Deutsche Welle –
German by Radio

“Deutsche Welle offers a number of German courses, on air and on line. On air, they currently have what seems to be a beginner’s course called ‘*Radio D*.’ Although there is nary a word about it on their website, I’m sure that will change eventually.” (*October 2006 Programming Spotlight*) Well, the website certainly has changed.

Go to the *Radio D* website today, and you’ll find (52) episodes from *Radio D*. “The material is geared towards beginners who have no or very little previous experience with German. Emphasis is placed on listening comprehension and each of the audio episodes is accompanied by a text manuscript. The course was developed in cooperation with the Goethe Institute and covers levels A1 and A2 of the European Framework of Reference for Languages (CEF).”

The listener has a number of options to listen to and study with the *Radio D* course. Of course one can try to hear DW on shortwave. One can also download each episode as an mp3 (as well as the .pdf version of the manuscript for each episode). One can subscribe to the program as a podcast, using iTunes or your podcasting software of choice.

“**Series 1:** An accompanying workbook containing two CDs with the transcripts for lessons one through 26 is available for purchase. It supports the learning process and ensures that the user understands the basic phrases presented in each episode. In addition, it explores the corresponding grammar points and offers detailed exercises for further practice. It is also a help in establishing a solid basic vocabulary.

“The workbook is entirely in German, but contains specially prepared inserts with translations, instructions for the exercises, explanations and a grammar overview. It can be purchased in Germany from the Langenscheidt publishing house (www.langenscheidt.de). Please direct all questions concerning the workbook to kundenservice@langenscheidt.de. In some regions, a bilingual version is available in local book stores. More information can be found on the Goethe Institute’s Website: www.goethe.de/knt/deindex.htm.” www.dw-world.de/dw/article/0,,2544761,00.html

Sadly, DW no longer broadcasts to North America, but, nonetheless, they get my vote for best provider of language courses. In addition to the current *Radio D* program, one can go to the Deutsche Welle website www.dw-world.de, and download many past language series as well, including the long-running *Deutsch – Warum Nicht?* (German – Why Not?) and *Marktplatz* (Marketplace - Business German) Simply go to the DW website and click German Courses on the left. It should also be noted that

German courses are available from at least 16 of Deutsche Welle’s language services.

Radio Japan –
Learn Japanese

Here’s another cutback in service. The Radio Japan online schedule suggests that Japanese lessons can be heard only during the 0900 UTC broadcast. If so, try 9795 kHz.

Online Radio Japan continues to offer Japanese language lessons, which you can access at www.nhk.or.jp/lesson/english/learn/story/index.html

The variety of lessons certainly isn’t as extensive as it was just a few years ago. The lessons, such as they are, can be downloaded in audio and pdf format.

Rock and Roll Revisited

Here is also an update on the August 2008 *Programming Spotlight* on Rock and Roll Music...

Radio Netherlands –
The Euro Hit 40

This program is hosted by Tim Fisher. While I don’t believe it actually airs on RN, many (all?) past episodes are available online at the Euro Hit 40 website. It can also be downloaded as a podcast. It seems like an excellent opportunity to keep up with the music scene in both The Netherlands and Europe.

“The Euro Hit 40 is based on the charts of 18 European countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

“To make an appearance on the chart, a recording has to have simultaneous chart success in at least two of these countries. The number of countries and the position of a track in the charts of those countries determine the position in the Euro Hit 40. However, the number of countries weighs more than the chart positions.

“The Euro Hit 40 was born on Dutch domestic public radio back in the mid 1970s, so the chart is now over 30 years old. Radio Netherlands Worldwide has been co-producer of the show for a number of years now, with the monthly programme being produced at Ad Roland Media in Hilversum in English, Indonesian, Portuguese and Spanish versions.

“The hour-long English programme - available in two parts and distributed free of charge by Radio Netherlands Worldwide to radio stations large and small across the globe - presents a selection of tracks (new entries, climbers, etc.) from the chart, which is made up of the biggest cross-border musical hits as recorded in the national hitlists of 18 countries across the continent of Europe.

“Each show also features two predictions for potential chart success, which are known as



Eurobusters one and two.

“As we’re based in the Netherlands, you can always expect one of the Eurobusters to be a Dutch production, though that doesn’t necessarily mean the performer(s) will also be Dutch. If you’re keen to hear even more Dutch music, then just click here to go to RNW’s Curious Music page, produced by the makers of our Curious Orange programme, which deals with all things Dutch.

“The second of our Eurobusters is a production from another European country.”

You can contact the program via snail mail (and maybe even win a T-shirt) at: Tim at Euro Hit 40, Radio Netherlands Worldwide, P.O. Box 222, 1200 JG HILVERSUM, The Netherlands, or email them at eurohit40@rnw.nl to enter competitions or to sign up for the monthly e-mail service.

If you want to receive monthly emails about Euro Hit 40, just write “sign me up” in the subject line. You will be sent an email asking you to confirm your subscription. www.radionetherlands.nl/eurohit40

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- Find links to all of our members at www.shortwave.org
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- Listen to “The Voice of the NASB” on the third Saturday of each month on HCJB’s DX Party Line: 12 midnight Eastern Time on 9955 kHz
- Come to our next annual meeting May 7-8, 2009 in Nashville, TN.
- More info at www.shortwave.org/meeting.htm

NASB is a member of the HFCC (High Frequency Coordination Conference) and the DRM (Digital Radio Mondiale) Consortium

Downsizing in Chile, Turkey. . .

The CVC shortwave transmissions from Chile have been reduced step by step: English eliminated a few years ago, CRI relays last year, and Portuguese overnight; later, Spanish overnight as reported last month; then with A-09, Portuguese overnight was stopped, and from end of April, Portuguese altogether, leaving nothing but Spanish in the daytime on two of the eight transmitters. Is it about to close completely? We asked Andrew Flynn, Director, International Broadcasting, at Christian Vision HQ in the UK:

"We don't have any plans to close Calera de Tango. The global economic situation has forced CVC, in common with other international broadcasters, to seek cost efficiencies. We have been hit hard by increases in the cost of power, unfavorable exchange rates. Savings can be made by cutting transmission hours at times and (and places) fewest people are listening. Nonetheless, shortwave remains an important medium for CVC, and we remain hopeful that DRM will also become useful in the future to reach certain targets."

News of closing Portuguese came from the Miami studios to Jorge Freitas, Brasil, as he was inquiring about African languages via ZAMBIA, *q.v.*

As reported last month, Voice of Turkey's relay via Canada 7325 at 0400 in the first half of March was in Turkish instead of scheduled English. And so it continued in the last half of March. We complained and complained to Ankara, Sackville and Montreal, and nothing was done except buck-passing. Finally on April 1, word from Ankara reached Sackville with the correct satellite downlink parameters and English resumed, by which time the DST shift to 0300 had occurred.

But TRT had even bigger problems. Early tentative schedules showed VOT adding Japanese and Mongolian, but they never showed up. Ms. Elvan Boratav, Chief Engineer of TRT, explains:

"Japanese and the Mongolian were planned for A09, but the idea was abandoned after the decision was taken to close down one of our transmitter sites. A number of other programs were also deleted. Our A09 schedule was changed by our External Broadcasts Dept. over and over again until a few days before the start of the period."

Kai Ludwig points out in *DX Listening Digest* that already canceled in recent months were Bosnian, Croatian, Georgian, Hungarian, Romanian, Serbian; and Turkish to Europe reduced. A revised 'final' schedule via *DX Mix News*, Bulgaria showed only 21 languages on SW, with these also deleted: Albanian, Greek, Kyrgyz, Macedonian.

And EMR = Emirler as the only transmitter site, so Çakirlar has closed. So we asked Ms. Boratav about that too:

"There are five transmitters (3 x 250 kW + 2 x 500 kW) at Çakirlar, but they are quite old. The head of our department has plans to move one 500 kW to Emirler, but it may not be possible to put it back into operation after re-installation. We are also planning to carry the rotatable antenna from Çakirlar to Emirler, but this is not yet settled, either. Çakirlar is still operational, but for the time being there won't be routine transmissions there."

English to NAm at 2200 on 9830 is subject to RTTY as reported in a recent column; at 0300 there is also a direct frequency, 5975.

More on the downsizing theme below: CANADA, KOREA SOUTH, PRIDNESTROVYE, RUSSIA, SWEDEN

ALGERIA [non] RTA relays via TDF, Issoudun, France effective from May 3 until Sept 5, 500 kW at 162 or 194 degrees back to Africa: 0400-0557 7295, 0500-0657 9535, 1800-1957 11775, 2000-2057 9375, 2100-2157 7495, 2100-2257 5875 (*DX Mix News*, Bulgaria)

ANGUILLA [and non] Pastor Melissa Scott's pornographic past is exposed in the May issue of *Marie Claire* fashion magazine. The article profiles her days in the porn industry, and how she became one of Dr. Gene Scott's "pony girls," ultimately to preside over a televangelist empire. Hard to believe that she was once a triple-X plaything known as Barbie Bridges. www.marieclaire.com/world-reports/news/latest/melissa-scott-porn-pastor (via Chaz Lambrusco, Harold Frodge, *DXLD*) Hear her on 13845, 11775, 6090, 5935

ANTARCTICA LRA36, R. Nacional Arcángel San Gabriel, 15476, had been missing in 2009 (gh) Started to be heard again from mid-March, but not every day and sometimes troubles with transmission and audio (Maurits Van Driessche, Belgium, *DXLD*) Schedule is M-F 1800-2100; sometimes get traces here on 15476, not 15475; hurry before Gabon 15475 comes back until 1900 (gh, OK) Full ID and address at 1900, poor (José Pedro Turner, Portugal, *DXLD*) And several other days poor to fair, ID at 2002 (Manuel Méndez, Spain, *ibid.*)

AUSTRIA Please note that all English programs of Radio Austria 1 International have been suspended 31 December 2008. Will continue to broadcast, but only in German. http://oe1.orf.at/service/international_en (A-09 website schedule via Jaisakhivel, ADXC, Chennai, India)

Except, the 3-minute English news weekdays at 0608, followed by French, out of the domestic service on 6155, have really been repeated during the *Journal* blocks. Why won't the station even admit this? (gh)

New 9820 with Spanish news 0030 to 0035, German news 0035 to 0045, English news at 0045 to 0046:30 (yes, a whole sesquiminute!), then French news to 0049, then more German talk until off in mid-sentence at 0057. It's a fast-paced program format, but still informative, and good language practice (Paul Brouillette, IL, *DXLD*) And same in the preceding and following semihours (gh)

BELARUS Radio Minsk A09: 1100-2300 7390, 7210; 1705-2300 7255 (Larisa Suárez, Radio Station Belarus, via Jaisakhivel, ADXC) English at 2000-2200; so abandoned 7135 in the expanded hamband, but new 7255 is liable to collide after 1900 with Nigeria, which doesn't bother to register its frequencies with HFCC, so Minsk may have imagined Nigeria is not there! (Glenn Hauser, *WORLD*

OF RADIO) 7390 and 7210 from Kalodziscy site produce a mixing product on 7030, says IARU German Bandwatch and there should be a match on 7570 (Wolfgang Büschel, *DXLD*)

BIAFRA [non] V. of Biafra International, the weekly anti-Nigerian broadcast mostly in English from Washington, DC, kept changing time and frequency via WHRI. As of Friday April 10 it was at 1900-2000 on 17520, the week before at 2100-2200 on 11885, before that 2100-2200 on 15665, and before that until mid-March at 2000-2100 on same. Where will it be now? It won't help much to check www.biafraland.com/vobi.htm which was even more outdated, but online program schedule via www.whr.org may be current if you search it on VOBI. The hour opens with music, what we call *Finlandia*, and then *All Hail Biafra* (gh)

Meanwhile, another clandestine service appeared in late March, Radio Biafra on 12050, at 1900-2000, "broadcasting live from Enugu, our capital city" (Dave Kenny, BDXC-UK) 12050 is on the VTC schedule as via Skelton, UK site, daily, 300 kW, 160 degrees (Wolfgang Büschel, *ibid.*) A few days later: English about struggles in Biafra and corruption in Nigeria, IDs, some African music. "This is Radio Biafra, coming to you live from London." (Brian Alexander, PA, *DXLD*)

BOLIVIA 4796.4, Radio Mallku, Uyuni, has apparently been renamed Radio Lipez, heard on the vernal equinox at 2230-0015* announcing 4795 and FM 92.3. A QSL from 2000y mentioned that there are two provinces nearby named Nor Lipez and Sud Lipez (Rafael Rodríguez, Colombia, *condiglist* yg) We think it's accented on the i: "LEE-poss" (gh)

CANADA RCI A-09 English via Sackville: 1505-1705 9515; 1800-1859 17735; 2000-2100 15235, 17735; 2305-0005(Tue-Sat 0105) 6100 (RCI)

Budget cuts at CBC resulted in RCI canceling its most expendable languages, Ukrainian, which was weekends only on SW, and Cantonese, which was a weekly half-hour via an AM station in Hong Kong. The Ukrainian-Canadian Congress lobbied to keep their language on, to no avail. Ukrainian via Sweden was promptly replaced by English and French (gh)

The RCI Action Committee www.geocities.com/rciaction/ is now on Facebook and Twitter: www.facebook.com/group.php?gid=61392551483 and http://twitter.com/rci_action

Other ways to keep up with what's happening at CBC and RCI: <http://teammakers.blogspot.com> and www.insidethecbo.com (CIDX Messenger and *WORLD OF RADIO*)

CHINA What's up with Voice of Strait? From

*All times UTC; All frequencies kHz; * before hr = sign on, * after hr = sign off; // = parallel programming; + = continuing but not monitored; 2 x freq = 2nd harmonic; sesqui = one and a half; A-09=spring/summer season; [non] = Broadcast to or for the listed country, but not necessarily originating there; u.o.s. = unless otherwise stated*

April 2 no longer heard on evening frequencies 4900, 4940 or 5050, the latter two which had interference (Ron Howard, Asilomar Beach, CA, **DXLD**)

Still heard on daytime frequencies 0000-1200, news channel on 9505, entertainment on 7280, Amoy on 6115. Finally confirmed staying on same into the night until 1700 when interference is terrible (Hiroshi and S. Hasegawa, NDXC) Try 9505 for **Focus on China**, Sunday English program at 1500-1530 (Howard, **ibid.**)

CROATIA [and non] V. of Croatia, A-09 via Germany 7375: 2200-0300 SAm, 2300-0300 ENAm, 0100-0500 WNA; via Singapore 11675: 0800-1200 Au/NZ. Direct to Europe: 0500-0800 6165, 0800-1600 7355, 1600-2030 6165, 2030-0500 3985 (via Dragan Lekic, Serbia, **DXLD**) English at 2215, 0200 (EiBi) But May 10-Aug 31 supposed to be on 9925 instead of 7375 (Wolfgang Büschel, **DXLD**)

CUBA [and non] Unexpected jamming from Cuba on 9545 tipped us that in A-09, Radio Republica had a new frequency from *2300, presumably Sackville ex-9810 which was still jammed anyway; length of 9545 transmission unclear as it fades into the jamming, but may last until 0400 as before, and the jamming kept going past 0630, sometimes stronger than and interfering with RHC on 9550.

RHC English announced some new frequencies effective April 13: 2030-2130 17660, 2300-2400 13790, 0500-0700 6010 (Alan Pennington, BDXC-UK) Ex-9550, bad news for México and Colombia already vying for 6010; 13790 also ex-9550 which had Cuban jamming on 9545; 17660 inaudible at 1st, but still on 11760 (gh)

ECUADOR 4814.98, R. Buen Pastor, religious pop music, 1034 and 1050 canned IDs, great signal ruined by horrible QRM from ute below and CODAR. Faded after 1050 (Dave Valko, PA, **HCDX**) 1100, good signal, ID using echo effect (Chuck Bolland, FL, **DXLD**)

EGYPT At beginning of A-09, R. Cairo English at 0200 was alternating between 7535 and 7540 from night to night, error? (Steve Wood, MA, **DXLD**)

ERITREA Among the broadcast transmitters staying put inside the expanded 40-meter hamband past the March 29 deadline: V. of Broad Masses of Eritrea, at 0355-0500 on 7174.987, switching to 7164.987 and then white noise jamming started; also // 7209.975 (Brandon Jordan, TN, **DXLD**)

ETHIOPIA R. Ethiopia also stayed on 7110, excellent modulation and music, distinctive ID and three gongs at hourtop (Brandon Jordan, TN, **DXLD**) 7110 from *0259 with electronic keyboard IS (Brian Alexander, PA, **ibid.**) 7110 also excellent at 0305, only signal on 7100-7200 (Liz Cameron, MI, **ibid.**) Still audible at 0600 (gh)

[non] RMI clandestines in A-09 via DTK Germany: Friday 1730-1800 on 13830, Radio Oromiyaa Liberation. Saturday 1700-1730 on 13830, Voice of Oromia Independence. Sunday, Tuesday and Thursday 1600-1630 on 11760 and 15670, Voice of Oromia Liberation Front (Jeff White, Radio Miami International, **WORLD OF RADIO**) Jeff will QSL for these (gh)

GREECE Voice of Greece, Radio Filia in English on 11645 at 0600-0700, strong on clear channel (Mike Barraclough, England, **World DX Club Contact**) Transmitter breakdown reported last month repaired in a few weeks, and in A-09, VOG back to two frequencies at once; and one for Radio Filia 11645 at 0500-1000, break at 1000-1100, Macedonian Station 1100-2250 (9935 at 1st, then 7450 from 1700); VOG with three frequencies 2300-0500: 7475 at 2300-0450, 7450 at 0400-0550, 9420 at 1100-1000, 15630 at 0600-1000, 1100-2250, 15650 at 2300-0350. Another weekly maintenance break is Tuesday 0800-1200. **Greek in Style**, music show introduced in English, is Sundays 2305-2405 (via John Babbis, **DXLD**)

INDIA A-09 schedules of All India Radio are available in different formats:

By frequency, all SW services: www.qsl.net/vu2jos/sw/freq.htm

SW Home service by station: www.qsl.net/vu2jos/fp/loc.htm

External Services:

By time: www.qsl.net/vu2jos/es/time.htm

By station: www.qsl.net/vu2jos/es/transmitter.htm

By language: www.qsl.net/vu2jos/es/language.htm

(Jose Jacob, VU2JOS, National Institute of Amateur Radio, Hyderabad, **DXLD**)

INDONESIA The radio war on 9680 among VOA, Taiwan and China, obliterating clear reception of RRI domestic service relay despite its 250 kW, abated somewhat in A-09, with RRI more or less clear after 1300, but squeezed by adjacents (gh, OK) CNR-1 jamming with echo ceased at 1301 (Ron Howard, CA, **DXLD**) But then resumed.

IRAN [and non] The tentative IRIB English schedule in our April column proved correct, except no 9635 at 1530, and the Lithuanian relay at 1930 is 5945 (via Jaisakthivel, India)

ITALY Propagation opened up briefly, enough to get a few minutes of DRM from 100-watt Radio Maria, Andrate, March 23 at 1910 on 26010. Image of the reception: www.qsl.net/py4zbz/hamdream/rxdrmm.htm#m (Roland M Zurmely, PY4ZBZ, Sete Lagoas, MG, Brasil, **radioescutas** yg) Amazing for 11 meters at solar min. This summer it might make it to NAM by multiple-hop sporadic-E (gh)

JAPAN For A-09, NHKWNRJ announced that **World Interactive**, the mailbag *et al* moved from Saturday to Sunday at same times starting at 0510 on 6110 via Canada, swapping with **Pop-Up Japan**, the J-pop music magazine with hyper hosts full of phony enthusiasm (or, what are they on?) now on UT Saturdays (gh)

JORDAN Radio Jordan resumed a second transmitter towards Europe: 11960 heard until 0710*, also 15290 from *1038v until 1130, both // 11810, all in Arabic. Unfortunately not back on 11690 with English (Noel Green, England, **DXLD**). And 9830 at 1745-2000 (Wolfgang Büschel, **ibid.**)

KOREA NORTH [non] Of the possible frequencies listed last month, Shiokaze/Sea Breeze at 1400-1430 started the A-09 season on 6120 (Ron Howard, CA, **DXLD**) but may have shifted to some others by now (gh) via Yamata, Japan transmitter JSR and the other broadcast at 2030-2100 on 6045 (Hiroshi via

S. Hasegawa, NDXC)

KOREA SOUTH [and non] KBSWR A09 in low-resolution color-coded grid format: <http://world.kbs.co.kr/english/radio/howlisten/shortwave.htm>

SAm gets a full hour in English at 0200-0300 on 9580, and NAm gets zero, as the Sackville relay 9560 is now Spanish-only at 0200-0230. Trouble is, 9580 is already occupied during that hour by CRI via Habana. 0230 English via Canada 9560 has been deleted so Spanish at 0600 to Eu could expand to a full hour. West-coasters, if you want to hear KBSWR in English, get up at 5 am (gh)

MADAGASCAR Madagascar World Voice may be the last major shortwave broadcast facility to be built anywhere in the world (Kim Andrew Elliott, kimandrewelliott.com) Following up our lead story in the April issue, 1st from the World Christian Broadcasting website, undated, sometime in March, after our previous deadline:

"Work on the new station continues. The three 100,000 watt transmitters have been built, tested, and are in Dallas waiting to be shipped out of Houston. Two additional diesel powered generators are in port in Madagascar and will be taken to the site to provide electricity that is needed. The four antennas being built will be digital ready, which means that from each antenna, four simultaneous broadcasts on four different frequencies will be possible.

"You may have read about the unrest in Madagascar recently. Things seem to be calmer, but not everything has been resolved. Kevin and Nancy Chambers have returned to continue construction. Wire, cable tools, and building supplies that we had stored in a warehouse were destroyed during the uprisings. This may set back the completion of the project three to six months. All but one of the buildings that we need have been completed and the towers are up. The curtain antennas are being constructed" (Andy Baker, WCB)

In their Dec 2008 newsletter, they talk about four towers which would mean three antennas [strung between them]. This would be in accordance with information from 2005 which indeed mentioned three antennas, two for 9-17 MHz and the third for 7-15 MHz (Kai Ludwig, Germany, **WORLD OF RADIO**)

From Mahajanga, an East Africa azimuth would include the Nile Valley as well as S and C Europe. Madagascar is a great location for a shortwave transmitting station (Jerry Lenamon, TX, **DXLD**) WCB talked about using Madagascar for Russia (Sergei S., Russia, **ibid.**)

"Dear Glenn, Thanks for mentioning World Christian Broadcasting in your April article. We did not post anything on our website during the crisis because we did not want to speculate on the possibilities of a change in government. Although the former president was a friend of World Christian Broadcasting, we are not a political organization. The new regime has asked for foreign investors. That's what we are, so we are going full speed ahead with construction as before the crisis. It is peaceful in the area around our site; we have not lost even one worker during the crisis" (Charles H. Caudill, President/CEO, World Christian Broadcasting, TN, March 25)

[non] From March 20, WRN transmits Radio Mada on 5895 to Madagascar at 1700-1730 and 0400-0430. It is from a Swiss NGO, **Tiako i Madagasikara**, www.tim-sfv.ch (WRN) Presumably via South Africa; hard to hear in NAm due to WWCR 5890, and in Europe at 1700 with co-channel R. Liberty in Tatar-Bashkir. Per website, this is pro-Ravolomanana so the deposed president has a clandestine voice (gh)

See also www.tim-madagascar.net Not to be confused with an unrelated Radio Mada in Bordeaux (Andy Sennitt, **Media Network** blog)

The 5895 broadcasts ceased abruptly April 6, perhaps to resume depending on funding (gh) TIM stands for I Love Madagascar, a political party. The websites continued to be updated and this one contains audio files of Radio Mada Internationale past April 6:

► <http://radiomada-int.blogspot.com/> (**Media Network**)

MÉXICO **Sintonía Libre**, Radio Educación's DX program, per its March grid, www.radioeducacion.edu.mx/ONDAMARZO.pdf here converted to UT days and times during UT-5 DST: Wed 0200-0230, Thu 2303-2330, Sun 0345-0415. This is on the SW-only 6185 schedule when programming separates from MW 1060, 2300-0500. However, 6185 transmitter stays on air another four sesquihours relaying MW for which there is a separate grid available; both of them have lots more very good programming, eclectic music; MW also webcast (gh)

MONGOLIA A new alternative frequency for VOM, 0900-1100 and 1400-1600, including English at 1030-1100 and 1530-1600, is 9665, besides usual 12085. Look out for Korea North on 9665. Then at 1418 and another day at 1338 I hear KCBS P'yongyang atop a low het indicating something else on 9665 (gh) KCBS on 9665. 18v drifting downward, 1338-1344, April 8, with music, much too strong to detect anything on 9665.0 (Ron Howard, CA, **DXLD**)

I could make out on 9665.00 Voice of Mongolia, at 1429 IS and opening Mandarin, just about readable in LSB to avoid KCBS on 9665.14. VOM then got bothered by co-channel CRI in presumed Pashto 1500 and 1530 but did manage to trace Japanese 1500 and normally English 1530 with de nite ID, frequency announcement and program preview. Apparently replacing 12085 (Martien Groot, Netherlands, **DXLD**)

MYANMAR 5770, Myanmar Defense Forces Broadcasting Station, via Taunggyi, heard between 1431 and 1513 in vernacular with fair signal on full AM, sometimes reported as USB (Ron Howard, CA, **DXLD**)

5915 from tune in around 1130 to past 1530. Not // 5985 (Jose Jacob, India, **DXLD**) 5915.0 is Myanma Radio - Minorities and Educational Service, heard from 1335, ex-9730.84v where it helped to be off-frequency, but previously on 5915 and now clashing with CRI, and sometimes Zambia long-path. Best reception 1400 to 1445, sign-off varies around 1512. On a Sunday had English lesson 1426-1445 (Ron Howard, CA, **DXLD**) Mostly in Myanmarese (Supratik Sanatani, India, **ibid.**)

5985.0, Myanma R., 1450-1536, in vernacular with Burmese songs, ID and news, weather in English at 1530-1545 (Ron Howard, CA, **DXLD**)

7185.09, Myanma Radio stayed in hamband still March 31, 0030-0038, Bamar opening after usual intro tune, sung NA (Martien Groot, Netherlands, **DXLD**) April 1 nally moved to 7200 at 0030-0230 (Alok Dasgupta, via Alokesh Gupta, India, **DXLD**) But 7200 is not far enough! (gh) 7200.09, 0030-0041, Off frequency by 90 Hz as was former 7185 (Martien Groot, Netherlands, *ibid.*)

PAKISTAN The Pakistani cabinet decided to adopt summer time (GMT+6) on 15 April (Chris Greenway, England, **DXLD**) Minister for Information and Broadcasting Qamar Zaman Kaira said last year DST helped save 250 MW of electricity daily (*The Nation* via *Media Network* blog) So VOA and other US services into Pakistan hustled to retime everything one UT hour earlier, frequency changes if needed (gh)

PERÚ 4805, the new Radio Rasuwilca mentioned last month, at 1035 strong signal and CODAR absent until 1053, "auta andina," brief ID, back to music (Bob Wilkner, FL, **DXLD**) 1008 usual campesina music, 1011 short canned ID; has a very distorted carrier and impossible to zero-beat. Listening in AM is a must (Dave Valko, PA, **HCDX**)

POLAND [non] PRES in English at 1700-1800 via France replaced 9555 with 9790 from April 15 (**BC-DX TopNews**)

PORTUGAL Thanks to its ideal location at the SW corner, RDPI gets into NAM further and better than most other Europeans. It's all in Portuguese, but with lots of great music (gh) A09 schedule:

To NAM, Mon-Fri 2300-0200 Tue-Sat on 9715, but available for special events, usually sports, also 1200-2000 15560, 2000-2300 13755. On Sat & Sun the 15560 span is definitely on, with 13755 optional.

Also well audible is European service at 0500-0800 M-F on 7240. And check transmissions for SAM: M-F 1000-1200 15575, 2300-0200 11630, 15295; Sat & Sun 2000-2300 optional 15295 (via Luis Carvalho, **DXLD**)

PRIDNESTROVYE In mid-March, Radio PMR disappeared from 7370 at 1430-1730, the weekday service to Europe, including English; nor was it on the summer frequency 12135 (Edwin Southwell, England, World DX Club via Mike Barraclough, **DXLD**) Still going at 2230-2400 Sun-Thu on 6240 (Barraclough, *ibid.*)

In recent months there were persistent reports of Radio PMR's financial troubles. Studios were badly affected by flooding last August. They haven't been fixed (Sergei S., Russia, *ibid.*) English reduced to one transmission as announced at 2315-2330 on 6240 (Chris Lewis, England, *ibid.*) A-09 moved to 9665 at 2215-2300 starting with English, 2300 relaying VOR in English (Joe Hanlon, NJ, *ibid.*)

RUSSIA VOR's A-09 schedule got off to a shaky start thanks to last minute cut-backs in a number of language services. Things became somewhat stable by mid-April (gh)

All the A-09 skeds of all RUVR services can be downloaded (in .xls format) here: www.ruvr.ru/main.php?lng=rus&w=471 (Alexey Zinevich: a DXer from Minsk, Belarus, **DXLD**)

Including this amazingly brief one for English to NAM:

2200-2300 9890

2300-0200 9890

9665

0400-0600 13775

And English to C&SAM:

0200-0300 9665

9890

0300-0400 9665

So the 'middle' of the 8-hour span is not really to NAM, but C/SAM, yet on the same frequencies, and 9665 Moldova at least, stays on the same azimuth 295 thruout. The two 9 MHz frequencies can work well in CNAM, but not 13775; how is it in WNAM? To put the schedule more straightforwardly: 22-03 on 9890, 22-04 on 9665, 04-06 on 13775.

That's not much compared to 40 frequencies at once in the heyday of Radio Moscow – but two good frequencies should be enough? Not always, when trans-Atlantic propagation is poor. What we need, and this should be obvious to anyone who knows the first thing about SW propagation, is a relay in the Caribbean area, say Guiana French, like we had in the winter season on 7335.

Europeans were also faced with mostly blocked MW frequencies in English from Russia, and SW at first mostly designated as DRM, but listeners such as Erik Koie, Denmark, complained and VOR relented with a few 12 MHz analog SW channels.

Again this A-season we sometimes hear VOR at 1400 on 15605 intended for S Asia. 15510, at 1344 rock music with heavy beat, utter, 1345 announcements, sounds like Radio Farda style, more music with Persian(?) lyrics. Faked me out, as at 1358 closed as VOR Dari/Pashto service; they know how to co-opt a popular format (gh)

SERBIA [and non] Technical director of International Radio Serbia, Mr. Predrag Graovac, told me that in A09, NAM broadcasts via 250 kW Bijeljina, Bosnia-Herzegovina, would be on new 9580, with English changed to 0100-0130 daily at 325 degrees and 0030-0100 except Sundays at 310 degrees. The Stubline (Beograd) station has been off since December because an electrical transformer is roasted. When reactivated with 10 kW, will be on a new frequency replacing 7200 (Dragan Lekic, Serbia, **DXLD**)

We notified them immediately that 9580 would be a disaster, as Romania is using it also to NAM in English at 0000-0100, and CRI via Habana after 0100; after colliding for two weeks, IRS changed to a good clear frequency Wolfgang Büschel and I suggested, 9675, starting in Serbian at 0000. They still need to put the two English broadcasts further apart, the second one much later for C&WNAM (gh)

SIERRA LEONE Dr. R. M. Ako of Jewels of God International says, "We recently received a license to operate a not for profit private SW radio station in West Africa and would appreciate assistance. We are looking at a 10 kW SW transmitter" (*NASB Newsletter*) And he won't even say in what country? (gh) According to one website this shortwave license was issued for Sierra Leone (Jari Savolainen, **DXLD**)

SOMALILAND In a qrz.com forum item surveying broadcasters still using the 7100-7200 hamband as of March 29, Sam Voron in Australia included on 7145, Radio Hargeisa in Somaliland, 1852-1858* with news in Somali, ID and anthem. This station had been inactive for years (gh) It was then heard by numerous listeners in Europe, as early as 1630 – Thorsten Hallmann in Germany, Jari Savolainen in Finland, Dave Kenny in England, Giampiero Bernardini in Italy, Zacharias Liangas in Greece, José Miguel Romero in Spain, Carlos Gonçalves in Portugal, Anker Petersen in Denmark – but not in North America where its local-evening-only scheduling makes it a tough catch. Press reports said it has a new 25 kW transmitter and has also been heard in Japan. See <http://somalilandpress.com/3966/radio-hargeisa-goes-global> (gh)

SUDAN R. Omdurman was another station in no hurry to get off its traditional frequency 7200, which is now no-man's-land between ham and broadcast bands (gh) Still heard in April until closing at 2000 (José Miguel Romero, Spain, **DXLD**) Good around 0400 including sesqui-minute-late timesignal on the hour (Jim Evans, TN, *ibid.*) Nominal sign-on at 0300, but heard from *0237 with Call to Prayer, 0241 ID in Arabic (Brandon Jordan, TN, **WORLD OF RADIO**)

SWEDEN [and non] Radio Sweden in English, A-09, to NAM via Canada, 0130 and 0230 on 6010; via Madagascar to Africa, Asia, 2030 and 2130 on 7395, 0230 on 11550. Direct to Asia and Pacific which we might hear on a good morning back in NAM: 1330 on 15735, 1430 on 13820 [never mind: Cuban jamming and Marti], 1530 on 13600 (gh, from sked via Alexey Zinevich, Belarus, *ptsw* yg)

With A-09, R. Sweden has closed down its award-winning Swedish language department, after 70 years. There is still plenty of Swedish to be heard on SW, a lot more than English, but it's all domestic service relays (SR website via Serghy Nikishin, Russia, **DXLD**)

SYRIA R. Damascus reactivated 12085 in Mid March: huge carrier at 2058 but when English audio came on just past the hour it was very low. Picked up a bit at 2106 newscast (Mick Delmage, Alberta, **DXLD**)

Only poor 9330 was heard same day until 1942* in French. A week later, 12085 at 1840, strong carrier, very low mod, no 9330. But from *2101 both frequencies in English with strong carrier, low mod and hum making both basically useless. And 9330 was intermittently on and off the air (Brian Alexander, PA, **DXLD**)

At last, the official English language website of Syrian Radio & Television came online. www.syriaonline.sy (Kris Janssen, Belgium, **DXLD**)

Daily audio archives for a week in each language:

🔊 www.rtv.gov.sy/index.php?m=541#5 (gh)

THAILAND Updated R. Thailand schedule at www.hsk9.com/Schedule.html no longer shows 9640 or 12120; only 15275 for NAM at 0000-0330, the first hour 'live' in English, and English repeat at 0200-0230. Another live English at 0530-0600 for Eu/Af on 17655 (gh)

UKRAINE Repeats of the national edition produced in February of Olex Yehorov's *Whole World on the Radio Dial* still aired on RUI April 4, but the DX program was gone on April 11, as the Saturday mailbag show expanded to fill the gap, starting at 0017 UT Sunday on 7440 (gh)

UK BBCWS program changes for A-09 include: replacing *Instant Guide* with *Letter From* preceding *Over To You*, the mailbag-cum-justification show; including once a month from – *India*, by Mark Tully. Clive James also participates from Australia, and later in the year, David Attenborough, but it's not clear just what the rotation cycle is. Mark Tully also gets more airtime as the main participant in *Something Understood*, treated by WS as if it were a brand-new idea, rather than something that has been on Radio 4 for sesquidecades! The BBCWS internet schedule grid for the following week is now here: www.bbc.co.uk/worldservice/schedules/internet/wsradio_weekly.shtml

Good luck hunting other schedules, which will not necessarily match this one if you are still trying to hear BBCWS on the shrinking number of SW frequencies remaining (gh)

USA VOA in Hausa via Greenville 15185 was scheduled M-F at 2030-2100, but in March we heard this in English instead. Dragan Lekic in Serbia checked IBB Monitoring audio archives and found that the wrong language had been broadcast for the entire B-08 season due to a satellite feed mismatch, and nobody noticed till our report (gh)

WWRB, Brother Stair service on 9385, developed spurs at approximately 9317 and 9453, heard at various times from 1300 past 1752, interfering with 9320 and 9455 stations such as Radio Free Asia and Radio Thailand. One day at 1400 it was even worse with fundamental 9385 also buzzing from 9370 to 9410, bothering WTJC 9370 (gh)

In northeast America, check 5110 for **WORLD OF RADIO** via Area 51 on WBCQ, UT Fridays 0000 (gh)

ZAMBIA unID on 4965 at 2003 in African language (Jorge Freitas, Brasil, **HCDX**) Surely it's CVC Zambia, not just in English any more (gh) 4965 not in English either at 1825-1845; e-mail to CVC Lusaka bounces (José Pedro Turner, Portugal, **WORLD OF RADIO**) Radio Christian Voice 6065 and 4965 from Zambia is mostly given over to four local languages now – Bemba, Tonga, Nyanja and Lozi (Andrew Flynn, CV)

Schedule grid is a color-coded checkerboard with only a few blocks explicitly English: daily 2200-2400 UT and Sunday 1600-1700 (gh)

Until the Next, Best of DX and 73 de Glenn!

BROADCAST LOGS

NOTEWORTHY LOGS FROM OUR READERS

Gayle Van Horn, W4GVH

gaylevanhorn@monitoringtimes.com
http://mt-shortwave.blogspot.com

0030 UTC on 12095

THAILAND: Radio Thailand. Abrupt sign-on with English news in progress. Station identification at 0034. Ads for yacht sailing and Thai Airways. Business news report at 0037, followed by sports news and weather at 0057. Anthem to gongs and chimes at 0100. Thai service commencing at 0102 for surprisingly good signal. (Brian Alexander, Mechanicsburg, PA) **Voice of America relay** 9725, 1153-1200 in Indonesian (Chuck Bolland, Clewiston, FL).

📻 Radio Thailand streaming audio www.hsk9.com

📻 VOA streaming/on-demand audio www.voanews.com/english/portal.cfm

0050 UTC on 7400

BULGARIA: Radio Bulgaria. *Time Out for Music* program // 5900 (SIO 454). 15700, 1250 workshop for political cartoonists. SIO 454 (Bob Fraser, Belfast, ME). 9700 // 11700 to North America 0200-0300 (T. Banks, Dallas, TX).

📻 Streaming/on-demand audio www.bnr.bg

0113 UTC on 5010

INDIA: All India Radio-Thiruvananthapuram. Vernacular programming from duo. Various musical bits, possibly a radio drama to music tone and advertisement. Time signal pips and station ID at 0130 to program intro with piano and wind instruments introducing Hindi music. Signal poor-fair (Scott Barbour, Intervale, NH). Website: www.allindiaradio.org with on-line reception report link <http://allindiaradio.org/receptfdk.html>

0147 UTC on 6155.21

BOLIVIA: Radio Fides. Spanish on-air calls to pop songs in English (*Rains Down in Africa* and *Saturday Night Fever*). Signal almost fair (Ron Howard, Asilomar Beach, CA). *Thanks Ron, for the kind comments on the Shortwave Central blog.* - GVH.

📻 Streaming audio www.radio-des.com/

0150 UTC on 5952.49

PERU: Radio Pio Doce. Spanish text to Peruvian music. Station ID at 0225. *River Kwai March* signature tune at 0232 and Spanish announcements to sign-off. Station seems to always play *River Kwai* tune at sign-off. Signal poor, very different copy with strong signal splatter from WYFR 5950 kHz (Alexander). Additional Peruvians in Spanish: **Radio Victoria** 6019.37, 0945-1000, 1010-1030 on subsequent monitoring. **Radio Huanta Dos Mil** 4746.81, 1045-1055; **Radio Tarma** 4774.85, 1050-1100; **Radio Libertad** 5039.11, 1103-1115 (Bolland).

📻 Radio Victoria streaming audio www.ipda.com.pe/

0612 UTC on 4845

MAURITANIA: Radio Mauritanie. Arabic recitations and prayers during good signal peaks (Joe Wood, Greenback, TN). 4845, Arabic 0650-0700. Non-stop talk minus an ID. Buried in band noise by 0705 (Bruce Barker, Broomall, PA).

0729 UTC on 11750

AUSTRALIA: HCJB Global. Station sign-on routine and several station IDs throughout the reception. Program's focus on young people (Wood). Audible with fair signal quality for religious programming 11750, 0815-0840 (GVH) Website with online email form www.hcjb.org.au. **Radio Australia** 6020, 1310 on new national budget. (Fraser). 11945, 0820-0841 *Pacific Break* program (Wood)

📻 Streaming/on-demand audio www.radioaustralia.net

0743 UTC on 9575

MOROCCO: Radio Medi Un. Up tempo Arabic music to news headlines in French. Commercials, promos and extended conversation. Solid signal with no fading (Barker). 9575, 2140-2150. SINPO 33333; **RTV Marocaine** 15345, Arabic 1807-1820 (Jim Evans, Germantown, TN).

📻 Radio Medi Un streaming/on-demand audio www.medi1.com/

0755 UTC on 5995

MALI: ORTVM. Vernacular talks to tune interval signal at sign-off. Co-channel interference from Radio Australia at *0758. Noted 0803 sign-on // 7284.88 on the air at 0805 (Alexander). Sign-on 0800 with opening announcements to tribal music. Signal rapidly decayed and gone by 0810 (Barker).

📻 Streaming audio via Chaîne 2, not on shortwave www.ortm.ml/

1140 UTC on 11935

SAUDI ARABIA: BSKSA. Holy Qu'ran programming to rapid-re Arabic text from 1146 to tune-out, Signal weak but clear (Barbour). Monitored 17615, 1128 Qu'ran // 17805; 15380, 1240. (Robin Tancoo, Fyzabad, Trinidad).

📻 Streaming audio www.saudiradio.net

1206 UTC on 4412.72v

LAOS: Lao National Radio. (Sam Neua-site per EiBi). Talk in vernaculars, clearly // 6130 to sign-off announcement at 1231, followed by choral anthem. Both frequencies about equal strength. 6130, 1416-1433 Asian music for usual French service. (Howard).

1310 UTC on 9450

GERMANY: Radio Polonia via Wertachtal. News report on troubled Polish-German relations. SIO 454 (Fraser). English service 7330 // 9525, 1200-1300; 9555, 1700-1759. (SW Guide)

1351 UTC on 6099.71v

MALAYSIA: Suara Malaysia/Voice of Malaysia. Pop music to "Suara Malaysia" ID to distinctive choral anthem and continued pop tunes. Additional ID and sign-off anthem. Assume Thai to 1400 and then Burmese. Signal poor with adjacent interference from 6095/6105 kHz. **Traxx FM** via **RTM** 7294.97, 1616-1628. **Sarawak FM** via **RTM** 7130, 1350-1410. **Voice of Malaysia** (tentative) 6099, 1442-1455.* Sounded like scheduled Burmese service amid easy-listening tunes during poor signal quality. (Howard)

📻 Traxx FM streaming audio/on-demand audio www.traxxfm.net

1512 UTC on 9541.50

SOLOMON ISLANDS: SIBC. Audible after my local sunrise. BBC news to *World Briefing*. Never did hear any local announcements, and covered by BBC's Singapore relay (9540) with recorded loop as "this is the BBC, there are no programs on this channel at present," to referral to BBC website. Subcontinent musical fanfare at 1545, followed by scheduled Tamil service (Howard).

1708 UTC on 15120

NIGERIA: Voice of Nigeria. *60 Minutes* program of news, views and comments. News items followed by station identification at 1710. Signal unusually strong, just a bit of over-modulation between studio audio and live reporting. Subsequent rechecks observed slightly lower and weaker audio. **Radio Nigeria** (Kaduna) 4770, 0603-0608 (Evans). Radio Nigeria (Kaduna) 6089.97, 2200-2205 (Van Horn). 4770, English/French 0541-0600 (Wood). VON 9690, Hausa 0815. Nigerian news to interval signal. Station ID as "this is the Voice of Nigeria" to tribal music (Barker). VON 15120, English 1824-1850 (Wood); 15120, 2042-2058* Close-down announcement at 2056, 2058.* (John Wilkins, Wheat Ridge, CO).

📻 VON Streaming/on-demand audio www.voiceofnigeria.org/

1800 UTC on 11510

ARMENIA: Voice of Russia relay. News item on *International Women's Day*, SIO 554; // 6180 via Petropavloska-Kamchatskiy (Fraser).

2050 UTC on 9895

MADAGASCAR: Radio Sweden relay. Report on turning around the economy. (Fraser). 7395, 2035-2048; 2140-2200. (Banks) Sackville, Canada relay 6010, 0235-0245 (Bolland).

📻 Streaming/on-demand audio www.radiosweden.org

2110 UTC on 11690

RWANDA: Deutsche Welle Kigali relay. News items on Gaza troubles. SIO 454 (Fraser). 15440, 1322 listed as Hausa service. Station ID at tune-in to newscast topics from African countries. (Barbour).

📻 Streaming/on-demand audio www.dw-world.de

2240 UTC on 5930

CZECH REPUBLIC: Radio Prague. Czech skier wins cross country ski event. SIO 454 (Fraser). 5930, 2323-2355. Program on aspects of *Czech Society* including their website URL, followed by discussion on Radio Prague and Radio Liberty. Fair signal quality (Bolland).

Additional logs excluded for space constraints are posted as **Blog Logs** on the *Shortwave Central* blog at the above web address.

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*Thanks to our contributors – Have you sent in YOUR logs?
Send to Gayle Van Horn, c/o Monitoring Times
English broadcast unless otherwise noted.*

Vintage Receivers from Radio Romania

Last year's QSL collectors added a card series of locomotives; this year, *Vintage Receivers* are wowing radio fans. Radio Romania International is issuing the series of QSL cards throughout this year. June, July and August cards may be viewed at www.rrl.ro/images/2009qsl06.jpg www.rrl.ro/images/2009qsl07.jpg; www.rrl.ro/images/2009qsl08.jpg. Consult their website link at www.rrl.ro/cat.shtml?lang=1&sec=28 to view the complete 2009 card series.

June Bits and Bytes

- All India Radio-Jeypore, 5040 kHz, verified with a QSL card and letter in 42 days, from a previous email report. The QSL was issued by Mrs. Harsha Latha-Station Engineer airjeypore@rediffmail.com. Postal address: All India Radio, Jeypore 764005, Orissa, India. (Takahito Akabayashi, Japan/WWDXC Top News #894)
- Bhutan Broadcasting Service verified a 1993 report with an email response in two days. The attached confirmation listed their current 6035 kHz instead of the reported 5030 kHz from Dorji Wangchuk-Head of the Transmission Division dwangk@gmail.com. An email follow-up the next day for the incorrect data, was reconfirmed in one day. (Rich D'Angelo/Australian DX News)
- Bolivian station Radio Mallku recently changed their name to Radio Lipez. Located

in Uyuni, the station is active on 4796 kHz, airing in Spanish and Aymara. At press time, it is assumed their address at Casilla No. 16, Uyuni, Provincia Antonio Quijarro, Departamento de Potosi, Bolivia remains active. Two U.S. dollars and a Spanish report are appreciated. (DX Window # 373)

- Clandestine, Radio Free North Korea via Gavar, Armenia 7530 kHz, verified with a no-data email reply in 48 days from Min Jae Oh mjoh6701@naver.com. Report details to: Mini6915@hanmail.com (D'Angelo/NASWA).
- Czech Republic's Radio Prague, 6090 via Litomyšl verified in ten days with a colorful St. Peter and Paul Cathedral card, reception details posted online at www.radio.cz/en/report (Sam Wright, Biloxi, MS).
- Deutsche Welle via Bonn skipped the QSL, but opted for a nice large bath and hand towel engraved with the DW insignia (Wachterhauser/Australian DX News). Try your luck with online reporting english@dw-world.de or postal address, D-53110 Bonn, Germany.
- Europirates, Old Time Radio 6241 kHz, full data email card in 48 days, for report to oldtime48@gmail.com. and Radio Geronimo 5825/5830 kHz in one day for email report to geronimo-shortwave@hotmail.com (Alex Vranes, WV/NASWA)
- Pirate station, MAC Shortwave, keeps the pirate oldies shows active on 6925 kHz. Send your details to macshortwave@yahoo.com
- Brazilian station, Rádio Educadora, 3375 kHz is inactive. Recent email response from comercial@radioeducadoraam.com.br stated the station from Guajará Mirim has reverted to internet

broadcasting at www.radioeducadoraam.com.br. (DX Window # 373). Send your outstanding Portuguese details with return mint postage to: Praça Mário Corrêa No. 90, 78957-000 Guajará Mirim RO, Brasil.

- Radio 700, Kall-Krekel, has expanded their broadcast on shortwave for the summer A09 period. Broadcasting on 6005 kHz, daily 0555-2200 UTC, and Sunday's listener's mailbag program. Reception reports are welcomed with a new QSL card. Please enclose German mint postage or two IRCs, directed to: Funkhaus Euskirchen, Radio 700, Kuchenheimer Strasse 155, D-53881 Euskirchen, Germany. Website www.radio700.eu (DX Window # 373).
- Religious broadcaster WINB is now streaming audio online. Click on Listen-To at www.winb.com (Hans Johnson/Cumbre DX) WINB has been transmitting since 1962 and welcomes reports via email to winb40th@yahoo.com or postal, 2900 Windsor Rd., P.O. Box 88, Red Lion, PA 19507 USA. Refer to MT's SW Guide for summer schedules.
- Zimbabwe Community Radio via Dhabbaya, United Arab Emirates, on 5995 kHz, responded within 12 hours with a full data email confirmation. The station's website at www.zicora.com includes streaming audio. Send your program details to Nigel Johnson-Station Manager of Radio Dialogue in Bulawayo to njohnson@mweb.co.zw (Foster via Dexplorer/DW Window # 373).

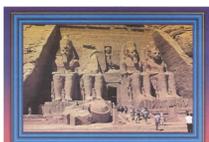
CYPRUS

Cyprus Broadcasting Corp., 6180 kHz. Full data studio buildings card with illegible signature. Received in 30 days for an English report and mint stamps (not used). Station address: P.O. Box 4824, Nicosia 1397, Cyprus (Bill Wilkins, Spring eld, MO)

- Streaming audio www.1560thegame.com/

EGYPT

Radio Cairo 6255 kHz. Full data color card Mask of King Tukankhamun, unsigned, plus program schedule. Received the next day a souvenir color postcard of Abu Simbul Temple and Ramses Offering to Isis, Hieroglyphic Alphabet bookmark. Received in 35/36 days for an English report and 1.00\$ US. Postal address: P.O. Box 566, Cairo 11511, Egypt. (Gayle Van Horn, NC) English email reports egyptianoverseas_english@hotmail.com



ETHIOPIA

Radio Fana (Addis Ababa), 7210 kHz. Full data green colored card with station's seal, for Amharic broadcast, signed by Woldu Yemessel-Genewral Manager. Received for an English report, \$1.00US, one IRC, applause card and local post card. Nice selection of Ethiopian stamps on the envelope. Station address: Radio Fana, P.O. Box 30702, Addis Ababa, Ethiopia. (Joe Wood, Greenback, TN) Website www.radiofana.com

FRANCE

Abu Dhabi Media via Issoudun, 13790 kHz. Full data QSL card from TDP including transmitter site/power. Program indicated as "ADM/DTK," French/English, Alliss-Rotatable antenna. Received in 15 weeks, with new address written in: TDF-Radio Business Unit, Shortwave Department, 106, Avenue Dornoy, 92541 Montrouge Cedex, France (Wendel Craighead, Prairie Village, KS).

MEDIUM WAVE

KCSP, 610 AM kHz. 610 Sports Radio. Partial data letter on Entercom Kansas City letterhead, signed by Kenneth Wolf-Director of Engineering. Received in 21 days for an AM report, \$1.00 US, and return address label. Station address: 7000 Squibb Rd., Mission, KS 66202

USA (Wilkins).

- Streaming audio www.610sports.com/

KGOW, 1560 AM kHz. The Game. Report returned as "That's us!" written at the bottom, signed by Chance McCoy-Program Director. Received in ten days for an AM report, \$1.00US and address label. Station address: 5353 W. Alabama St., Ste. 415, Houston, TX USA (Wilkins).

- Streaming audio www.1560thegame.com/

KQQZ, 1430 AM kHz. Full data prepared card signed by Paul (illegible) general Manager. Received in ten days for an AM report and SASE. Station address: 11647 Olive Blvd., St. Louis, MO 63141-7001 USA (Wilkins).

WZFG, 1100 AM kHz. Dilworth, MN. Email reply in six hours from Jim Offerdahl-Chief Engineer. Report to jim@offerdahlbroadcast.com (Patrick Martin, Oceanside, OR)

PALAU

Nippon no Kaze via T8WH, MEDORN. Full data verification letter via email, including transmitter site. Received in 13 days for email report to info@rachi.go.jp (Ed Kusalik, Alberta, Canada)



HOW TO USE THE SHORTWAVE GUIDE

0000-0100 twhfa USA, Voice of America 5995am 6130ca 7405am 9455af
 ① ② ⑤ ③ ④ ⑥ ⑦

Convert your time to UTC.

Broadcast time on ① and time off ② are expressed in Coordinated Universal Time (UTC) – the time at the 0 meridian near Greenwich, England. To translate your local time into UTC, first convert your local time to 24-hour format, then add (during Daylight Time) 4, 5, 6 or 7 hours for Eastern, Central, Mountain or Pacific Times, respectively. Eastern, Central, and Pacific Times are already converted to UTC for you at the top of each hour.

Note that all dates, as well as times, are in UTC; for example, a show which might air at 0030 UTC Sunday will be heard on Saturday evening in America (in other words, 8:30 pm Eastern, 7:30 pm Central, etc.).

Find the station you want to hear.

Look at the page which corresponds to the time you will be listening. English broadcasts are listed by UTC time on ①, then alphabetically by country ③, followed by the station name ④. (If the station name is the same as the country, we don't repeat it, e.g., "Vanuatu, Radio" [Vanuatu].)

If a broadcast is not daily, the days of broadcast ⑤ will appear in the column following the time of broadcast, using the following codes:

Codes	
s/Sun	Sunday
m/Mon	Monday
t	Tuesday
w	Wednesday
h	Thursday
f	Friday
a/Sat	Saturday
occ:	occasional
DRM:	Digital Radio Mondiale
irreg	Irregular broadcasts
vl	Various languages
USB:	Upper Sideband

Choose the most promising frequencies for the time, location and conditions.

The frequencies ⑥ follow to the right of the station listing; all frequencies are listed in kilohertz (kHz). Not all listed stations will be heard from your location and virtually none of them will be heard all the time on all frequencies.

Shortwave broadcast stations change some of their frequencies at least twice a year, in April and October, to adapt to seasonal conditions. But they can also change in response to short-term conditions, interference, equipment problems, etc. Our frequency manager coordinates published station schedules with confirmations and reports from her monitoring team and MT readers to make the Shortwave Guide up-to-date as of one week before

print deadline.

To help you find the most promising signal for your location, immediately following each frequency we've included information on the target area ⑦ of the broadcast. Signals beamed toward your area will generally be easier to hear than those beamed elsewhere, even though the latter will often still be audible.

Target Areas

- af: Africa
- al: alternate frequency (occasional use only)
- am: The Americas
- as: Asia
- ca: Central America
- do: domestic broadcast
- eu: Europe
- me: Middle East
- na: North America
- pa: Pacific
- sa: South America
- va: various

Mode used by all stations in this guide is AM unless otherwise indicated.

Shortwave Broadcast Bands

kHz	Meters
2300-2495	120 meters (Note 1)
3200-3400	90 meters (Note 1)
3900-3950	75 meters (Regional band, used for broadcasting in Asia only)
3950-4000	75 meters (Regional band, used for broadcasting in Asia and Europe)
4750-4995	60 meters (Note 1)
5005-5060	60 meters (Note 1)
5730-5900	49 meter NIB (Note 2)
5900-5950	49 meter WARC-92 band (Note 3)
5950-6200	49 meters
6200-6295	49 meter NIB (Note 2)
6890-6990	41 meter NIB (Note 2)
7100-7300	41 meters (Regional band, not allocated for broadcasting in the western hemisphere) (Note 4)
7300-7350	41 meter WARC-92 band (Note 3)
7350-7600	41 meter NIB (Note 2)
9250-9400	31 meter NIB (Note 2)
9400-9500	31 meter WARC-92 band (Note 3)
9500-9900	31 meters
11500-11600	25 meter NIB (Note 2)
11600-11650	25 meter WARC-92 band (Note 3)
11650-12050	25 meters
12050-12100	25 meter WARC-92 band (Note 3)
12100-12600	25 meter NIB (Note 2)
13570-13600	22 meter WARC-92 band (Note 3)
13600-13800	22 meters
13800-13870	22 meter WARC-92 band (Note 3)
15030-15100	19 meter NIB (Note 2)
15100-15600	19 meters
15600-15800	19 meter WARC-92 band (Note 3)
17480-17550	17 meter WARC-92 band (Note 3)
17550-17900	17 meters
18900-19020	15 meter WARC-92 band (Note 3)
21450-21850	13 meters
25670-26100	11 meters

Notes

- Note 1 Tropical bands, 120/90/60 meters are for broadcast use only in designated tropical areas of the world.
- Note 2 Broadcasters can use this frequency range on a (NIB) non-interference basis only.
- Note 3 WARC-92 bands are allocated of cially for use by HF broadcasting stations in 2007
- Note 4 WRC-03 update. After March 29, 2009, the spectrum from 7100-7200 kHz will no longer be available for broadcast purposes and will be turned over to amateur radio operations worldwide

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Thank You ...

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0000UTC-8PMEDT/7PMCDT/5PMPDT

0000	0000	UK, BBC World Service	5970as	6195as	
		7395as	9410as	9740as	11955as
		13725as	15335as	15360as	
0000	0005	Canada, R Canada International		6100na	
0000	0020	Japan, NHK World Radio Japan		5960eu	
		6145na	13650as	17810as	
0000	0030	Egypt, Radio Cairo		11590na	
0000	0030	Thailand, Radio Thailand World Svc		15275na	
0000	0030	USA, Voice of America		7555as	
0000	0045	India, All India Radio		9705as	9950as
		11620as	11645as		
0000	0045	USA, WYFR/Family Radio Worldwide		17805na	
0000	0057	Canada, R Canada International		11700na	
0000	0100	Anguilla, Worldwide Univ Network		6090am	
0000	0100	Australia, ABC NT Alice Springs		2310do	
		4835do			
0000	0100	Australia, ABC NT Katherine		5025do	
0000	0100	Australia, ABC NT Tennant Creek		4910do	
0000	0100	Australia, Radio Australia		9660as	12080as
		13690as	15240pa	17715as	17750va
		17775va	17795va		
0000	0100	Canada, CFRX Toronto ON		6070na	
0000	0100	Canada, CFVP Calgary AB		6030na	
0000	0100	Canada, CKZN St John's NF		6160na	
0000	0100	Canada, CKZU Vancouver BC		6160na	
0000	0100	China, China Radio International		6020na	
		6075as	6180as	7415as	9570na
		11790as	11885as	13750as	15125as
0000	0100	Germany, Deutsche Welle		9885as	15595as
		17525as			
0000	0100	Guyana, Voice of Guyana		3291do	
0000	0100	Malaysia, RTM/Traxx FM		7295as	
0000	0100	DRM New Zealand, Radio NZ International		13730pa	
0000	0100	New Zealand, Radio NZ International		15720pa	
0000	0100	vi Papua New Guinea, Wantok R. Light		7325do	
0000	0100	Romania, R Romania International		9580na	
		11790na			
0000	0100	Russia, Voice of Russia		9480sa	9665sa
0000	0100	Spain, Radio Exterior Espana		6055na	
0000	0100	Ukraine, R Ukraine International		7440na	
0000	0100	USA, American Forces Network		4319usb	
		5446usb	5765usb	6350usb	7811usb
		10320usb	12132usb	13362usb	
0000	0100	USA, EWTN Vandiver AL		11520af	
0000	0100	USA, WBCQ Monticello ME		5110am	7415am
		9330am			
0000	0100	USA, WBCQ Monticello ME		5110am	7415am
		9330am			
0000	0100	USA, WBOH Newport NC		5920am	
0000	0100	USA, WHRA Greenbush ME		5850eu	
0000	0100	USA, WHRI Cypress Creek SC		5875na	
		7385na			
0000	0100	USA, WINB Red Lion PA		9265ca	
0000	0100	USA, WRMI Miami FL		9955am	
0000	0100	USA, WTJC Newport NC		9370na	
0000	0100	USA, WWCR Nashville TN		5070na	7465na
		5935na	9980na		
0000	0100	USA, WWRB Manchester TN		3185va	3215na
		5050na	6890na		
0000	0100	USA, WYFR/Family Radio Worldwide		5950na	
		6985na	9505sa	15440am	
0000	0100	Zambia CVC/ The Voice Africa		4965af	
0005	0100	twhfa Canada, R Canada International		6100am	
0025	0100	Sri Lanka, SLBC		6005as	9770as
		6005as		9770as	15745as
0030	0045	twhfes Albania, Radio Tirana		9345na	
0030	0045	Sun Germany, Pan American BC		9640as	
0030	0100	Australia, Radio Australia		15415as	
0030	0100	China, China Radio International		11730as	
0030	0100	mtwhfa Serbia, International Radio of Serbia		9675na	
0030	0100	asf UK, Bible Voice Broadcasting		9490as	
0030	0100	USA, Voice of America		7430va	9715va
		9780va	11725va	15205va	15290va
		15560va	17820va		
0030	0100	Uzbekistan, CVC Intl-The Voice Asia		11800as	

0100UTC-9PMEDT/8PMCDT/6PMPDT

0100	0105	twhfa Canada, R Canada International		6100am	
0100	0125	Vietnam, Voice of Vietnam		6175na	
0100	0127	Czech Rep, Radio Prague		6200na	7345na
0100	0130	Australia, Radio Australia		9660as	12080as
		13690as	15240pa	17715as	17750va
		17775va	17795va		
0100	0130	mtwhfa Serbia, International Radio of Serbia		9675na	
0100	0130	Slovakia, R Slovakia International		5930am	

0100	0157	9440am North Korea, Voice of Korea		7140as	9345as
		9730as	11735sa	13760sa	15180sa
0100	0159	Canada, R Canada International		9620va	
0100	0200	Anguilla, Worldwide Univ Network		6090am	
0100	0200	Australia, ABC NT Katherine		5025do	
0100	0200	Australia, ABC NT Tennant Creek		4910do	
0100	0200	Canada, CFRX Toronto ON		6070na	
0100	0200	Canada, CFVP Calgary AB		6030na	
0100	0200	Canada, CKZN St John's NF		6160na	
0100	0200	Canada, CKZU Vancouver BC		6160na	
0100	0200	China, China Radio International		6080na	
		6175as	9410eu	9470eu	9535as
		9580na	9790na	11870as	15125as
		15785as			
0100	0200	Cuba, Radio Havana Cuba		6000na	6060na
		6140na			
0100	0200	Guyana, Voice of Guyana		3291do	
0100	0200	Malaysia, RTM/Traxx FM		7295as	
0100	0200	DRM New Zealand, Radio NZ International		13730pa	
0100	0200	New Zealand, Radio NZ International		15720pa	
0100	0200	Palau, T8WH/World Harvest		15710as	
0100	0200	vi Papua New Guinea, Wantok R. Light		7325do	
0100	0200	Russia, Voice of Russia		9480sa	9665sa
0100	0200	Sri Lanka, SLBC		6005as	9770as
		6005as		9770as	15745as
		9740as	11750as	11955as	15310as
		15335as	15360as	17615as	
0100	0200	USA, American Forces Network		4319usb	
		5446usb	5765usb	6350usb	7811usb
		10320usb	12133usb	13362usb	
0100	0200	USA, EWTN Vandiver AL		11520af	
0100	0200	USA, KJES Vado NM		7555na	
0100	0200	USA, Voice of America		7430va	9780va
		11705va			
0100	0200	USA, WBCQ Monticello ME		5110am	7415am
		9330am			
0100	0200	USA, WBOH Newport NC		5920am	
0100	0200	USA, WHRA Greenbush ME		5850eu	
0100	0200	USA, WHRI Cypress Creek SC		5875na	
		7385na			
0100	0200	Sat/Sun USA, WHRI Cypress Creek SC		7315va	
0100	0200	mtwhf USA, WHRI Cypress Creek SC		5850na	
0100	0200	USA, WINB Red Lion PA		9265ca	
0100	0200	USA, WRMI Miami FL		9955am	
0100	0200	USA, WTJC Newport NC		9370na	
0100	0200	USA, WWCR Nashville TN		3215na	5070na
		5935na	9980na		
0100	0200	USA, WWRB Manchester TN		3185va	5050na
		6890na			
0100	0200	USA, WYFR/Family Radio Worldwide		5950na	
		6985na	9505na	15440am	
0100	0200	Uzbekistan, CVC Intl-The Voice Asia		11790as	
		11880as			
0100	0200	Zambia CVC/ The Voice Africa		4965af	
0130	0200	Australia, Radio Australia		9660as	12080as
		13690as	15240pa	15415as	17715as
		17750va	17795va		
0130	0200	Iran, VOIRI/ IRIB		7235na	9495na
0130	0200	Sweden, Radio Sweden		6010na	
0130	0200	twhfa USA, Voice of America		6040va	9820va
0140	0200	Vatican City, Vatican Radio		5915as	7335as
0145	0200	twhfes Albania, Radio Tirana		7425na	

0200UTC-10PMEDT/9PMCDT/7PMPDT

0200	0230	Iran, VOIRI/ IRIB		7235na	9495na
0200	0230	Thailand, Radio Thailand World Svc		15275na	
0200	0230	USA, KJES Vado NM		7555na	
0200	0245	USA, WYFR/Family Radio Worldwide		11835am	
0200	0257	North Korea, Voice of Korea		13650as	15100as
0200	0258	Sun Lithuania, Mighty KBC Radio		6110na	
0200	0300	Anguilla, Worldwide Univ Network		6090am	
0200	0300	Argentina, Radio Nacional RAE		11710am	
0200	0300	Australia, ABC NT Alice Springs		2310do	
		4835do			
0200	0300	Australia, ABC NT Katherine		5025do	
0200	0300	Australia, ABC NT Tennant Creek		4910do	
0200	0300	Australia, Radio Australia		9660as	12080as
		13690as	15240pa	15415as	15515as
		17750va	21725va		
0200	0300	DRM Bulgaria, Radio Bulgaria		9500na	
0200	0300	Bulgaria, Radio Bulgaria		9700na	11700na
0200	0300	Canada, CFRX Toronto ON		6070na	
0200	0300	Canada, CFVP Calgary AB		6030na	
0200	0300	Canada, CKZN St John's NF		6160na	
0200	0300	Canada, CKZU Vancouver BC		6160na	
0200	0300	China, China Radio International		11770as	

13640as			
0200	0300	Cuba, Radio Havana Cuba	6000na 6060na
6140na			
0200	0300	Egypt, Radio Cairo	7540na
0200	0300	Guyana, Voice of Guyana	3291do
0200	0300	Indonesia, Voice of Indonesia	9526va 11784al
0200	0300	Malaysia, RTM/Traxx FM	7295as
0200	0300	DRM New Zealand, Radio NZ International	13730pa
0200	0300	New Zealand, Radio NZ International	15720pa
0200	0300	Palau, T8WH/World Harvest	15710as
0200	0300	vi Papua New Guinea, Wantok R. Light	7325do
0200	0300	Philippines, Radyo Pilipinas	11880va 15510va
0200	0300	Russia, Voice of Russia	9480sa 9665sa
15425na			
0200	0300	South Korea, KBS World Radio	9580sa
0200	0300	Sri Lanka, SLBC	6005as 9770as 15745as
0200	0300	Taiwan, R Taiwan International	5950na
0200	0300	vi Uganda, UBC Radio	4976do
0200	0300	UK, BBC World Service	6005af 6195me
9410eu 11955as 15310as			
0200	0300	USA, American Forces Network	4319usb
5446usb 5765usb 6350usb 7811usb			
0200	0300	USA, EWTN Vandiver AL	11520af
0200	0300	USA, WBCQ Monticello ME	5110am 7415am
9330am			
0200	0300	USA, WBOH Newport NC	5920am
0200	0300	USA, WHRA Greenbush ME	5850eu
0200	0300	USA, WHRI Cypress Creek SC	5875na
7315va 7385na			
0200	0300	USA, WINB Red Lion PA	9265ca
0200	0300	USA, WRMI Miami FL	9955am
0200	0300	USA, WTJC Newport NC	9370na
0200	0300	USA, WWCR Nashville TN	3215na 5070na
5890na 5935na			
0200	0300	USA, WWRB Manchester TN	3185va 5050na
6890na			
0200	0300	USA, WYFR/Family Radio Worldwide	5985sa
6985na 9505na 9680am 11855sa			
0200	0300	Uzbekistan, CVC Intl-The Voice Asia	11790as
11880as			
0200	0300	Zambia CVC/ The Voice Africa	4965af
0215	0230	Nepal, Radio Nepal	5005as
0230	0255	Vietnam, Voice of Vietnam	6175na
0230	0300	twhfas Albania, Radio Tirana	7425na
0230	0300	China, China Radio International	15435as
0230	0300	Malaysia, RTM/Voice of Malaysia	15295pa
0230	0300	Sweden, Radio Sweden	6010na 11550va
0245	0300	Australia, HCJB Global	15400as
0250	0300	Vatican City, Vatican Radio	6040na 7305na
0255	0300	vi Rwanda, Radio Rwanda	6055do

0300	0400	Malaysia, RTM/Traxx FM	7295as
0300	0400	Malaysia, RTM/Voice of Malaysia	6175as
9750as 15295as			
0300	0400	New Zealand, Radio NZ International	15720pa
0300	0400	DRM New Zealand, Radio NZ International	13730pa
0300	0400	Oman, Radio Oman	15355as
0300	0400	Palau, T8WH/World Harvest	15700as
0300	0400	vi Papua New Guinea, Wantok R. Light	7325do
0300	0400	Romania, R Romania International	6150na
9645na 9735as 11895as			
0300	0400	DRM Russia, Voice of Russia	15735as
0300	0400	Russia, Voice of Russia	9665sa 15425na
15585as 15755as			
0300	0400	vi Rwanda, Radio Rwanda	6055do
0300	0400	South Africa, Channel Africa	3345af 6135af
0300	0400	Sri Lanka, SLBC	6005as 9770as 15745as
0300	0400	Sweden, Radio Sweden	6010na
0300	0400	Taiwan, R Taiwan International	5950na
0300	0400	UK, BBC World Service	3255af 6005af
6145af 6190af 6195as 7255af			
9410eu 9750af 12035af 12095as			
15310as 17790as			
0300	0400	Ukraine, R Ukraine International	7440na
0300	0400	USA, American Forces Network	4319usb
5446usb 5765usb 6350usb 7811usb			
0300	0400	USA, EWTN Vandiver AL	11520af
0300	0400	USA, Voice of America	4930af 6080af
9885af 15580af			
0300	0400	USA, WBCQ Monticello ME	5110am 7415am
9330am			
0300	0400	USA, WBOH Newport NC	5920am
0300	0400	USA, WHRA Greenbush ME	5850eu
0300	0400	twhfas USA, WHRI Cypress Creek SC	6110ca
0300	0400	USA, WHRI Cypress Creek SC	5875na
7315va			
0300	0400	USA, WRMI Miami FL	9955am
0300	0400	USA, WTJC Newport NC	9370na
0300	0400	USA, WWCR Nashville TN	3215na 5070na
5890na 5935na			
0300	0400	USA, WWRB Manchester TN	3185va 5050na
6890na			
0300	0400	USA, WYFR/Family Radio Worldwide	11740na
15255am			
0300	0400	Uzbekistan, CVC Intl-The Voice Asia	13680as
0300	0400	Zambia CVC/ The Voice Africa	4965af
0330	0355	Vietnam, Voice of Vietnam	6175na
0330	0357	Czech Rep, Radio Prague	6080na 9445na
11600na			
0330	0400	twhfas Albania, Radio Tirana	7425na
0330	0400	UK, BBC World Service	11945af
0330	0400	Uzbekistan, CVC Intl-The Voice Asia	15555as

0300UTC-11PMEDT/10PMCDT/8PMPDT

0300	0320	Vatican City, Vatican Radio	6040am 7305na
9545as			
0300	0327	Czech Rep, Radio Prague	7345na 9870na
0300	0330	Egypt, Radio Cairo	7540na
0300	0330	Philippines, Radyo Pilipinas	11880va 15285va
15510va			
0300	0330	Uzbekistan, CVC Intl-The Voice Asia	11800as
11880as			
0300	0330	Vatican City, Vatican Radio	7360af 9660af
0300	0355	Turkey, Voice of Turkey	5975va 6165me
7325na			
0300	0357	North Korea, Voice of Korea	7140as 9345as
9730as			
0300	0400	Anguilla, Worldwide Univ Network	6090am
0300	0400	Australia, ABC NT Alice Springs	2310do
4835do			
0300	0400	Australia, ABC NT Katherine	5025do
0300	0400	Australia, ABC NT Tennant Creek	4910do
0300	0400	Australia, Radio Australia	9660as 12080as
13690as 15240pa 15415as 15515as			
17750va 21725va			
0300	0400	twhfas Canada, CBC NQ SW Service	9625na
0300	0400	Canada, CFRX Toronto ON	6070na
0300	0400	Canada, CFVP Calgary AB	6030na
0300	0400	Canada, CKZN St John's NF	6160na
0300	0400	Canada, CKZU Vancouver BC	6160na
0300	0400	China, China Radio International	9690na
9790na 11770as 13750as 15110as			
15120as 15785as			
0300	0400	Cuba, Radio Havana Cuba	6000na 6060na
6140na			
0300	0400	Germany, Deutsche Welle	11975as 15595as
0300	0400	Guyana, Voice of Guyana	3291do

0400UTC-12AMEDT/11PMCDT/9PMPDT

0400	0430	Australia, Radio Australia	9660as 12080as
13690as 15240pa 15515as 17750va			
0400	0430	mtwhf France, Radio France International	9805af
11995af			
0400	0430	Netherlands, R Netherlands Worldwide	9885af
12080af			
0400	0430	USA, Voice of America	4930af 6080af
9885af 15580af			
0400	0445	USA, WYFR/Family Radio Worldwide	6985na
9505na			
0400	0458	DRM New Zealand, Radio NZ International	15720pa
0400	0458	New Zealand, Radio NZ International	13730pa
0400	0500	Anguilla, Worldwide Univ Network	6090am
0400	0500	Australia, ABC NT Alice Springs	2310do
4835do			
0400	0500	Australia, ABC NT Katherine	5025do
0400	0500	Australia, ABC NT Tennant Creek	4910do
0400	0500	twhfas Canada, CBC NQ SW Service	9625na
0400	0500	Canada, CFRX Toronto ON	6070na
0400	0500	Canada, CKZN St John's NF	6160na
0400	0500	Canada, CKZU Vancouver BC	6160na
0400	0500	China, China Radio International	6020na
6080na 6190na 13750as 15120as			
15785as 17730as 17855as			
0400	0500	Cuba, Radio Havana Cuba	6000na 6060na
6140na			
0400	0500	Germany, Deutsche Welle	7245af 7430af
12045af 15445af			
0400	0500	DRM Germany, Deutsche Welle	3995af
0400	0500	Guyana, Voice of Guyana	3291do
0400	0500	Malaysia, RTM/Traxx FM	7295as
0400	0500	Malaysia, RTM/Voice of Malaysia	6175as

0600	0700		Nigeria, Radio Nigeria/Kaduna	4770do	
0600	0700		Palau, T8WH/World Harvest	15700as	
0600	0700	vl	Papua New Guinea, Wantok R. Light	7325do	
0600	0700		Russia, Voice of Russia	17635pa	
0600	0700		South Africa, Channel Africa	7230af	15255af
0600	0700		UK, BBC World Service	3995eu	6005af
			6190af	9410af	9860af
			12015af	12095as	15310as
			17790as		17640af
0600	0700	Sat/Sun	UK, BBC World Service	15420af	
0600	0700		USA, American Forces Network	4319usb	
			5446usb	5765usb	6350usb
			10320usb	12133usb	13362usb
0600	0700		USA, EWTN Vandiver AL	11520af	
0600	0700		USA, Voice of America	6080af	12080af
			15580af		
0600	0700		USA, WBCQ Monticello ME	5110am	7415am
0600	0700		USA, WBOH Newport NC	5920am	
0600	0700		USA, WHRA Greenbush ME	7390va	
0600	0700		USA, WHRI Cypress Creek SC	11565na	5875na
0600	0700	Sat	USA, WHRI Cypress Creek SC	7390na	
0600	0700	smtwhf	USA, WHRI Cypress Creek SC	7365na	
0600	0700		USA, WRMI Miami FL	9955am	
0600	0700		USA, WTJC Newport NC	9370na	
0600	0700		USA, WWCR Nashville TN	3215na	5070na
			5890na	5935na	
0600	0700		USA, WWRB Manchester TN	3185va	
0600	0700		USA, WYFR/Family Radio Worldwide	5850eu	
			7520sa	9680na	11530va
0600	0700		Uzbekistan, CVC Intl-The Voice Asia	15555as	
0600	0700	vl	Vanuatu, Radio Vanuatu	7260do	
0600	0700		Zambia CVC/ The Voice Africa	13590af	6065af
0630	0645		Vatican City, Vatican Radio	4005eu	5965eu
			7250eu	9645eu	11740eu
0630	0700		Australia, Radio Australia	9660as	11650as
			12080as	13690as	15160as
			15415as	15515as	17750va
0630	0700		Bulgaria, Radio Bulgaria	9600eu	11600eu
0630	0700		Swaziland, TWR 3200af		
0645	0700	Sun	Germany, TWR Europe	6105eu	
0645	0700	Sun	Monaco, TWR Europe	9800eu	
0659	0700		New Zealand, Radio NZ International		6170pa
0659	0700	DRM	New Zealand, Radio NZ International		7285pa

0700UTC-3AMEDT/2AMCDT/12AMPDT

0700	0727		Czech Rep, Radio Prague	9880eu	11600na
0700	0730		France, Radio France International		13675af
0700	0730		Slovakia, R Slovakia International		9440va
			11650va		
0700	0730	Sun	UK, Bible Voice Broadcasting	5945eu	
0700	0745		USA, WYFR/Family Radio Worldwide		7520eu
0700	0750	smtwhf	Germany, TWR Europe	6105eu	
0700	0750	smtwhf	Monaco, TWR Europe	9800eu	
0700	0800		Anguilla, Worldwide Univ Network		6090am
0700	0800		Australia, ABC NT Alice Springs		2310do
			4835do		
0700	0800		Australia, ABC NT Katherine	5025do	
0700	0800		Australia, ABC NT Tennant Creek		4910do
0700	0800		Australia, Radio Australia	9475as	9660as
			9710as	11650as	11945as
			13630pa	15160va	15240pa
			17750va		17750va
0700	0800		Bhutan, Bhutan Broadcasting Svc		6035as
0700	0800		Canada, CFRX Toronto ON	6070na	
0700	0800		Canada, CFVP Calgary AB	6030na	
0700	0800		Canada, CKZN St John's NF	6160na	
0700	0800		Canada, CKZU Vancouver BC	6160na	
0700	0800		China, China Radio International		11880as
			11895as	13660as	13710eu
			15350as	15465as	17490eu
			17710as		17540as
0700	0800	DRM	Germany, Deutsche Welle	5790eu	9545eu
0700	0800		Guyana, Voice of Guyana	3291do	
0700	0800		Kuwait, Radio Kuwait	15110va	
0700	0800	Sat	Latvia, Radio SWH9290eu		
0700	0800	vl	Liberia, ELWA	4760do	6070al
0700	0800		Malaysia, RTM/Traxx FM	7295as	
0700	0800		Malaysia, RTM/Voice of Malaysia		6175as
			9750as	15295as	
0700	0800		Myanmar, Myanma Radio	9731do	
0700	0800		New Zealand, Radio NZ International		6170pa
0700	0800	DRM	New Zealand, Radio NZ International		7285pa
0700	0800		Nigeria, Radio Nigeria/Kaduna		4770do
0700	0800		Palau, T8WH/World Harvest	9930as	15700as
0700	0800	vl	Papua New Guinea, R East New Britain		3385do

0700	0800	vl	Papua New Guinea, Wantok R. Light		7325do
0700	0800		Russia, Voice of Russia		17635as
0700	0800	vl	Solomon Islands, SIBC		5020do
0700	0800		South Africa, Channel Africa		7230af
0700	0800		Swaziland, TWR 3200af		
0700	0800	Sat/Sun	UK, BBC World Service		15420af
0700	0800		UK, BBC World Service		5790eu
			9860af	11760me	11765af
			15310af	15400af	15575as
			17830af		
0700	0800		USA, American Forces Network		4319usb
			5446usb	5765usb	6350usb
			10320usb	12133usb	13362usb
0700	0800		USA, EWTN Vandiver AL		11520af
0700	0800		USA, WBCQ Monticello ME		5110am
0700	0800		USA, WBOH Newport NC		5920am
0700	0800		USA, WHRI Cypress Creek SC		7385na
			7390na	11565na	
0700	0800		USA, WRMI Miami FL		9955am
0700	0800		USA, WTJC Newport NC		9370na
0700	0800		USA, WWCR Nashville TN		3215na
			5890na	5935na	
0700	0800		USA, WWRB Manchester TN		3185va
0700	0800		USA, WYFR/Family Radio Worldwide		5950na
			5985na	6915na	9340am
					9505af
0700	0800		Uzbekistan, CVC Intl-The Voice Asia		15555as
0700	0800	vl	Vanuatu, Radio Vanuatu		7260do
0700	0800		Zambia CVC/ The Voice Africa		13590af
					6065af
0715	0750	Sat	Germany, TWR Europe		6105eu
0715	0750	Sat	Monaco, TWR Europe		9800eu
0730	0800		Australia, HCJB Global		11750pa
0730	0800	Sat	UK, Bible Voice Broadcasting		5945eu
0745	0800	f	UK, Bible Voice Broadcasting		5945eu
0750	0800		Saudi Arabia, BSKSA		17785as

0800UTC-4AMEDT/3AMCDT/1AMPDT

0800	0815	Sat	UK, Bible Voice Broadcasting		5945eu
0800	0825		Malaysia, RTM/Voice of Malaysia		6175as
			9750as	15295as	
0800	0830		Australia, ABC NT Katherine		5025do
0800	0830		Australia, ABC NT Tennant Creek		4910do
0800	0830		Myanmar, Myanma Radio		9731do
0800	0845		USA, WYFR/Family Radio Worldwide		5950na
			9340af		
0800	0900		Anguilla, Worldwide Univ Network		6090am
0800	0900		Australia, ABC NT Alice Springs		2310do
			4835do		
0800	0900		Australia, HCJB Global		11750pa
0800	0900		Australia, Radio Australia		5995as
			9580va	9590as	9710as
			12080as	13630pa	11945pa
0800	0900		Bhutan, Bhutan Broadcasting Svc		6035as
0800	0900		Canada, CFRX Toronto ON		6070na
0800	0900		Canada, CFVP Calgary AB		6030na
0800	0900		Canada, CKZN St John's NF		6160na
0800	0900		Canada, CKZU Vancouver BC		6160na
0800	0900		China, China Radio International		11620as
			11880as	11895as	13710eu
			15350as	15465as	15625as
			17540as		17490eu
0800	0900	DRM	Germany, Deutsche Welle		9545eu
			13810eu		12095as
0800	0900		Guyana, Voice of Guyana		3291do
0800	0900	Sat	Italy, NEXUS/IRRS		9510va
0800	0900	vl	Liberia, ELWA		4760do
0800	0900		Malaysia, RTM/Traxx FM		7295as
0800	0900		New Zealand, Radio NZ International		6170pa
0800	0900	DRM	New Zealand, Radio NZ International		7285pa
0800	0900		Nigeria, Radio Nigeria/Kaduna		4770do
0800	0900		Nigeria, Voice of Nigeria/Lagos		9690af
0800	0900		Palau, T8WH/World Harvest		9930as
0800	0900	vl	Papua New Guinea, R East New Britain		3385do
0800	0900	vl	Papua New Guinea, Wantok R. Light		7325do
0800	0900		Russia, Voice of Russia		17635as
0800	0900	DRM	Russia, Voice of Russia		12060eu
0800	0900	vl	Solomon Islands, SIBC		5020do
0800	0900		South Africa, Channel Africa		9625af
0800	0900	Sun	South Africa, SA Radio League		7205af
			17570af		
0800	0900		South Korea, KBS World Radio		9570as
0800	0900		Swaziland, TWR		6120af
0800	0900		UK, BBC World Service		6190af
			11760me	15310as	15400af
			17640af	17790as	17830af
0800	0900		USA, American Forces Network		4319usb

		5446usb	5765usb	6350usb	7811usb
		10320usb	12133usb	13362usb	
0800	0900	USA, EWTN Vandiver AL		11520af	
0800	0900	USA, KNLS Anchor Point AK		7355as	
0800	0900	USA, WBCQ Monticello ME		5110am	7415am
0800	0900	USA, WBOH Newport NC		5920am	
0800	0900	USA, WHRA Greenbush ME		7335va	
0800	0900	USA, WHRI Cypress Creek SC			5875na
0800	0900	USA, WHRI Cypress Creek SC			7385na
		11565na			
0800	0900	USA, WRMI Miami FL		9955am	
0800	0900	USA, WTJC Newport NC		9370na	
0800	0900	USA, WWCR Nashville TN		3215na	5070na
		5890na	5935na		
0800	0900	USA, WWRB Manchester TN		3185va	
0800	0900	USA, WYFR/Family Radio Worldwide			5985am
		6915na			
0800	0900	Uzbekistan, CVC Intl-The Voice Asia			15555as
		15555as			
0800	0900	Vanuatu, Radio Vanuatu		7260do	
0800	0900	Zambia CVC/ The Voice Africa			6065af
		13590af			
0805	0900	Guam, KTW/TWR		15190as	
0820	0900	Guam, KTW/TWR		15170as	
0830	0900	Australia, ABC NT Katherine		2485do	
0830	0900	Australia, ABC NT Tennant Creek			2325do
0830	0900	Australia, CVC International		15555as	
0835	0900	Guam, KTW/TWR		15170as	
0855	0900	Guam, KTW/TWR		11840pa	

0900UTC-5AMEDT/4AMCDT/2AMPDT

0900	0927	Czech Rep, Radio Prague		9880am	9955na
		21745af			
0900	0930	Australia, HCJB Global		11750pa	
0900	0930	Guam, KTW/TWR		11840pa	
0900	0930	Japan, NHK World Radio Japan			9625pa
		9825pa	11815as	15590as	
0900	0930	Uzbekistan, CVC Intl-The Voice Asia			15555as
		15555as			
0900	1000	Anguilla, Worldwide Univ Network		6090am	
0900	1000	Australia, ABC NT Alice Springs			2310do
		4835do			
0900	1000	Australia, ABC NT Katherine		2485do	
0900	1000	Australia, ABC NT Tennant Creek			2325do
0900	1000	Australia, Radio Australia		9475va	9580va
		9590va	11945as	12080as	
0900	1000	Canada, CFRX Toronto ON		6070na	
0900	1000	Canada, CFVP Calgary AB		6030na	
0900	1000	Canada, CKZN St John's NF		6160na	
0900	1000	Canada, CKZU Vancouver BC		6160na	
0900	1000	China, China Radio International			11620as
		15210va	15270eu	15350as	15625af
		17490eu	17570eu	17690va	17750af
0900	1000	Germany, Deutsche Welle		15340as	17705as
0900	1000	Germany, Deutsche Welle		9545eu	13810eu
0900	1000	Guyana, Voice of Guyana		3291do	
0900	1000	Liberia, ELWA		4760do	6070al
0900	1000	Malaysia, RTM/Traxx FM		7295as	
0900	1000	New Zealand, Radio NZ International			6170pa
0900	1000	New Zealand, Radio NZ International			7285pa
0900	1000	Nigeria, Radio Nigeria/Kaduna			4770do
0900	1000	Nigeria, Voice of Nigeria/Lagos			9690af
0900	1000	Palau, T8WH/World Harvest		9930as	15700as
0900	1000	Papua New Guinea, R East New Britain			3385do
0900	1000	Papua New Guinea, Wantok R. Light			7325do
0900	1000	Russia, Voice of Russia		15470as	15610as
		21790as			
0900	1000	Russia, Voice of Russia		12060eu	
0900	1000	Saudi Arabia, BSKSA		15250af	
0900	1000	Solomon Islands, SIBC		5020do	
0900	1000	South Africa, Channel Africa		9625af	
0900	1000	Swaziland, TWR		6120af	
0900	1000	UK, BBC World Service		6190af	6195as
		9740as	9860af	11760me	15310as
		15400af	15575as	17640af	17760as
		17790as	17830af	21470af	21660as
0900	1000	Ukraine, R Ukraine International			11550eu
0900	1000	USA, American Forces Network			4319usb
		5446usb	5765usb	6350usb	7811usb
		10320usb	12133usb	13362usb	
0900	1000	USA, EWTN Vandiver AL		11640as	
0900	1000	USA, WBCQ Monticello ME		5110am	7415am
0900	1000	USA, WBOH Newport NC		5920am	
0900	1000	USA, WHRI Cypress Creek SC			9425na
0900	1000	USA, WHRI Cypress Creek SC			7465na
0900	1000	USA, WHRI Cypress Creek SC			7385na
		11565na			

0900	1000	USA, WRMI Miami FL			9955am
0900	1000	USA, WTJC Newport NC			9370na
0900	1000	USA, WWCR Nashville TN			5070na
		5935na	9985na		5890na
0900	1000	USA, WWRB Manchester TN			3185va
0900	1000	USA, WYFR/Family Radio Worldwide			5950na
		6915na	9755as		
0900	1000	Vanuatu, Radio Vanuatu			7260do
0900	1000	Zambia CVC/ The Voice Africa			6065af
		13590af			
0915	0930	Guam, KTW/TWR			11840pa
0930	1000	Australia, CVC International			15555as
0930	1000	Italy, NEXUS/IRRS			9510va

1000UTC-6AMEDT/5AMCDT/3AMPDT

1000	1030	Vietnam, Voice of Vietnam		9840as	12020as
1000	1057	Netherlands, R Netherlands Worldwide			12065as
		15110as	11895as		
1000	1057	North Korea, Voice of Korea		11710sa	11735as
		13650as	15180sa		
1000	1058	New Zealand, Radio NZ International			6170pa
1000	1100	Anguilla, Worldwide Univ Network			11775am
1000	1100	Australia, ABC NT Alice Springs			2310do
		4835do			
1000	1100	Australia, ABC NT Katherine		2485do	
1000	1100	Australia, ABC NT Tennant Creek			2325do
1000	1100	Australia, CVC International		15555as	
1000	1100	Australia, Radio Australia		9475va	9580va
		9590va	11945as	12080as	
1000	1100	Canada, CFRX Toronto ON		6070na	
1000	1100	Canada, CFVP Calgary AB		6030na	
1000	1100	Canada, CKZN St John's NF		6160na	
1000	1100	Canada, CKZU Vancouver BC		6160na	
1000	1100	China, China Radio International			6040na
		6090as	11610as	11635as	11750na
		13590as	13620as	13720as	15190as
		15350as	17490eu		
1000	1100	Germany, Deutsche Welle		9545eu	13810eu
1000	1100	Guyana, Voice of Guyana		3291do	
1000	1100	India, All India Radio		7270as	13695va
		15070as	15260as	15410pa	17510pa
		17800pa	17895pa		
1000	1100	Indonesia, Voice of Indonesia		9526va	11784al
1000	1100	Italy, NEXUS/IRRS		9510va	
1000	1100	Malaysia, RTM/Traxx FM		7295as	
1000	1100	New Zealand, Radio NZ International			7285pa
1000	1100	Nigeria, Radio Nigeria/Kaduna			4770do
1000	1100	Nigeria, Voice of Nigeria/Lagos			9690af
1000	1100	Palau, T8WH/World Harvest		9930as	15700as
1000	1100	Papua New Guinea, R East New Britain			3385do
1000	1100	Papua New Guinea, Wantok R. Light			7325do
1000	1100	Russia, Voice of Russia		15470as	15610as
		21790as			
1000	1100	Russia, Voice of Russia		12060eu	
1000	1100	Saudi Arabia, BSKSA		15250af	
1000	1100	Solomon Islands, SIBC		5020do	
1000	1100	South Africa, Channel Africa		9625af	
1000	1100	Swaziland, TWR		6120af	
1000	1100	UK, BBC World Service		6190af	6195as
		9740as	9860af	11760me	15310as
		15400af	15575as	17640af	17760as
		17790as	17830af	21470af	21660as
1000	1100	USA, American Forces Network			4319usb
		5446usb	5765usb	6350usb	7811usb
		10320usb	12133usb	13362usb	
1000	1100	USA, EWTN Vandiver AL		11640as	
1000	1100	USA, KNLS Anchor Point AK		6890as	
1000	1100	USA, WBCQ Monticello ME		5110am	7415am
1000	1100	USA, WBOH Newport NC		5920am	
1000	1100	USA, WHRI Cypress Creek SC			7385na
		11565na			
1000	1100	USA, WRMI Miami FL		9955am	
1000	1100	USA, WTJC Newport NC		9370na	
1000	1100	USA, WWCR Nashville TN		5070na	5890na
		5935na	9985na		
1000	1100	USA, WWRB Manchester TN		3185va	
1000	1100	USA, WYFR/Family Radio Worldwide			5950na
		6890na	6915na	9555sa	
1000	1100	Zambia CVC/ The Voice Africa			6065af
		13590af			
1015	1045	UK, Bible Voice Broadcasting		5910as	
1030	1057	Czech Rep, Radio Prague		9880eu	11665eu
1030	1100	Iran, VOIRI/IRIB		15600as	17660as
1030	1100	Mongolia, Voice of Mongolia		9665as	12085as
1059	1100	New Zealand, Radio NZ International			9655pa

1100UTC-7AMEDT/6AMCDT/4AMPDT

1100	1103	mtwhf	Croatia, Voice of Croatia	6165eu	
1100	1130		Australia, CVC International	15555as	
1100	1130		China, China Radio International	6060as	
1100	1130		Iran, VOIRI/IRIB	15600as	17660as
1100	1130	f/DRM	Japan, NHK World Radio Japan	9760eu	
1100	1130		Vietnam, Voice of Vietnam	7285as	
1100	1145		USA, WYFR/Family Radio Worldwide	9550am	9755sa
1100	1158	DRM	New Zealand, Radio NZ International	7285pa	
1100	1200		Anguilla, Worldwide Univ Network	11775am	
1100	1200		Australia, ABC NT Alice Springs	2310do	4835do
1100	1200		Australia, ABC NT Katherine	2485do	
1100	1200		Australia, ABC NT Tennant Creek	2325do	
1100	1200	DRM	Australia, Radio Australia	5995pa	
1100	1200		Australia, Radio Australia	6020va	9475as
1100	1200		Australia, Radio Australia	9560as	9580va
1100	1200	Sat/Sun	Canada, CBC NQ SW Service	9625na	
1100	1200		Canada, CFRX Toronto ON	6070na	
1100	1200		Canada, CFVP Calgary AB	6030na	
1100	1200		Canada, CKZN St John's NF	6160na	
1100	1200		Canada, CKZU Vancouver BC	6160na	
1100	1200		China, China Radio International	5955as	6040na
1100	1200		China, China Radio International	11650as	11660as
1100	1200		China, China Radio International	13645as	13650eu
1100	1200	DRM	Germany, Deutsche Welle	9545eu	13810eu
1100	1200	Sun	Italy, NEXUS/IRRS	9510va	
1100	1200		Malaysia, RTM/Traxx FM	7295as	
1100	1200		New Zealand, Radio NZ International	9655pa	
1100	1200		Nigeria, Radio Nigeria/Kaduna	4770do	
1100	1200		Nigeria, Voice of Nigeria/Lagos	9690af	
1100	1200		Palau, T8WH/World Harvest	9930as	15700as
1100	1200	vl	Papua New Guinea, R East New Britain	3385do	
1100	1200	vl	Papua New Guinea, Wantok R. Light	7325do	
1100	1200		Romania, R Romania International	5210eu	11775eu
1100	1200		Romania, R Romania International	11790af	15430af
1100	1200		Russia, Voice of Russia	12065as	15470as
1100	1200		Saudi Arabia, BSKSA	15250af	
1100	1200	vl	Solomon Islands, SIBC	5020do	9545al
1100	1200		South Africa, Channel Africa	9625af	
1100	1200		Taiwan, R Taiwan International	7445as	11715as
1100	1200		UK, BBC World Service	6190af	6195as
1100	1200		UK, BBC World Service	9740as	9860af
1100	1200		UK, BBC World Service	15310as	15340as
1100	1200		UK, BBC World Service	17640af	17760as
1100	1200		UK, BBC World Service	21470af	17790as
1100	1200		Ukraine, R Ukraine International	11550eu	
1100	1200		USA, American Forces Network	4319usb	5446usb
1100	1200		USA, American Forces Network	5765usb	6350usb
1100	1200		USA, American Forces Network	10320usb	12133usb
1100	1200		USA, EWTN Vandiver AL	11640as	
1100	1200		USA, WBCQ Monticello ME	5110am	7415am
1100	1200		USA, WBOH Newport NC	5920am	
1100	1200		USA, WHRI Cypress Creek SC	7385va	9425sa
1100	1200		USA, WRMI Miami FL	9955am	
1100	1200		USA, WTJC Newport NC	9370na	
1100	1200		USA, WWCR Nashville TN	5890na	7490na
1100	1200		USA, WWCR Nashville TN	5935na	15825na
1100	1200		USA, WWRB Manchester TN	3185va	
1100	1200		USA, WYFR/Family Radio Worldwide	5950af	5985na
1100	1200		USA, WYFR/Family Radio Worldwide	7730sa	9625sa
1100	1200		Zambia CVC/ The Voice Africa	6065af	13590af
1115	1130	mtwhfa	UK, Bible Voice Broadcasting	5945as	
1115	1145	Sun	UK, Bible Voice Broadcasting	5945as	
1130	1200		Australia, CVC International	13635as	
1130	1200		Bulgaria, Radio Bulgaria	11700eu	15700eu
1130	1200		Vatican City, Vatican Radio	15565me	17765me
1130	1200		Vietnam, Voice of Vietnam	9840as	12020as
1145	1200		UK, Bible Voice Broadcasting	5945as	

1200UTC-8AMEDT/7AMCDT/5AMPDT

1200	1230		China, China Radio International	11780as	
1200	1230		France, Radio France International	21620af	
1200	1230		Germany, AWR-Europe	15435as	
1200	1230		Japan, NHK World Radio Japan	6120na	9625pa
1200	1230		Japan, NHK World Radio Japan	9695as	9790eu
1200	1230		Saudi Arabia, BSKSA	15250af	
1200	1245		Australia, HCJB Global	15400as	
1200	1245		USA, WYFR/Family Radio Worldwide	5950na	5985na
1200	1258		New Zealand, Radio NZ International	9655pa	
1200	1300		Anguilla, Worldwide Univ Network	11775am	

1200	1300		Australia, ABC NT Alice Springs	2310do	4835do
1200	1300		Australia, ABC NT Katherine	2485do	
1200	1300		Australia, ABC NT Tennant Creek	2325do	
1200	1300		Australia, CVC International	13635as	
1200	1300		Australia, Radio Australia	6020va	9475as
1200	1300		Australia, Radio Australia	9560pa	9580va
1200	1300	DRM	Australia, Radio Australia	5995va	12080pa
1200	1300	Sat/Sun	Canada, CBC NQ SW Service	9625na	
1200	1300		Canada, CFRX Toronto ON	6070na	
1200	1300		Canada, CFVP Calgary AB	6030na	
1200	1300		Canada, CKZN St John's NF	6160na	
1200	1300		Canada, CKZU Vancouver BC	6160na	
1200	1300		China, China Radio International	5955as	9460as
1200	1300		China, China Radio International	9600as	9645as
1200	1300		China, China Radio International	9760va	11650as
1200	1300		China, China Radio International	11760va	11980as
1200	1300		China, China Radio International	17490eu	13645as
1200	1300	DRM	Germany, Deutsche Welle	9545eu	13810eu
1200	1300	Sun	Latvia, Radio SWH	9290eu	
1200	1300	vl	Libya, Voice of Africa	17725af	21695af
1200	1300		Malaysia, RTM/Traxx FM	7295as	
1200	1300		Nigeria, Radio Nigeria/Kaduna	4770do	
1200	1300		Nigeria, Voice of Nigeria/Lagos	9690af	
1200	1300		Palau, T8WH/World Harvest	9930as	12130as
1200	1300	vl	Papua New Guinea, Wantok R. Light	7325do	
1200	1300		Poland, Polish Radio	7330eu	9525eu
1200	1300		Russia, Voice of Russia	7330as	12065as
1200	1300		Russia, Voice of Russia	15470as	
1200	1300	vl	Solomon Islands, SIBC	5020do	9545al
1200	1300		South Korea, KBS World Radio	9650na	
1200	1300		UK, BBC World Service	5875as	6190af
1200	1300		UK, BBC World Service	6195as	9545eu
1200	1300		UK, BBC World Service	11750as	11760me
1200	1300		UK, BBC World Service	17640af	17790as
1200	1300		USA, American Forces Network	17830af	21470af
1200	1300		USA, American Forces Network	5446usb	5765usb
1200	1300		USA, American Forces Network	6350usb	7811usb
1200	1300		USA, American Forces Network	10320usb	12133usb
1200	1300		USA, EWTN Vandiver AL	9340as	
1200	1300		USA, KNLS Anchor Point AK	7355as	9780as
1200	1300		USA, Voice of America	6140va	7575va
1200	1300		USA, Voice of America	9510va	9760va
1200	1300		USA, WBCQ Monticello ME	5110am	7415am
1200	1300		USA, WBCQ Monticello ME	9330am	15420am
1200	1300		USA, WBOH Newport NC	17495am	5920am
1200	1300		USA, WHRA Greenbush ME	15710va	
1200	1300		USA, WHRI Cypress Creek SC	7315va	7385na
1200	1300		USA, WHRI Cypress Creek SC	9410va	
1200	1300		USA, WRMI Miami FL	9955am	
1200	1300		USA, WTJC Newport NC	9370na	
1200	1300		USA, WWCR Nashville TN	7490na	9980na
1200	1300		USA, WWCR Nashville TN	13845na	15825na
1200	1300		USA, WWRB Manchester TN	9385va	
1200	1300		USA, WYFR/Family Radio Worldwide	17555am	17795na
1200	1300		Zambia CVC/ The Voice Africa	6065af	13590af
1215	1300		Egypt, Radio Cairo	17870as	
1230	1300		Bangladesh, Bangla Betar	7250as	
1230	1300		Thailand, Radio Thailand World Svc	9890va	
1230	1300		Turkey, Voice of Turkey	15420eu	15520as
1230	1300		Vietnam, Voice of Vietnam	9840as	12020as
1245	1300	smtwhf	Australia, HCJB Global	15400as	

1300UTC-9AMEDT/8AMCDT/6AMPDT

1300	1325		Turkey, Voice of Turkey	15450eu	15520as
1300	1327		Czech Rep, Radio Prague	13580af	17540af
1300	1330	vl	Australia, HCJB Global	15400as	
1300	1330		Egypt, Radio Cairo	17870as	
1300	1357		North Korea, Voice of Korea	9335na	11710na
1300	1400		North Korea, Voice of Korea	13760eu	15245eu
1300	1400		Anguilla, Worldwide Univ Network	11775am	
1300	1400		Australia, CVC International	13635as	
1300	1400		Australia, Radio Australia	6020va	9560as
1300	1400		Australia, Radio Australia	9580va	9590va
1300	1400	DRM	Australia, Radio Australia	5995va	12080pa
1300	1400	Sat/Sun	Canada, CBC NQ SW Service	9625na	
1300	1400		Canada, CFRX Toronto ON	6070na	
1300	1400		Canada, CFVP Calgary AB	6030na	
1300	1400		Canada, CKZN St John's NF	6160na	
1300	1400		Canada, CKZU Vancouver BC	6160na	
1300	1400		China, China Radio International	5995as	9570na
1300	1400		China, China Radio International	9650na	9730as
1300	1400		China, China Radio International	9870as	11660as
1300	1400		China, China Radio International	13755as	13790eu
1300	1400	DRM	Germany, Deutsche Welle	15260na	13810eu
1300	1400		Indonesia, Voice of Indonesia	9526va	11784al

1300	1400	vl	Libya, Voice of Africa	17725af	21695af
1300	1400		Malaysia, RTM/Traxx FM	7295as	
1300	1400		New Zealand, Radio NZ International		6170pa
1300	1400		Nigeria, Radio Nigeria/Kaduna		4770do
1300	1400		Nigeria, Voice of Nigeria/Lagos		9690af
1300	1400		Palau, T8WH/World Harvest	9930as	11685as
1300	1400	vl	Papua New Guinea, Wantok R. Light		7325do
1300	1400		Russia, Voice of Russia	7330as	12065as
1300	1400	vl	Solomon Islands, SIBC	5020do	9545af
1300	1400		South Korea, KBS World Radio		9570na
			9770as		
1300	1400	DRM	UK, BBC World Service	9545eu	13810eu
1300	1400		UK, BBC World Service	5875as	6190af
			6195as	9545eu	9740as
			11760me	15310as	15420af
			17640af	17790as	17830af
					21470af
1300	1400		USA, American Forces Network		4319usb
			5446usb	5765usb	6350usb
			10320usb	12133usb	13362usb
1300	1400		USA, EWTN Vandiver AL		9340as
1300	1400		USA, KJES Vado NM		11715na
1300	1400		USA, Voice of America	7575va	9510va
			9760va		
1300	1400		USA, WBCQ Monticello ME	5110am	7415am
			9330am	15420am	17495am
1300	1400		USA, WBOH Newport NC		5920am
1300	1400		USA, WHRA Greenbush ME		15710va
1300	1400	Sat/Sun	USA, WHRI Cypress Creek SC		7315va
			9840na		
1300	1400		USA, WHRI Cypress Creek SC		9495va
1300	1400		USA, WRMI Miami FL		9955am
1300	1400		USA, WTJC Newport NC		9370na
1300	1400		USA, WWCN Nashville TN	7490na	9980na
			13845na	15825na	
1300	1400		USA, WWRB Manchester TN		9385va
1300	1400		USA, WYFR/Family Radio Worldwide		11830am
			11865na	11910na	17795na
1300	1400		Zambia CVC/ The Voice Africa		6065af
			13590af		
1310	1340		Japan, NHK World Radio Japan		11985as
1330	1357	fa/ DRM	Czech Rep, Radio Prague	9850eu	
1330	1400	mtwhfa	Guam, KSDA/ AWR		15275as
1330	1400	hfa	Guam, KSDA/ AWR		11880as
1330	1400		India, All India Radio	9690as	11620as
			13710as		
1330	1400		Laos, National Radio		7145as
1330	1400		Sweden, Radio Sweden		15735va
1330	1400		Vietnam, Voice of Vietnam	9840as	12020as

1400UTC-10AMEDT/9AMCDT/7AMPDT

1400	1427		Czech Rep, Radio Prague	9955na	
1400	1430		Australia, Radio Australia	5995va	6080va
			7240va	9590va	
1400	1430		China, China Radio International		7325as
1400	1430	Sun	Germany, Pan American BC	15205as	
1400	1430		Japan, NHK World Radio Japan		11705as
			11985as	13630eu	21560af
1400	1430		Thailand, Radio Thailand World Svc		9455va
1400	1430	Sun	United Arab Emirates, FEBA		12025as
1400	1457		Netherlands, R Netherlands Worldwide	5825as	
			7530as	9345as	11835as
					15815as
1400	1500		Anguilla, Worldwide Univ Network		11775am
1400	1500		Australia, CVC International	13635as	
1400	1500		Australia, HCJB Global	15425as	
1400	1500		Bhutan, Bhutan Broadcasting Svc		6035as
1400	1500	Sat/Sun	Canada, CBC NQ SW Service	9625na	
1400	1500		Canada, CFRX Toronto ON		6070na
1400	1500		Canada, CFVP Calgary AB		6030na
1400	1500		Canada, CKZN St John's NF		6160na
1400	1500		Canada, CKZU Vancouver BC	6160na	
1400	1500		China, China Radio International		5955as
			9870as	11675as	11765as
			13710eu	13790eu	13740na
1400	1500		Germany, CVC Intl-Christian Vision		17770af
1400	1500	DRM	Germany, Deutsche Welle		15780eu
1400	1500		Germany, Overcomer Ministries		6110eu
			13810eu		
1400	1500		India, All India Radio	9690as	11620as
			13710as		
1400	1500	vl	Libya, Voice of Africa	17725af	21695af
1400	1500		Malaysia, RTM/Traxx FM	7295as	
1400	1500		New Zealand, Radio NZ International		6170pa
1400	1500		Nigeria, Radio Nigeria/Kaduna		4770do
1400	1500		Nigeria, Voice of Nigeria/Lagos		9690af
1400	1500		Oman, Radio Oman		15140as
1400	1500		Palau, T8WH/World Harvest	9930as	9965as
1400	1500	vl	Papua New Guinea, Wantok R. Light		7325do

1400	1500		Russia, Voice of Russia	6045as	7330as
			9850as	15605as	
1400	1500	DRM	Russia, Voice of Russia	9445as	9750eu
1400	1500	vl	Solomon Islands, SIBC	5020do	9545af
1400	1500		UK, BBC World Service	5875as	6190af
			6195as	7230af	9545eu
			11920as	12095as	15310as
			17830af	21470af	17640af
1400	1500	DRM	UK, BBC World Service	9545eu	15780eu
1400	1500	Sat/Sun	UK, Bible Voice Broadcasting		15680as
1400	1500		USA, American Forces Network		4319usb
			5446usb	5765usb	6350usb
			10320usb	12133usb	13362usb
1400	1500		USA, EWTN Vandiver AL		9340as
1400	1500		USA, KJES Vado NM		11715na
1400	1500		USA, KNLS Anchor Point AK		7355as
1400	1500		USA, Voice of America	4930af	6080af
			7545va	9760va	11715va
			15530va	15580af	17585af
					17740va
1400	1500		USA, WBCQ Monticello ME	5110am	7415am
			9330am	15420am	17495am
1400	1500		USA, WBOH Newport NC		5920am
1400	1500	Sat/Sun	USA, WHRI Cypress Creek SC		9840na
			11785na	15195na	
1400	1500		USA, WHRI Cypress Creek SC		9495va
1400	1500		USA, WINB Red Lion PA		13570ca
1400	1500		USA, WRMI Miami FL		9955na
1400	1500		USA, WTJC Newport NC		9370na
1400	1500		USA, WWCN Nashville TN	7490na	9980na
			13845na	15825na	
1400	1500		USA, WWRB Manchester TN		9385va
1400	1500		USA, WYFR/Family Radio Worldwide		11830am
			11910na	13695as	17795na
1400	1500		Zambia CVC/ The Voice Africa		6065af
			13590af		
1415	1430	mtwhfa	Germany, Pan American BC		15205as
1415	1430		Nepal, Radio Nepal		5005as
1415	1450		Guam, KTWR/TWR		9975as
1430	1445	Sun	Germany, Pan American BC		15205as
1430	1445	vl/ mtwhf	Moldova, Radio PMR/Pridnestrovia		7370eu
1430	1500	mtwhfa	Albania, Radio Tirana		13625na
1430	1500		Australia, Radio Australia	5995va	6080va
			7240va	9475as	9590va
					11660pa
1430	1500		China, Central People's BS/CNR		6010do
			7350do	9480do	
1430	1500		Ethiopia, Radio Ethiopia	5990af	7110af
			9704af		
1430	1500	DRM	South Korea, KBS World Radio		9660eu
1430	1500		Sweden, Radio Sweden		13820va

1500UTC-11AMEDT/10AMCDT/8AMPDT

1500	1510	mtwhfa	Turkmenistan, Turkmen Radio	5015eu	
1500	1515	Sun	UK, Bible Voice Broadcasting		15680as
1500	1528		Vietnam, Voice of Vietnam	7285va	9840va
			12020va		
1500	1530		Australia, HCJB Global		15425as
1500	1530		China, China Radio International		9600as
1500	1530		Guam, KSDA/ AWR		11720as
1500	1530		Nigeria, Radio, National Svc/Abuja		7275do
1500	1530		UK, BBC World Service	7385af	11860af
			15420af		
1500	1530	Sat	UK, Bible Voice Broadcasting	15295as	
1500	1530		UK, Sudan Radio Service		17745af
1500	1545		USA, WYFR/Family Radio Worldwide		15770sa
1500	1550		New Zealand, Radio NZ International		6170pa
1500	1557		Canada, R Canada International		11675as
			17720as		
1500	1557	vl	Libya, Voice of Africa	17725af	21695af
1500	1557		Netherlands, R Netherlands Worldwide		5825as
			7530as	11835as	15815as
1500	1557		North Korea, Voice of Korea	9335na	11710na
			13760eu	15245eu	
1500	1600		Anguilla, Worldwide Univ Network		11775am
1500	1600		Australia, CVC International	11730as	
1500	1600		Australia, Radio Australia	5995va	6080va
			7240va	9475as	9590va
					11660pa
1500	1600	Sat/Sun	Canada, CBC NQ SW Service	9625na	
1500	1600		Canada, CFRX Toronto ON		6070na
1500	1600		Canada, CFVP Calgary AB		6030na
1500	1600		Canada, CKZN St John's NF		6160na
1500	1600		Canada, CKZU Vancouver BC	6160na	
1500	1600		China, China Radio International		5955as
			6095as	7160as	7325as
			9720as	9800as	9870as
			13640as	13740na	11965eu
1500	1600		Germany, CVC Intl-Christian Vision		17770af
1500	1600	DRM	Germany, Deutsche Welle		15780eu

1500	1600	Germany, Overcomer Ministries	6110eu
		13810me 17485af	
1500	1600	Italy, NEXUS/IRRS	15650af
1500	1600	Malaysia, RTM/Traxx FM	7295as
1500	1600	Myanmar, Myanma Radio	5985as
1500	1600	Nigeria, Radio Nigeria/Kaduna	4770do
1500	1600	Nigeria, Voice of Nigeria/Lagos	9690af
1500	1600	Palau, T8WH/World Harvest	9905as 9965as
1500	1600	Papua New Guinea, Wantok R. Light	7325do
1500	1600	Russia, Voice of Russia	4975me 9625as 11985me
		9660as 9735me 9850as	
		12040eu 15605as	
1500	1600	Solomon Islands, SIBC	5020do 9545al
1500	1600	Uganda, Dunamis Shortwave	4750af
1500	1600	UK, BBC World Service	5790eu 15780eu
1500	1600	UK, BBC World Service	5790eu 5875as
		5975as 6190af 6195as 7230af	
		9740as 11920as 12095eu 15310as	
		15400af 17640af 17830af 21470af	
1500	1600	USA, American Forces Network	4319usb
		5446usb 5765usb 6350usb 7811usb	
		10320usb 12133usb 13362usb	
1500	1600	USA, EWTN Vandiver AL	15610eu
1500	1600	USA, KJES Vado NM	11715na
1500	1600	USA, Voice of America	4930af 6080af
		6160va 7545va 7575va 9485va	
		9700va 12005va 12150va 13570af	
		15530va 15550va 15580af 17895af	
1500	1600	USA, WBCQ Monticello ME	5110am 7415am
		9330am 15420am 17495am	
1500	1600	USA, WBOH Newport NC	5920am
1500	1600	USA, WHRI Cypress Creek SC	9840na
		11785na 15195na	
1500	1600	USA, WHRI Cypress Creek SC	9495va
1500	1600	USA, WINB Red Lion PA	13570ca
1500	1600	USA, WRMI Miami FL	9955na
1500	1600	USA, WTJC Newport NC	9370na
1500	1600	USA, WWCR Nashville TN	7490na 9980na
		13845na 15825na	
1500	1600	USA, WWRB Manchester TN	9385va
1500	1600	USA, WYFR/Family Radio Worldwide	11830am
		11910na 17795na	
1500	1600	Zambia CVC/ The Voice Africa	6065af
		13590af	
1505	1600	Canada, R Canada International	9800na
1505	1600	Canada, R Canada International	9515as
1515	1530	Moldova, Radio PMR/Pridnestrovie	7370eu
1530	1545	India, All India Radio	7255as 9820as
		9910as	
1530	1550	Vatican City, Vatican Radio	13765as 15235as
1530	1600	Germany, AWR-Europe	15335as
1530	1600	Iran, VOIRI/ IRIB	7305as 9600as
1530	1600	Mongolia, Voice of Mongolia	9665as 12085as
1530	1600	Sweden, Radio Sweden	13600va
1530	1600	UK, BBC World Service	7385af 15420af
1530	1600	UK, Bible Voice Broadcasting	13590me
1530	1600	UK, Bible Voice Broadcasting	15680as
1530	1600	UK, Bible Voice Broadcasting	15680as
1545	1600	UK, Bible Voice Broadcasting	13590me
1551	1600	New Zealand, Radio NZ International	6170pa
1551	1600	New Zealand, Radio NZ International	7285pa

1600UTC-12PMEDT/11AMCDT/9AMPDT

1600	1605	Sun	Croatia, Voice of Croatia	6165eu
1600	1615	mtwhfa	Croatia, Voice of Croatia	6165eu
1600	1615	vl/ mtwhf	Moldova, Radio PMR/Pridnestrovie	7370eu
1600	1615		Pakistan, Radio Pakistan	9385va 11565va
			15100af	
1600	1615		UK, Bible Voice Broadcasting	13590me
1600	1620	†	UK, Bible Voice Broadcasting	13590me
1600	1627		Czech Rep, Radio Prague	5935eu 17845na
1600	1628		Vietnam, Voice of Vietnam	7220va 7280va
			9550va 9730va	
1600	1630		Guam, KSDA/ AWR	11720as 11805as
1600	1630		Iran, VOIRI/ IRIB	7305as 9600as
1600	1630		Myanmar, Myanma Radio	9730do
1600	1630		Nigeria, Voice of Nigeria/Lagos	9690af
1600	1630		Yemen, Rep of Yemen Radio	9780me
1600	1645		USA, WYFR/Family Radio Worldwide	11830am
			11865na	
1600	1657		North Korea, Voice of Korea	9990va 11545va
1600	1700		Anguilla, Worldwide Univ Network	11775am
1600	1700		Australia, CVC International	9680as
1600	1700		Australia, Radio Australia	5995va 6080va
			7240as 9475va 9580va 9710as	
			11660pa	
1600	1700	Sat	Canada, CBC NQ SW Service	9625na

1600	1700		Canada, CFRX Toronto ON	6070na
1600	1700		Canada, CFVP Calgary AB	6030na
1600	1700		Canada, CKZN St John's NF	6160na
1600	1700		Canada, CKZU Vancouver BC	6160na
1600	1700		Canada, R Canada International	9515as
1600	1700	DRM	Canada, R Canada International	9800na
1600	1700		China, China Radio International	6095af
			6180as 7235as 7420af 9570af	
			9720af 9760as 11650eu 11900af	
			11940eu 11965eu 13760eu	
1600	1700		Egypt, Radio Cairo	12170af
1600	1700		Ethiopia, Radio Ethiopia	7165af 9560af
1600	1700		France, Radio France International	15605af
			17605af	
1600	1700		Germany, CVC Intl-Christian Vision	17770af
1600	1700		Germany, Deutsche Welle	9485as 9540as
			15640as	
1600	1700	DRM	Germany, Deutsche Welle	11810eu
1600	1700		Italy, NEXUS/IRRS	15650af
1600	1700		Malaysia, RTM/Traxx FM	7295as
1600	1700		Netherlands, R Netherlands Worldwide	13570af
1600	1700	DRM	New Zealand, Radio NZ International	6170pa
1600	1700		New Zealand, Radio NZ International	7285pa
1600	1700		Nigeria, Radio Nigeria/Kaduna	4770do
1600	1700		Palau, T8WH/World Harvest	9905as 9965as
1600	1700	vl	Papua New Guinea, Wantok R. Light	7325do
1600	1700		Russia, Voice of Russia	4975me 11985va
			13855af	
1600	1700	vl	Rwanda, Radio Rwanda	6055do
1600	1700	vl	Solomon Islands, SIBC	5020do 9545al
1600	1700		South Korea, KBS World Radio	9515eu
1600	1700		Taiwan, R Taiwan International	13840as
1600	1700		Uganda, Dunamis Shortwave	4750af
1600	1700		UK, BBC World Service	3255af 5790eu
			5975as 6190af 9625as 11920as	
			12095eu 15400af 17640af 17795af	
			17830af 21470af	
1600	1700	DRM	UK, BBC World Service	5790eu 11810eu
1600	1700	Sat	UK, BBC World Service	7385af 15420af
1600	1700	Sun	UK, Bible Voice Broadcasting	13590me
1600	1700		USA, American Forces Network	4319usb
			5446usb 5765usb 6350usb 7811usb	
			10320usb 12133usb 13362usb	
1600	1700		USA, EWTN Vandiver AL	15610eu
1600	1700		USA, Voice of America	4930af 6080af
			9885af 12080va 13570va 15580af	
			17715af 17895va	
1600	1700		USA, WBCQ Monticello ME	5110am 7415am
			9330am 15420am 17495am	
1600	1700		USA, WBOH Newport NC	5920am
1600	1700		USA, WHRA Greenbush ME	17520af
1600	1700		USA, WHRI Cypress Creek SC	9495va
			9840na 15195na	
1600	1700		USA, WINB Red Lion PA	13570ca
1600	1700		USA, WRMI Miami FL	9955na
1600	1700		USA, WTJC Newport NC	9370na
1600	1700		USA, WWCR Nashville TN	9980na 12160na
			13845na 15825na	
1600	1700		USA, WWRB Manchester TN	9385va
1600	1700		USA, WYFR/Family Radio Worldwide	6085sa
			13695as 17795na 18980af 21455eu	
			21525af	
1600	1700		Zambia CVC/ The Voice Africa	4965af
			13590af	
1615	1630		Vatican City, Vatican Radio	4005eu 5885eu
			7250eu 9645eu 15595me	
1615	1700	Sun	UK, BBC World Service	7385af 11860af
			15420af	
1615	1700		UK, Bible Voice Broadcasting	13590me
1630	1645		UK, Bible Voice Broadcasting	13590me
1630	1700		Guam, KSDA/ AWR	6190as
1630	1700		Nigeria, Voice of Nigeria/Lagos	15120af
1630	1700		Slovakia, R Slovakia International	5920eu
			6055eu	
1630	1700	mtwhf	UK, BBC World Service	15420af
1630	1700	Sat	UK, BBC World Service	11860af
1640	1650	mtwhfa	Turkmenistan, Turkmen Radio	4930eu
1645	1700	vl/ mtwhf	Moldova, Radio PMR/Pridnestrovie	7370eu
1645	1700		Tajikistan, Tajik Radio	7245as

1700UTC-1PMEDT/12PMCDT/10AMPDT

1700	1705	DRM	Canada, R Canada International	9800na
1700	1715	t/ vl	UK, Bible Voice Broadcasting	13590me
1700	1727		Czech Rep, Radio Prague	5930eu 17485eu
1700	1730		Australia, CVC International	9680as
1700	1730		UK, Bible Voice Broadcasting	13590me
1700	1730		USA, Voice of America	6080af 9885af

1800	1900		USA, WWCR Nashville TN	9980na	12160na
			13845na	15825na	
1800	1900		USA, WWRB Manchester TN	9385va	
1800	1900		USA, WYFR/Family Radio Worldwide	6180af	
			13615am	13690af	17795na
			18980eu		17845af
1800	1900		Yemen, Rep of Yemen Radio	9780me	
1800	1900		Zambia CVC/ The Voice Africa	4965af	
			13590af		
1805	1810	Sat	Croatia, Voice of Croatia	6165eu	
1805	1815	mtwhf	Croatia, Voice of Croatia	6165eu	
1830	1900		Serbia, International Radio of Serbia	6100eu	
1830	1900		Slovakia, R Slovakia International	5920eu	
			6055eu		
1830	1900		Turkey, Voice of Turkey	9785eu	
1830	1900		UK, BBC World Service	6005af	9410af
1830	1900	f	UK, Bible Voice Broadcasting	9430me	
1845	1900	mtwhfa	Albania, Radio Tirana	7430eu	13640na
1845	1900		UK, Bible Voice Broadcasting	11830af	
1851	1900	DRM	New Zealand, Radio NZ International	9890pa	

1900UTC-3PMEDT/2PMCDT/12PMPDT

1900	1905		Canada, R Canada International	9515af	
1900	1925		Turkey, Voice of Turkey	9785eu	
1900	1928		Vietnam, Voice of Vietnam	7280va	9730va
1900	1930		Germany, Deutsche Welle	6150af	11795af
			15620af	17860af	
1900	1935	DRM	New Zealand, Radio NZ International	9890pa	
1900	1945		India, All India Radio	7410eu	9445af
			11620eu	11935af	13605as
			17670af		15155af
1900	1945	DRM	India, All India Radio	9950eu	
1900	1945		USA, WYFR/Family Radio Worldwide	6085sa	
1900	1950		New Zealand, Radio NZ International	9615pa	
1900	1957		Netherlands, R Netherlands Worldwide	5905af	
			7425af	9480af	11660af
			15535af		15335af
1900	1957		North Korea, Voice of Korea	7100af	9975va
			11910af	11535va	
1900	2000		Anguilla, Worldwide Univ Network	11775am	
1900	2000		Australia, Radio Australia	6080va	7240as
			9500va	9580va	11880as
1900	2000		Canada, CFRX Toronto ON	6070na	
1900	2000		Canada, CFVP Calgary AB	6030na	
1900	2000		Canada, CKZN St John's NF	6160na	
1900	2000		Canada, CKZU Vancouver BC	6160na	
1900	2000		China, China Radio International	7285eu	
			7295va	9435va	9440va
1900	2000		Egypt, Radio Cairo	11510af	
1900	2000		Equatorial Guinea, Radio Africa	15190af	
1900	2000		Germany, CVC Intl-Christian Vision	17770af	
1900	2000	DRM	Germany, Deutsche Welle	3995eu	5875eu
1900	2000		Germany, Overcomer Ministries	6175eu	
1900	2000	fas	Italy, NEXUS/IRRS 7290va		
1900	2000		Kuwait, Radio Kuwait	11990va	
1900	2000		Malaysia, RTM/Traxx FM	7295as	
1900	2000		Nigeria, Radio Nigeria/Kaduna	4770do	
1900	2000		Nigeria, Voice of Nigeria/Lagos	15120af	
1900	2000		Palau, T8WH/World Harvest	9905as	9965as
1900	2000	vl	Papua New Guinea, Wantok R. Light	7325do	
1900	2000	vl	Rwanda, Radio Rwanda	6055do	
1900	2000	vl	Solomon Islands, SIBC	5020do	
1900	2000	mtwhf	Spain, Radio Exterior Espana	9665eu	11620af
1900	2000		Swaziland, TWR	3200af	
1900	2000		Thailand, Radio Thailand World Svc	7570eu	
1900	2000	vl	Uganda, UBC Radio	4976do	
1900	2000		UK, BBC World Service	3255af	3995eu
			5875eu	5995as	6005af
			6190af	9410af	11810af
			15400af	17795af	12095af
1900	2000		UK, Bible Voice Broadcasting	11830af	
1900	2000		Ukraine, R Ukraine International	7490eu	
1900	2000		USA, American Forces Network	4319usb	
			5446usb	5765usb	6350usb
			10320usb	12133usb	13362usb
1900	2000		USA, EWTN Vandiver AL	15610na	
1900	2000		USA, KJES Vado NM	11715na	
1900	2000		USA, Voice of America	4930af	4940af
			5990af	6080af	7480va
			9885af	15580af	17895af
1900	2000		USA, WBCQ Monticello ME	5110am	7415am
			9330am	15420am	17495am
1900	2000		USA, WBOH Newport NC	5920am	
1900	2000	mtwhfa	USA, WHRA Greenbush ME	15665va	
1900	2000	Sat/Sun	USA, WHRA Greenbush ME	17690af	
1900	2000		USA, WHRI Cypress Creek SC	9495va	
			9840na	11785na	

1900	2000	mtwhfa	USA, WHRI Cypress Creek SC	15665na	
1900	2000	Sun	USA, WHRI Cypress Creek SC	17690na	
1900	2000		USA, WINB Red Lion PA	13570ca	
1900	2000		USA, WRMI Miami FL	9955am	
1900	2000		USA, WTJC Newport NC	9370na	
1900	2000		USA, WWCR Nashville TN	9980na	12160na
			13845na	15845na	
1900	2000		USA, WWRB Manchester TN	9385va	
1900	2000		USA, WYFR/Family Radio Worldwide	3230af	
			13615am	13690af	17795na
			18930eu	18980eu	17845af
1900	2000		Zambia CVC/ The Voice Africa	4965af	
			5940af		
1905	2000	Mon	South Africa, SA Radio League	3215af	
1930	2000		Iran, VOIRI/ IRIB	5945eu	6205eu
			9800af	9925af	7205eu
1930	2000		South Africa, RTE	6220af	
1936	1950	DRM	New Zealand, Radio NZ International	9890pa	
1945	2000	mtwhf	UK, Bible Voice Broadcasting	11830af	
1945	2000	DRM	Vatican City, Vatican Radio	9800na	
1950	2000		New Zealand, Radio NZ International	11725pa	
1951	2000	DRM	New Zealand, Radio NZ International	9890pa	

2000UTC-4PMEDT/3PMCDT/1PMPDT

2000	2005	Mon	South Africa, SA Radio League	3215af	
2000	2015	mtwhf	UK, Bible Voice Broadcasting	11830af	
2000	2027		Czech Rep, Radio Prague	5930eu	11600na
2000	2030	mtwhfa	Albania, Radio Tirana	7465eu	13640na
2000	2030		Egypt, Radio Cairo	11510af	
2000	2030		Iran, VOIRI/ IRIB	5945eu	6205eu
			9800af	9925af	7205eu
2000	2030		South Africa, RTE	6220af	
2000	2030		USA, Voice of America	4930af	4940af
			6080af	9885af	15580af
2000	2030		Vatican City, Vatican Radio	7365af	9755af
			11625af		
2000	2030	DRM	Vatican City, Vatican Radio	9800na	
2000	2045		USA, WYFR/Family Radio Worldwide	17750sa	
2000	2050		New Zealand, Radio NZ International	11725pa	
2000	2050	DRM	New Zealand, Radio NZ International	9890pa	
2000	2057		Netherlands, R Netherlands Worldwide	5905af	
			7425af	11610af	
2000	2100		Anguilla, Worldwide Univ Network	11775am	
2000	2100		Australia, ABC NT Alice Springs	2310do	
			4835do		
2000	2100		Australia, ABC NT Katherine	2485do	
2000	2100		Australia, ABC NT Tennant Creek	2325do	
2000	2100	Sat/Sun	Australia, Radio Australia	6080va	7240va
			12080as		
2000	2100		Australia, Radio Australia	9500va	11650as
			11660pa	11880as	
2000	2100		Canada, CFRX Toronto ON	6070na	
2000	2100		Canada, CFVP Calgary AB	6030na	
2000	2100		Canada, CKZN St John's NF	6160na	
2000	2100		Canada, CKZU Vancouver BC	6160na	
2000	2100		Canada, R Canada International	15235af	
2000	2100		China, China Radio International	5960eu	
			5985af	7275va	7285eu
			9600eu	11640af	13630af
2000	2100		Equatorial Guinea, Radio Africa	15190af	
2000	2100		Germany, CVC Intl-Christian Vision	17770af	
2000	2100		Germany, Deutsche Welle	6150af	11795af
			11865af	15205af	
2000	2100	fas	Italy, NEXUS/IRRS 7290va		
2000	2100		Kuwait, Radio Kuwait	11990va	
2000	2100	vl	Liberia, ELWA	4760do	6070al
2000	2100		Malaysia, RTM/Traxx FM	7295as	
2000	2100		Nigeria, Radio Nigeria/Kaduna	4770do	
2000	2100		Nigeria, Voice of Nigeria/Lagos	15120af	
2000	2100		Palau, T8WH/World Harvest	9905as	9965as
2000	2100	vl	Papua New Guinea, R East New Britain	3385do	
2000	2100	vl	Papua New Guinea, Wantok R. Light	7325do	
2000	2100	vl	Rwanda, Radio Rwanda	6055do	
2000	2100	vl	Swaziland, TWR	3200af	9500af
2000	2100	vl	Uganda, UBC Radio	4976do	
2000	2100		UK, BBC World Service	3255af	3995eu
			5875eu	6005af	6190af
			11810af	12095af	13820af
2000	2100	DRM	UK, BBC World Service	3995eu	5875eu
2000	2100		USA, American Forces Network	4319usb	
			5446usb	5765usb	6350usb
			10320usb	12133usb	13362usb
2000	2100		USA, EWTN Vandiver AL	15610va	
2000	2100		USA, WBCQ Monticello ME	5110am	7415am
			9330am	15420am	17495am
2000	2100		USA, WBOH Newport NC	5920am	
2000	2100	mtwhfa	USA, WHRA Greenbush ME	7520eu	

2000	2100	USA, WHRI Cypress Creek SC	9495va
		15665na	
2000	2100 f	USA, WHRI Cypress Creek SC	17650af
2000	2100 Sat/Sun	USA, WHRI Cypress Creek SC	9495va
2000	2100	USA, WINB Red Lion PA	13570ca
2000	2100	USA, WRMI Miami FL	9955am
2000	2100	USA, WTJC Newport NC	9370na
2000	2100	USA, WWCN Nashville TN	9980na
		13845na	12160na
		15825na	
2000	2100	USA, WWRB Manchester TN	9385va
2000	2100	USA, WYFR/Family Radio Worldwide	13615am
		17725sa	17795na
		17845af	18980eu
2000	2100	Zambia CVC/ The Voice Africa	4965af
		5940af	
2030	2045	Thailand, Radio Thailand World Svc	9680eu
2030	2058	Vietnam, Voice of Vietnam	7220va
		9550va	7280va
		9730va	
2030	2100	Cuba, Radio Havana Cuba	17660va
2030	2100	Romania, R Romania International	9765eu
		11810eu	11940af
		15465af	
2030	2100	Sweden, Radio Sweden	7395va
2030	2100	Turkey, Voice of Turkey	7205va
2030	2100	USA, Voice of America	4930af
		7555as	6080af
		9885af	15580af
		17895af	
2045	2100	India, All India Radio	7410eu
		9910pa	9445eu
		9950eu	11620va
		11715pa	
2051	2100	New Zealand, Radio NZ International	13730pa
2051	2200 DRM	New Zealand, Radio NZ International	15720pa

2100UTC-5PMEDT/4PMCDT/2PMPDT

2100	2125	Turkey, Voice of Turkey	7205va
2100	2130	Australia, ABC NT Katherine	2485do
2100	2130	Australia, ABC NT Tennant Creek	2325do
2100	2130	Austria, AWR-Europe	11955af
2100	2130 Sat	Canada, CBC NQ SW Service	9625na
2100	2130	China, China Radio International	6135eu
		7225eu	7415eu
		9490eu	9600eu
		11640af	13630af
2100	2130	Cuba, Radio Havana Cuba	11760va
2100	2130	Nigeria, Radio, National Svc/Abuja	7275do
2100	2130	Serbia, International Radio of Serbia	6100eu
2100	2130	South Korea, KBS World Radio	3955eu
2100	2145	USA, WYFR/Family Radio Worldwide	13615am
		13690na	17795na
		18980af	
2100	2157	North Korea, Voice of Korea	13760eu
2100	2200	Angola, Radio Nacional de Angola	7217do
2100	2200	Anguilla, Worldwide Univ Network	11775am
2100	2200	Australia, ABC NT Alice Springs	2310do
		4835do	
2100	2200	Australia, Radio Australia	9500as
		11650pa	9660as
		11660pa	11695as
		13630as	12080as
		15515as	
2100	2200	Belarus, Radio Belarus Minsk	7210eu
		7390eu	7255eu
2100	2200	Bulgaria, Radio Bulgaria	5900eu
2100	2200	Canada, CFRX Toronto ON	6070na
2100	2200	Canada, CFVP Calgary AB	6030na
2100	2200	Canada, CKZN St John's NF	6160na
2100	2200	Canada, CKZU Vancouver BC	6160na
2100	2200 DRM	Canada, R Canada International	9800na
2100	2200	China, China Radio International	5990eu
		7205af	7285eu
		7325af	
2100	2200	Equatorial Guinea, Radio Africa	15190af
2100	2200	Germany, Deutsche Welle	9735af
		15205af	11865af
2100	2200 DRM	Germany, Deutsche Welle	3995af
2100	2200	Guyana, Voice of Guyana	3291do
2100	2200	India, All India Radio	7410eu
		9910pa	9445eu
		9950eu	11620va
		11620va	11715pa
2100	2200 vl	Liberia, ELWA	4760do
2100	2200	Malaysia, RTM/Traxx FM	7295as
2100	2200	New Zealand, Radio NZ International	13730pa
2100	2200	Nigeria, Radio Nigeria/Kaduna	4770do
2100	2200	Nigeria, Voice of Nigeria/Lagos	7255af
2100	2200	Palau, T8WH/World Harvest	9905as
2100	2200	Papua New Guinea, Wantok R. Light	9965as
2100	2200 vl	Papua New Guinea, Wantok R. Light	7325do
2100	2200 Sat/Sun	Spain, Radio Exterior Espana	9650eu
2100	2200	Swaziland, TWR	3200af
2100	2200	Syria, Radio Damascus	9330eu
2100	2200	UK, BBC World Service	3255af
		5790eu	12085as
		5905as	3915as
		5965as	6005af
		6190af	6005af
		7410af	9915af
		12095af	
2100	2200 DRM	UK, BBC World Service	3995eu
2100	2200	Ukraine, R Ukraine International	5790eu
2100	2200	USA, American Forces Network	4319usb
		5446usb	7811usb
		5765usb	6350usb
		10320usb	12133usb
		13362usb	

2100	2200	USA, EWTN Vandiver AL	15610va
2100	2200	USA, Voice of America	6080af
		15580af	7555as
2100	2200	USA, WBCQ Monticello ME	5110am
		9330am	7415am
		15420am	17495am
2100	2200	USA, WBOH Newport NC	5920am
2100	2200	USA, WHRI Cypress Creek SC	7315na
		15665na	11885na
		11785na	
2100	2200 Sat	USA, WHRI Cypress Creek SC	9690na
2100	2200	USA, WINB Red Lion PA	9265ca
2100	2200	USA, WRMI Miami FL	9955am
2100	2200	USA, WTJC Newport NC	9370na
2100	2200	USA, WWCN Nashville TN	7465na
		12160na	9980na
		13845na	
2100	2200	USA, WWRB Manchester TN	3215na
2100	2200	USA, WYFR/Family Radio Worldwide	17845na
2100	2200	Zambia CVC/ The Voice Africa	4965af
		5940af	
2115	2200	Egypt, Radio Cairo	6255eu
2130	2157	Czech Rep, Radio Prague	9410na
2130	2200	Australia, ABC NT Katherine	5025do
2130	2200	Australia, ABC NT Tennant Creek	4910do
2130	2200 mtwhfa	Canada, CBC NQ SW Service	9625na
2130	2200	China, China Radio International	6135eu
		7225eu	7365eu
		7325eu	7415eu
		9600eu	
2130	2200	Guam, KSDA/ AWR	11850as
2130	2200	Lithuania, Mighty KBC Radio	6055eu
2130	2200	Sweden, Radio Sweden	7395va

2200UTC-6PMEDT/5PMCDT/3PMPDT

2200	2220	Japan, NHK World Radio Japan	13640pa
2200	2228	Lithuania, Mighty KBC Radio	6055eu
2200	2230	Australia, HCJB Global	15525as
2200	2230	India, All India Radio	7410eu
		9910pa	9445eu
		9950eu	11620va
		11620va	11715pa
2200	2230	Swaziland, TWR	3200af
2200	2230	USA, WBCQ Monticello ME	5110am
		9330am	7415am
		15420am	
2200	2235 DRM	New Zealand, Radio NZ International	15720pa
2200	2235	New Zealand, Radio NZ International	13730pa
2200	2245	Egypt, Radio Cairo	6255eu
2200	2245	USA, WYFR/Family Radio Worldwide	15770af
		17845va	
2200	2255	Turkey, Voice of Turkey	9830va
2200	2300	Anguilla, Worldwide Univ Network	6090am
2200	2300	Australia, ABC NT Alice Springs	2310do
		4835do	
2200	2300	Australia, ABC NT Katherine	5025do
2200	2300	Australia, ABC NT Tennant Creek	4910do
2200	2300	Australia, Radio Australia	12010va
		15230va	13630pa
		15240pa	15515as
		17795va	17785pa
2200	2300	Belarus, Radio Belarus Minsk	7210eu
		7390eu	7255eu
2200	2300 smtwhf	Canada, CBC NQ SW Service	9625na
2200	2300	Canada, CFRX Toronto ON	6070na
2200	2300	Canada, CFVP Calgary AB	6030na
2200	2300	Canada, CKZN St John's NF	6160na
2200	2300	Canada, CKZU Vancouver BC	6160na
2200	2300	China, China Radio International	7350eu
		7360eu	
		9590as	
2200	2300	Equatorial Guinea, Radio Africa	15190af
2200	2300	Guyana, Voice of Guyana	3291do
2200	2300 vl	Liberia, ELWA	4760do
2200	2300	Malaysia, RTM/Traxx FM	7295as
2200	2300	Nigeria, Radio Nigeria/Kaduna	4770do
2200	2300	Nigeria, Voice of Nigeria/Lagos	7255af
2200	2300	Palau, T8WH/World Harvest	9965as
2200	2300 vl	Papua New Guinea, Wantok R. Light	7325do
2200	2300	Romania, R Romania International	7440eu
		9675eu	9790af
		11940af	
2200	2300	Russia, Voice of Russia	9890na
2200	2300	UK, BBC World Service	3915as
		5965as	5905as
		6005af	6195as
		6195as	9440as
		9740as	12095af
2200	2300	USA, American Forces Network	4319usb
		5446usb	7811usb
		5765usb	6350usb
		10320usb	12133usb
		13362usb	
2200	2300	USA, EWTN Vandiver AL	15610va
2200	2300	USA, Voice of America	5895va
		7460va	5915va
		7480va	7555as
		11955va	9415va
2200	2300	USA, WBCQ Monticello ME	5110am
		9330am	7415am
2200	2300	USA, WBOH Newport NC	5920am
2200	2300	USA, WHRI Cypress Creek SC	7385va

2200	2300	9615na	11785na	11885na	
2200	2300	USA, WINB Red Lion PA		9265ca	
2200	2300	USA, WRMI Miami FL		9955am	
2200	2300	USA, WTJC Newport NC		9370na	
2200	2300	USA, WWCR Nashville TN		5070na	7465na
		9980na	13845na		
2200	2300	USA, WWRB Manchester TN		3215na	5050na
		6890na	9385va		
2200	2300	USA, WYFR/Family Radio Worldwide			5950na
		11740af	15440na		
2200	2300	Zambia CVC/ The Voice Africa			4965af
2215	2300	Moldova, Radio PMR/Pridnestrovie			6240na
2230	2257	Czech Rep, Radio Prague		7345na	9415na
2230	2300	Guam, KSDA/ AWR		15320as	
2230	2300	USA, Voice of America		9570va	11705va
		15145va			
2236	2300	DRM	New Zealand, Radio NZ International		13730pa
2245	2300	India, All India Radio		9705eu	9950as
		11620as	11645as	13605as	

2300UTC-7PMEDT/6PMCDT/4PMPDT

2300	0000	Anguilla, Worldwide Univ Network			6090am
2300	0000	Australia, ABC NT Alice Springs			2310do
		4835do			
2300	0000	Australia, ABC NT Katherine		5025do	
2300	0000	Australia, ABC NT Tennant Creek			4910do
2300	0000	Bulgaria, Radio Bulgaria		9700na	11700na
2300	0000	Canada, CBC NQ SW Service		9625na	
2300	0000	Canada, CFRX Toronto ON		6070na	
2300	0000	Canada, CFVP Calgary AB		6030na	
2300	0000	Canada, CKZN St John's NF		6160na	
2300	0000	Canada, CKZU Vancouver BC		6160na	
2300	0000	China, China Radio International			5915as
		5990na	6145na	7410na	9610as
		11690as	11790as	11840na	
2300	0000	Cuba, Radio Havana Cuba		13790sa	
2300	0000	Egypt, Radio Cairo		6850na	
2300	0000	Guyana, Voice of Guyana		3291do	
2300	0000	India, All India Radio		9705eu	9950as
		11620as	11645as	13605as	
2300	0000	Malaysia, RTM/Traxx FM		7295as	
2300	0000	New Zealand, Radio NZ International			15720pa
2300	0000	DRM	New Zealand, Radio NZ International		13730pa
2300	0000	Palau, T8WH/World Harvest		15550as	
2300	0000	Papua New Guinea, Wantok R. Light			7325do
2300	0000	Russia, Voice of Russia		9665sa	9890na
2300	0000	UK, BBC World Service		3915as	5965as
		6195as	9580as	9740as	9885as
		11850as	12010as		
2300	0000	USA, American Forces Network			4319usb
		5446usb	5765usb	6350usb	7811usb
		10320usb	12133usb	13362usb	
2300	0000	USA, EWTV Vandiver AL		15610va	
2300	0000	USA, Voice of America		5895va	5915va
		7480va	7555as	9415va	11955va
2300	0000	USA, WBOH Newport NC		5920am	
2300	0000	USA, WHRA Greenbush ME		5850eu	
2300	0000	USA, WHRI Cypress Creek SC			5875na
		7315va	9615na		
2300	0000	USA, WINB Red Lion PA		9265ca	
2300	0000	USA, WRMI Miami FL		9955am	
2300	0000	USA, WTJC Newport NC		9370na	
2300	0000	USA, WWCR Nashville TN		5070na	7465na
		9980na	13845na		
2300	0000	USA, WWRB Manchester TN		3215na	5050na
		6890na	9385va		
2300	0000	USA, WYFR/Family Radio Worldwide			5950na
		15255as	15440na	17750eu	
2300	0000	Zambia CVC/ The Voice Africa			4965af
2300	2305	vi	Liberia, ELWA	4760do	6070al
2300	2315	Nigeria, Radio Nigeria/Kaduna			4770do
2300	2330	Australia, Radio Australia		9660as	12010pa
		12080pa	13690pa	15230va	15240pa
		17785va	17795va		
2300	2330	USA, Voice of America		9570va	13755va
		15145va			
2300	2345	USA, WYFR/Family Radio Worldwide			11740am
2300	2345	DRM	Vatican City, Vatican Radio		9755na
2305	0000	Canada, R Canada International			6100na
2315	2330	Croatia, Voice of Croatia		3985eu	7375sa
2315	2330	Moldova, Radio PMR/Pridnestrovie			6240na
2330	0000	Australia, Radio Australia		9660as	12010as
		12080as	13690as	15230va	15415as
		17750va	17795va		
2330	0000	USA, Voice of America		7460va	9570va
		13755va	15145va	15340va	
2330	2358	Vietnam, Voice of Vietnam		9840as	12020as

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Albania, Radio Tirana	http://rtsh.sil.at/
Angola, Radio Nacional de Angola	www.rna.ao/
Anguilla, Worldwide Univ Network	www.worldwideuniversitynetwork.com/
Argentina, RAE	www.radionacional.gov.ar/rae/rae.asp
Australia, ABC NT Alice Springs	www.abc.net.au/radio/
Australia, ABC NT Katherine	www.abc.net.au/radio/
Australia, ABC NT Tennant Creek	www.abc.net.au/radio/
Australia, CVC International	www.christianvision.com/
Australia, HCJB Global	www.hcjb.org/
Australia, Radio Australia	www.abc.net.au/ra/
Austria, AWR Europe	www.awr2.org/
Austria, Radio Austria Intl	http://oe1.orf.at/service/international
Bahrain, Radio Bahrain	www.radiobahrain.net/
Bangladesh, Bangla Betar	www.betar.org.bd/
Belarus, Radio	www.radiobelarus.tv.by/eng/
Bhutan, BBS	www.bbs.com.bt/
Bulgaria, Radio	www.bnr.bg/
Canada, CBC NQ SW Service	www.cbc.ca/north/
Canada, Radio Canada Intl	www.rcinet.ca/
China, China Radio Intl	www.cri.cn/
Costa Rica, Worldwide Univ Network	www.worldwideuniversitynetwork.com/
Croatia, Croatian Radio	www.hrt.hr/
Cuba, Radio Havana	www.radiohc.cu/
Czech Rep, Radio Prague	www.radio.cz/en/
Finland, Overcomer Ministries	www.overcomerministries.org
France, Radio France Intl	http://r_english.com
Germany, AWR Europe	www.awr2.org/
Germany, CVC Intl/Voice Africa	www.christianvision.com/
Germany, Deutsche Welle	www.dw-world.de/
Germany, Overcomer Ministries	www.overcomerministry.org/
Germany, Pan American BC	www.radiopanam.com/
Germany, The Overcomer Ministries	www.overcomerministry.org/
Germany, TWR Europe	www.twr.org/
Greece, Voice of Greece	www.voiceofgreece.gr/
Guam, AWR/KSDA	www.awr2.org/
Guam, TWR/KTWR	www.twr.org/
Guyana, Voice of	http://voiceofguyana.com/
India, All India Radio	www.allindiaradio.org/
Indonesia, Voice of Indonesia	www.voi-online.com/
Iran, Voice of the Islamic Rep of Iran	www.2.irib.ir/worldservice/
Italy, IRRS	www.nexus.org
Japan, NHK World/Radio Japan	www.nhk.or.jp/english/
Jordan, Radio	www.jrtv.jo/ri/index.php
Latvia, Radio SWH	www.radioswh.lv/index.php
Liberia, ELWA	www.elwaministries.org/
Liberia, Star Radio	www.radioswh.lv/index.php
Libya, Voice of Africa	www.libc.net/home.php
Lithuania, Radio Vilnius	www.lrt.lt/
Malaysia, RTM/Traxx FM	www.traxxfm.net/index.php
Malaysia, RTM/Voice of Malaysia	http://202.190.233.9/vom/utama.htm
Monaco, TWR Europe	www.twr.org/
Nepal, Radio Nepal	www.radionepal.org/
Netherlands, Radio Netherlands	www.radioneetherlands.nl/
New Zealand, Radio NZ Intl	www.rnz.com
Nigeria, Radio, Natl Svc/Abuja	http://radionigeriaonline.com
Nigeria, Radio/Kaduna	http://radionigeriaonline.com
Nigeria, Voice of/ Ext. Svc Lagos	www.voiceofnigeria.org
Oman, Radio Oman	www.oman-tv.gov.om
Pakistan, Radio	www.radio.gov.pk
Papua New Guinea, NBC	www.nbc.com.pg/
Papua New Guinea, Wantok R. Light	http://wantokradio.net/
Philippines, Radio Pilipinas	www.radiopilipinas.com/
Poland, Polish Radio	www.polskieradio.pl/zagranica/gb/
Romania, Radio Romania Intl	www.rri.ro/
Russia, Voice of Russia	www.vor.ru/world.html
Saudi Arabia, BSKSA	www.saudiradio.net/
Slovakia, Radio Slovakia Int	www.rsi.sk
Solomon Islands, SIBC	www.sibconline.com.sb/
South Africa, AWR Africa	www.awr2.org/
South Africa, Channel Africa	www.channelafrica.org
South Africa, Trans World Radio	www.twr.org/
South Korea, KBS World Radio	http://rki.kbs.co.kr/english/
Spain, Radio Exterior Espana	www.ree.rne.es/
Sri Lanka, SLBC	www.slbc.lk
Swaziland, Trans World Radio	www.twr.org/
Sweden, Radio	www.sr.se/rs/english/
Syria, Radio Damascus	www.rtv.gov.sy/
Taiwan, Radio Taiwan Intl	http://english.rti.org.tw/
Thailand, Radio	www.hsk9.com/
Turkey, Voice of	www.trt.net.tr
UK, BBC World Service	www.bbc.co.uk/worldservice/
UK, Bible Voice BC	www.biblevoice.org/
UK, FEBA	www.feba.org.uk
UK, Sudan Radio Service	www.sudanradio.org/
Ukraine, Radio Ukraine Intl	www.nrcu.gov.ua/
USA, American Forces Radio	http://myafn.dodmedia.osd.mil/
USA, KNLS Anchor Point AK	www.knls.org/
USA, KTBN Salt Lake City UT	www.tbn.org/
USA, KWHR Naalehu HI	www.whr.org/
USA, Voice of America	www.voanews.com/
USA, WBCQ Monticello ME	www.wbcq.com/
USA, WBOH Newport NC	www.wbfnradio.com/
USA, WEWN Vandiver AL	www.ewtn.com
USA, WHRA Greenbush ME	www.whr.org/
USA, WHRI Cypress Creek SC	www.whr.org/
USA, WINB Red Lion PA	www.winb.com/
USA, WRMI Miami FL	www.wrmi.net/
USA, WTJC Newport NC	www.fbfnradio.com/
USA, WWCR Nashville TN	www.wwcr.com
USA, WWRB Manchester TN	www.wwrb.org/
USA, WYFR/Family Radio Worldwide	www.worldwide.familyradio.org
Uzbekistan, CVC International	www.christianvision.com/
Vatican City, Vatican Radio	www.vaticanradio.org
Vietnam, Voice of Vietnam	www.vov.org.vn
Yemen, Rep of Yemen Radio	www.yemenradio.net
Zambia, CVC Intl/Christian Voice	www.christianvision.com/

Monitoring the Defenders of the Homeland

The North American Aerospace Defense Command (NORAD) is a bi-national United States and Canadian organization charged with the missions of aerospace warning and aerospace control for North America. There have been some major changes to the organizational structure of this military command since it was last mentioned in this column nearly four years ago. This also includes the myriad of frequencies that are used by these defenders of the homeland.

Aerospace warning includes the monitoring of man-made objects in space, and the detection, validation, and warning of attack against North America, whether by aircraft, missiles, or space vehicles, through mutual support arrangements with other commands. Aerospace control includes ensuring air sovereignty and air defense of the airspace of Canada and the United States.

In May 2006, a NORAD agreement renewal among the all of the partners added a maritime warning mission, which entails a shared awareness and understanding of the activities conducted in U.S. and Canadian maritime approaches, maritime areas and inland waterways.

To accomplish the aerospace warning mission, the commander of NORAD provides an integrated tactical warning and attack assessment to the governments of Canada and the United States. To accomplish the aerospace control mission, NORAD uses a network of satellites, ground-based radar, airborne radar and fighters to detect, intercept and, if necessary, engage any air-breathing threat to North America.

As a part of its aerospace control mission, NORAD assists in the detection and monitoring of aircraft suspected of illegal drug trafficking. This information is passed to civilian law enforcement agencies to help combat the flow of illegal drugs into North America. The command is currently developing a concept for implementing the new maritime warning mission.

To accomplish these critically important missions, NORAD continually adjusts its structure to meet the demands of a changing world. The commander is appointed by, and is responsible to, both the U.S. president and the Canadian prime minister.

The commander maintains his headquarters at Peterson Air Force Base (AFB), Colorado. The NORAD-U.S. Northern Command (USNORTHCOM) Command Center serves as a central collection and coordination facility for a worldwide system of sensors designed to provide the commander and the leadership of Canada and the U.S. with an accurate picture of any aerospace threat. Three subordinate regional headquarters – located

at Elmendorf Air Force Base, Alaska; Canadian Forces Base, Winnipeg, Manitoba; and Tyndall Air Force Base, Florida – receive direction from the commander and control air operations within their respective areas of responsibility.

Alaska NORAD Region

The Alaskan NORAD Region (ANR) is the binational organization responsible for performing the NORAD air sovereignty and air control mission over the state of Alaska, as well as the northwest approaches to North America. The headquarters for the ANR is collocated at Elmendorf Air Force Base, Alaska, with headquarters Alaska Command (ALCOM), a sub-unified command of U.S. Pacific Command (USPACOM) and Joint Task Force-Alaska (JTF-AK), a subordinate unit of USNORTHCOM.

The ANR Commander is also the Commander of ALCOM and JTF-AK. ANR is supported by active duty forces from both Canada and the U.S., as well as by Alaska Air National Guard units. The ANR's Regional Air Operations Center is manned by both U.S. and Canadian personnel to maintain continuous surveillance of its operational area. The Alaska Air Defense Sector (ADS) is the single ADS within the ANR and is also collocated at Elmendorf AFB.

Canadian NORAD Region

The Canadian NORAD Region (CANR), like the ANR, is also a binational organization responsible for performing NORAD's air sovereignty and air control mission over Canada, as well as the polar approaches to North America. CANR is located at Canadian Forces Base (CFB) Winnipeg, Manitoba. The Sector Air Operations Center (SAOC) for Canada is located at CFB North Bay, Ontario. The CANR Commander is also the Commander of 1 Canadian Air Division (CAD). CANR is manned by both 1 CAD and U.S. personnel.

Continental United States NORAD Region

The Continental United States NORAD Region (CONR) is the subordinate, binationally staffed command responsible for the air sovereignty and air control of the airspace over the Continental United States (CONUS), to include the approaches to North America. The CONR Commander exercises operational control (OPCON) over all air defense forces within CONUS from Tyndall AFB, Florida.



Air Combat Command (ACC) and the United States Joint Forces Command (USJFCOM) are the force providers for ground, sea, and air units apportioned through the Joint Strategic Capabilities Plan (JSCP) to support the NORAD missions. ANG support is liaised through USJFCOM and ACC.

CONR operates in an extremely complex, binational and multi-command environment where political, military and economic conditions interrelate. CONR is collocated with a numbered air force subordinate to ACC. The CONR Commander is also the Commander, Air Force North (AFNORTH), located at Tyndall AFB, Florida, and may be designated the joint force air component commander for USNORTHCOM for unilateral U.S. air operations within the USNORTHCOM area of responsibility (AOR).

Within the continental United States, NORAD runs the following air defense sectors.

National Capital Region Integrated Air Defense System (NCR IADS)

NCR-IADS is a unique sub-element of the NORAD continental U.S. region, which was established in response to terrorist air threats to the National Capitol Region. NCR-IADS has a coordination relationship with Eastern Air Defense Sector (EADS).

Eastern Air Defense Sector (EADS)

In 2005, the United States Air Force announced the consolidation of the Northeast Air Defense Sector with the Southeast Air Defense Sector (SEADS) to form the new East Air Defense Sector (EADS), which will operate from the existing NEADS facility at Griffiss AFB in Rome, New York, and provides military air surveillance for the entire East Coast, east of the Mississippi River (east of 97 degrees West Longitude).

I first broke this story on my *Milcom Monitoring Post* blog on November 18, 2006, at <http://mt-milcom.blogspot.com/2006/11/end-of-era-seadsoak-grove-closes.html>. I continued to research the story and finally fleshed out the rest of the NORAD organizational structure changes in the following posts to my online blog:

<http://mt-milcom.blogspot.com/2006/11/seads-ends-operations-becomes-aoc.html>
<http://mt-milcom.blogspot.com/2006/11/mt-milcom-blog-exclusive-inside.html>
<http://mt-milcom.blogspot.com/2007/04/eads-its-official-now.html>

<http://mt-milcom.blogspot.com/2007/09/news-is-no-more-now-it-is-official.html>

Western Air Defense Sector (WADS)

WADS, located at McChord AFB, Washington, is the western equivalent to the EADS mentioned above and is responsible for all CONR air operations west of 97 degrees West Longitude (roughly the Mississippi River).

The Joint Surveillance Site (JSS)

The JSS is a network of ground-based, fixed long range surveillance radars, primarily operated and maintained by the Federal Aviation Administration (FAA), but providing communication and radar data to both FAA and USAF control centers. The newest long range search radar in the Joint Surveillance System (JSS) that has recently been fielded is the Air Route Surveillance Radar (ARSR-4). Providing air defense and air traffic control for the continental United States, Guam, and Hawaii, forty-four joint radar sites were installed during the 1992-1995 period. The ARSR-4 was fielded through a \$1 billion, Congressionally mandated, joint FAA and Air Force program, and each station costs over \$12 million.

JSS Site Locations

Here is a list of the known JSS sites in current operation, located along the perimeter of the US and looking outward. In addition to the radar feed, each site has a communications capability on a variety of frequencies, including NORAD frequencies that are relayed through these sites.

Citronelle AL (?), Ajo AZ (AJO), Mill Valley CA (QMV), Mount Laguna CA (QRW), Paso Robles CA (PRB), Rainbow Ridge CA (QZZ), San Clemente Island CA (NSD), Cross City FL (CTY), Fort Green FL (QJT), Key West FL (NQX), Melbourne FL (MLB), Tamiami FL (QMB), Tyndall FL (PAM), Whitehouse FL (NEN), Mt. Santa Rosa Guam (QLR), Mt. Kaala HI (QKA), Lake Charles LA (LCH), Slidell LA (NEW), North Truro MA (QEA), Bucks Harbor ME (QYA), Caribou ME (QYD), Canton MI (?), Empire MI (QJA), Nashwauk MN (QJD), Bootlegger Ridge MT (GFA), Lakeside MT (QLS), Ft. Fisher NC (QGV), Finley ND (QFI), Wafford City ND (QWA), Gibbsboro NJ (J51), Deming NM (DMN), Dansville NY (?), Riverhead NY (QVH), Utica NY (QXU), Keno OR (?), Salem OR (SLE), Jetburg SC (QRJ), Eagle Peak TX (QNW), King Mountain TX (QO9), Morales TX (QNA), Oilton TX (QZA), Rock Springs TX (RSG), Oceana VA (QVR), Plains VA (?), Makah WA (QKW), and Mica Peak WA (QMI).

ARSR-4 (AN/FPS130)

The Air Route Surveillance Radar (ARSR)-4 System is three-dimensional long range radar that is the centerpiece of the FAA/Air Force Radar Replacement (FARR) program. The system replaces the earlier FPS-20 series two-dimensional long range air route surveillance systems.

The ARSR-4 system provides 360 degree azimuth coverage for ranges out to 250 nautical miles, at heights up to 100,000 feet, and for elevation angles of -7 to +30 degrees (stacked beam). Unlike the FPS-20's, which had two separate and independent channels providing full transmitter and receiver redundancy, the ARSR-4

uses two separate but dependent air-cooled solid state transmitters to generate the two transmit pulses (60 and 90 microsecond wide). The radar echoes (returns) are received by the antenna and processed by a seven-channel RF receiver and signal processor.

The primitive target detections from the seven signal processor channels are further processed in a data processor (Common Digitizer) that provides scan-to-scan correlation (search and beacon alignment) and radar/beacon target merging (reinforcement). The data processor formats the target data into user acceptable message formats (13 bit) and transmits the target data to end users via a system of serial data links (serial in/out, radar cable junction box, modems).

Monitoring NORAD on Your Scanner

Since the re-organization of the CONR into the EADS-WADS, our Milcom Monitoring Post team has spend hundreds of hours shaking out the new system. Table 1 is our latest list of NORAD frequencies, followed by static callsigns. We have dropped a lot of frequencies from our previous list. Those old frequencies appear to be casualties of the UHF milair band rebanding that we have been reporting on for some time.

Some of the frequencies on our list appear to be nationwide primary frequencies, some are secondary, some appear to be used in one or two air defense sectors, and still others we have listed as tentative (T).

If you have some additions, corrections, or updates to our frequency that you have monitored recently, please pass that along to the email in our masthead.

Given the current security climate that we find ourselves in, I would strongly recommend to all readers of this column that if you program our frequency list in your Milcom scanner or bank, you will be ready for whatever contingency may come at us.

TABLE 1: PRIMARY NORAD FREQUENCIES

121.5000	Civilian Aero Emergency/Distress/Calling
243.0000	Military International Distress, Calling and Guard

VHF High Band Nationwide Combat Air Patrol (CAP) Air-to-Air

138.0000	138.0250	138.2000	138.8250 (T)
139.7000	CAP Air-to-Ground	143.2000 (T)	143.8250

UHF Nationwide Frequencies

228.8000	Autocat Tac-1
228.9000	CAP/AWACS/Aircraft Aerial Refueling (AAR)
234.6000	CAP/AWACS
234.7000	Tactical
235.9000	CAP
238.4000	Tactical
251.2500	Tactical
252.0000	CAP/AAR
254.2000	CAP/AWACS Auto Control
254.4750	AWACS
260.9000	CAP/AWACS
265.4000	CAP/Ground Controlled Intercept (GCI)/AAR
270.2000	AWACS
274.4000	Tactical

271.0000	CAP/AWACS
277.6000	AWACS/SOCC Coordination/Calling/AAR
278.0000	US/Russian Military Voice Coordination (Worldwide)
282.6000	CAP/AWACS
288.4000	CAP/AWACS
293.6000	CAP/AWACS/AAR
306.4000	Autocat Tac-2
316.3000	AWACS Voicetell
320.6000	CAP/AWACS/AAR
321.3000	FAA ARTCC Special Use
324.0000	CAP/AAR
327.9000	Tactical
328.0000	CAP/AAR
335.9500	AWACS
364.2000	NORAD AICC
364.8000	FAA ARTCC Special Use
369.0000	Tactical
369.9000	FAA ARTCC Special Use
381.3500	Tactical
386.0000	AWACS/AAR

Miscellaneous Frequencies

Note: More monitoring information is need in order to con rm geographic coverage

126.2000	ANR Tactical Secondary
225.8000	EADS CAP/AWACS
232.5000	EADS AWACS
258.4000	AWACS (Occasional exercise)
261.6750	Military satellite traffic (mostly encrypted)
261.8000	ANR Military satellite traf c (mostly encrypted)
262.1500	EADS Tactical
262.4000	Tactical
264.8000	Hawaii Air Defense SOCC Ground Control Intercept/AWACS Operations
264.9000	CONR AAR Exercise/Contingency
267.0000	WADS Tactical
267.0500	Military satellite traffic (mostly encrypted)
267.8000	Hawaii Air Defense SOCC Tactical
267.8500	EADS Mission/refueling aircraft boom discrete
269.9000	ANR Tactical Primary
276.6500	Alert/Air Defense Tactical
276.7500	EADS CAP Air-to-Air
288.5000	ANR Tactical
293.2000	ANR Tactical
295.8000	AAR
297.8000	ANR Tactical
300.1250	WADS CAP/AAR
309.4000	WADS Tactical
309.5000	EADS Tactical
318.4000	EADS Tactical AAR
325.5000	Tactical
338.4000	Tactical
350.0000	EADS Tactical
350.2500	EADS Tactical
358.8500	EADS Tactical CAP
360.1500	EADS Tactical CAP
362.3000	EADS Tactical CAP
364.3000	WADS Tactical
387.8000	Tactical Command and Control

Possible NORAD Frequencies

More information from monitors is needed in order to con rm if these are NORAD frequencies and geographic coverage.

229.1000 (East/Alaska)	235.8000	239.7000 (West)	256.6000	260.8000 (West)	263.2000
278.4000 (East)	298.5000	320.8000	357.2000 (East)		

NORAD Static Callsigns:

Big Foot	Western Air Defense Sector
Guard Dog	National Capital Region Integrated Air Defense System
Hula Dancer	Hawaii Air Defense Sector
Huntress	Eastern Air Defense Sector
Side Car	Canada Air Defense Region
Top Rocc	Alaska Air Defense Sector

Ham Antennas and AM DX

One of the biggest attractions of ham radio is the ability to communicate with other hams all over the world. Even a simple station can work the world on the 7, 14, and 21 MHz shortwave amateur bands. There is, of course, a lot more to amateur radio than 7, 14, and 21MHz...

Amateur radio offers two low-frequency bands, at 1.8 and 3.5 MHz. Foreign work on these low frequencies is difficult; noise levels are high, and interference from much stronger, close-in amateurs is a problem. Amateurs have developed some interesting receiving antennas to pull the DX out of the noise. The 1.8 MHz ham band is not that far from the top of the AM broadcasting band, and many of these ham antennas are also applicable to broadcast DX.

The name of the game on the low-frequency ham bands is directivity. In the case of amateur radio, interference from other hams isn't much of a problem. Noise, both natural and man-made, is. For the broadcast DXer, it's the other way around. Either way, if your antenna can reject signals coming from the "wrong" direction, accepting them only from the "right" direction, you're ahead of the game.

The first receiving antenna design that comes to mind is the Beverage. This antenna is, quite simply, a very long wire suspended a few feet above ground. Hams typically suspend them just high enough to ride a lawn tractor under the antenna. A Beverage should be at least one wavelength long at the lowest frequency on which it will be used. For AM DXing, a wavelength at 530 kHz is 566 meters – nearly 1,900 feet. Luckily, much shorter antennas are still worthwhile. I've had luck with antennas as short as 400 feet.

A Beverage antenna is "terminated" at the far end – connected to ground through a terminating resistor. The proper value varies but is around 500 ohms. Many hams use a variable resistor and adjust it for best performance. The near end is connected to the radio through a 9:1 matching transformer.

A Beverage antenna receives well in the direction of the terminating resistor. More to the point, it receives poorly in any other direction.

Obviously, few hams have 1,900 feet available for a Beverage – indeed few have 400 feet for a shortened antenna. The "EWE" antenna first appeared in February 1995 *QST* magazine. This antenna is, as Tom, KN4LF put it, an "inverted U." The antenna is a much more manageable 1/8 wavelength long – for 530 kHz this is 71 meters, about 230 feet. (For the 1500 kHz end of the broadcast band, it's more like 80 feet.) The sides of the "U" are 1/16 wavelength – 115 feet for the bottom of the band, 40 feet for the top. Termination of the EWE is similar to that of the Beverage – a resistor (closer to 1,000 ohms) at the far end and a 9:1 transformer at the near end. The EWE runs in the "other" direction, with best reception in the direction of the transformer, not the terminating resistor.

Even a 230-foot antenna 115 feet high is still pretty difficult for most broadcast DXers (and a lot of hams!) to muster. Gary, K9AY found that if you close the loop – bring the radio and the terminating-resistor end together – the loop retains its directional characteristics regardless of size. The strength of the desired signal drops as the loop gets smaller, but the ratio between desired and undesired signals stays high.

The "K9AY Loop" proposes 85 feet of wire, arranged in a triangle. (Any convenient shape will work; in most cases a triangle is the most convenient shape.) The top of the triangle is 25 feet high; the bottom is about 30 feet wide. At the center of the bottom of the triangle, one end of the wire is grounded through a terminating resistor of about 500 ohms. The other end connects to the radio through a 9:1 matching transformer. Like the EWE, the K9AY antenna receives best in the direction of the matching transformer.

You'll find a lot of literature on all three antennas online. If you prefer "dead-tree" books, I can highly recommend *Low-Band DXing* by John Devoldere ON4UN. Not only does this book (available from the ARRL) cover low-frequency receiving antennas, but it also has valuable information about propagation on 160 meters – and by extension, the AM broadcast band.

Analog TV: ~~maybe~~ not dead yet?

In April, I mentioned the "DTV Delay Act," which would extend analog TV licenses through the middle of this month. The Act had passed the Senate but didn't pass the House by a large enough margin to bypass House rules and avoid the normal committee procedure. As predicted, it was rushed through the normal procedure and passed the House; and President Obama indeed signed it. Analog TV will survive until June 12th.

Actually, it will survive into mid-July; the "Analog Nightlight Act" that would have allowed analog operation to continue for 30 days after the original February 17th deadline will now allow 30 days' operation after the new June 12th deadline. "Nightlight" operation only allows broadcast of information about the digital transition and emergencies.

When the DTV Delay Act first came along, I felt many stations would go off in February, as scheduled. Several hundred had notified the FCC of their intent to go off on February 17th, regardless of what might happen with the Delay Act. (Many others felt no notification was necessary.)

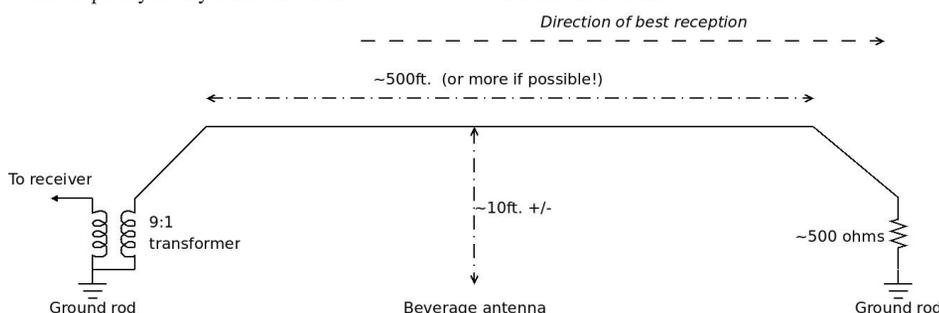
It didn't turn out that way.

Here in Nashville, at the last minute the four major stations, channels 2, 4, 5, and 8, decided to leave their analog transmitters on the air until the new June deadline. Similar decisions were made in many other markets. Many stations felt political pressure to keep an analog signal for those viewers who've been unable to find converter boxes or unable to get them working. Other stations feared ratings problems if one of their competitors still had an analog signal during the all-important May "book."

Stations that had to move their digital operations to new channels when their analog signals were silenced had to prepare engineering studies to show no interference would result – some stations felt it was less expensive to leave their analog on the air until June than to pay for an expensive study. In all, I would "guesstimate" about 3/4 of analog stations remain on the air.

In other markets, stations "stuck to their guns" and continued to plan to shut down analog operations in February. At this point, the FCC intervened. In cases where all of the major-network affiliates serving a given area continued to plan to shut down analog operation, the FCC imposed strict conditions. Stations would have to engage in an extensive public-education campaign, including operating walk-in centers where viewers could obtain information about the transition.

In most of these markets, at least one network-



A design for a Beverage receiving antenna

affiliated station agreed to remain on through June. For example, in Madison, Wis., WMSN-47 agreed to continue analog operations through June; WISC-3, WMTV-15, and WKOW-27 were permitted to silence their analogs on time on February 17th.

Sinclair Broadcast Group, owners of many Fox affiliates (and a fair number of other TV stations), did silence most of their analog stations on February 17th. Sinclair controls three stations here in Nashville. Those stations ran a National Association of Broadcasters (NAB) educational DVD for two weeks, then closed their analog transmitters. Two other Nashville stations – WHTN-39 and WJFB-66 – had silenced their analogs well before the deadline.

As I write, the UHF dial is eerily blank on an analog TV. Half of the channels I used to receive are gone. A Kentucky station I used to receive on analog channel 13 is also gone; they got their notification filed early and were permitted to flip to digital in mid-January.

FCC Notes

A few months ago, I reported the case of WOLY-1500, Battle Creek, Michigan. This station never filed for renewal when its license expired in October 2004. But they stayed on the air anyway, at least through 2007. Broadcast renewals are required to be filed electronically, through a secure area of the FCC website. WOLY personnel told the FCC they had no access to a computer, so they couldn't file that way. They claim they'd requested Special Temporary Authority (STA) to operate until a renewal could be filed – and *assumed* it would be granted. (In fact, no action was ever taken on a STA. The FCC documents don't say whether a request was *received*.)

The FCC Enforcement Bureau didn't buy that argument; a Notice of Apparent Liability (NAL) for \$10,000 was issued. After submission of additional information, the Commission refused to rescind the fine. They did find the financial record showed the station couldn't afford a \$10,000 NAL; it was reduced to \$5,000.

Finally, in January of this year, WOLY filed an application to renew their license. They also filed again for Special Temporary Authority to operate until the Commission could act on the renewal application.

And in February, the FCC rejected both requests. The release says the petition for reconsideration of the notice of license expiration is "untimely" – it should have been filed within 30 days of receipt of notice, not four years later. The STA request was also denied, on the basis that temporary authority to extend a license can only be granted if there's a license to extend.

As far as the FCC is concerned, WOLY would appear to be gone. However, sometimes such things end up in the courts – so I wouldn't rule out the possibility of a signal appearing again on 1500 AM in Battle Creek.

Canadian Notes

The slow economy has led to major budget cutbacks at over-the-air TV stations across the United States. At least one station has returned its permit to increase power, telling the FCC that at this time, they simply can't afford to build the more powerful transmitter facility. As tough as it is

here in the States, no station has ceased operating altogether since the current downturn began. That may not be the case in Canada. Two station owners have proposed to permanently shut down a number of stations.

Hamilton, Ontario's CHCH-TV has been on the air since the early 1950s. Canwest has put the station up for sale; if it doesn't sell, they're considering shutting it down altogether. A group of station employees and Hamilton community leaders is attempting to prepare a bid to purchase CHCH and keep it on the air.

The country's largest private broadcaster, CTV, is also considering closing stations. Two stations on the chopping block are the "A-Channel" stations in Windsor and Wingham, Ontario. These stations currently mostly relay CTV's CFPL-TV, London. Usually, when a Canadian station talks about "closing," they mean shutting down the studios and using the transmitter to relay some other station. In this case, CTV intends to actually shut down the transmitters.

The other primary station CTV proposes to shut down is CKX-TV, the only local station operating in Brandon, Manitoba. CKX-TV is part of a "dual-stick operation"; it's affiliated with the CBC, while CTV operates a second transmitter, CKYB-TV, carrying their own network. If CKX-TV were shut down, three relay transmitters would go with it. CTV says they offered to sell the station to the CBC for *one dollar*. Reportedly the CBC refused,

indicating they simply couldn't afford to operate the station and convert it to digital (even though chances are, the studios would be closed and the station operated as a relay of the CBC's Winnipeg station).

CTV also proposes to shut down 45 relay stations. These relay the signals of their larger stations into small towns and rural areas. Most are fairly low-powered, but twelve of the threatened relay stations run more than 50 kilowatts of power.

'Til next month

Have you logged any unexpected last-minute analog TV DX? Write me at 7540 Highway 64 West, Brasstown NC 28902-0098, or by email to dougsmith@monitoringtimes.com. Good DX!

URLs in this Month's Column:

<http://americanbandscan.blogspot.com> My AM DX blog.
www.fcc.gov/eb/Orders/2008/DA-08-2815A1.html FCC refuses to reinstate WOLY-1500.
www.arrl.org/catalog/7040/ "Low-Band DXing", John Devoldere's book.
www.nrcdxas.org/articles/ewe.html E W E antenna information.
www.hard-core-dx.com/nordicdx/antenna/loop/k9ay/k9ay.html Information on the K9AY Terminated Loop.
http://en.wikipedia.org/wiki/Beverage_antenna Wikipedia article on the Beverage antenna.

AMBANDSCANSTATIONREPORT

NEW:

New station permits granted

Desert Hot Springs, Cal.	1220	1,400/1,200 DA-2 (two-site operation)
Dalton Gardens, Idaho	1490	810/810 ND
Columbia Falls, Montana	1400	1,000/670 ND
Valencia, New Mexico	1220	400/250 DA-2
Central Point, Oregon	1400	1,000/1,000 ND

New station applications denied/dismisssed

Casper, Wyoming	1490	
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CHANGES:

Stations granted moves to new frequencies

Revelstoke, B.C.	106.1	CKCR	from 1340 AM
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Callsign changes

Birmingham, Alabama	1320	WENN	from WPSB
Priceville, Alabama	1310	WKZD	from WQAH
Tuscaloosa, Alabama	1420	WACT	from WENN
Desert Hot Springs, Cal.	1220	KJML	(new station)
Silt, Colorado	1490	KNAM	(new station)
Dunedin, Florida	1470	WMGG	from WHBO; was brie y WWBA
Largo, Florida	820	WWBA	from WMGG
Orlando, Florida	740	WYGM	from WQTM
Pinellas Park, Florida	1040	WHBO	from WWBA
Brooklet, Georgia	1450	WQOT	(new station)
Dry Branch, Georgia	1670	WFSM	from WYVM
Royston, Georgia	810	WXFO	from WBIC
Cannonsburg, Kentucky	1080	WYHY	from WOKT
Bangor, Maine	910	WAEI	from WABI
South Haven, Michigan	940	WCSY	from WHIT
North Las Vegas, Nevada	1140	KYDZ	from KSFN
Exeter, New Hampshire	1540	WXEX	from WGIP
Milan, New Mexico	1100	KIVA	from KKJY
Jacksonville, N.C.	1400	WAVQ	from WSTK
Central Point, Oregon	1400	KFJL	(new station)
Martinsburg, Penna.	1110	WWBJ	from WJSM
Cedar City, Utah	940	KOBY	from KNNZ
Hurricane, W. Virginia	1110	WIHY	from WOKU

ND: non-directional

DA-N: directional at night only

DA-D: directional during daytime only

DA-2: directional all hours, two different patterns

DA-3: directional day, night and critical hours, three different patterns

The Best of Times, The Worst of Times

2008 was a good year for railroads – and a bad year, depending on what aspects of railroading you looked at. Railroad technology moved forward on several fronts. Passenger rail was more popular than it has been in half a century.

Looking back; Looking forward

Amtrak finally received a budget reflecting what it was expected to do. But, the economic downturn also took its toll on railroads, giving a particularly hard hit to luxury passenger train travel. GrandLuxe Rail (formerly American Orient Express) ceased operations when it ran out of money. An attempt to put luxury cars on the back of Amtrak trains came at the wrong time and never produced the anticipated bookings.

Colorado Railcar, maker of specialty passenger cars, including some for tour trains in Alaska, and a company that tried to bring back the self-propelled diesel railcar (or diesel multiple unit – DMU) also ceased operations.

Colorado Railcar and GrandLuxe were largely owned by the same person. In better times, when either operation hit a slow period, the other might have provided continued cash flow. GrandLuxe even had plans for expanding its fleet of luxury passenger cars. Instead, the GrandLuxe fleet was sold off. Commuter operations that planned to purchase DMUs from Colorado Railcar now have to look elsewhere.

As I wrote this in March, freight railroads had placed many locomotives and freight cars into storage due to decreased traffic. Older and

less fuel efficient equipment is always the first to go – and likely will be scrapped and never returned to active duty once traffic picks up.

But, the picture is not entirely bleak. The past year saw the startup of commuter rail operations of all types – and most exceeded ridership predictions. Siemens Transportation Systems, whose California plant produces light rail vehicles for numerous American cities, is looking at adapting European DMU equipment to American requirements.

Meeting and Fleeting

Railroads are a good barometer of the national economy, as the number and length of trains is directly related to the volume of goods produced and shipped. Fewer trains produces an even greater decrease in the volume of radio traffic. Why? Because most radio traffic relates to trains passing, meeting, or otherwise interacting with each other. If there is only one train on a line, there's little need for radio traffic, unless the train encounters problems.

Much of the effort of managing railroad operations focuses on getting trains past and around each other on single track. Yes, there are double, triple, and even quadruple track main lines, but even for the largest railroads, the majority of long-distance lines are single track, with sidings at intervals determined by how busy the line is and how difficult it is to build sidings in particular terrain.

When opposing trains get around each other at a siding, that's a "meet." When one train overtakes another going in the same direction, that's a "pass." Though meets are more numerous than



In one of the AOE's dining cars, place settings with the train's own fine china await passengers.

passes, it's common to refer to longer sidings as passing sidings. (Shorter sidings – too short for typical freight trains – may be designated as "work sidings" used primarily to store track equipment or to set out "bad order" defective cars that need repairs before they can be moved.)

In rare situations, trains get past each other at locations other than passing sidings. A shorter train may leave the main line by pulling or backing into an industrial spur or other secondary track. This requires a backup move, either entering or leaving, often through manual switches.

Meets and passes have acquired their own vocabulary, so railroad employees can quickly describe what needs to happen. You may hear the dispatcher tell a northbound train the following: "4429 North (identification of the train by direction and lead engine number), you're in the hole for three. We're fleeting southbound."

The "hole" is obvious. That's a passing siding. The rest of the message tells the waiting train that there will be three opposing trains at close intervals.

"Fleeting" refers to running a fleet of trains in the same direction, as closely spaced as safety rules for this line allow. On a signaled line, fleeting can be set on the dispatcher's console. That way, instead of authorizing each of the following trains to move forward over short segments, the dispatcher sets up a route for the first train, and then simply authorizes the following trains to operate over the same route.

In this set-up, the centralized traffic control (CTC) signals act as automatic block signals (ABS). If a following train gets too close to the preceding train, it will first get a yellow ("approach"), indication, telling it to slow down. That is followed by a red ("stop") indication. On lines with higher speeds, there may be intermediate signals, such yellow over green ("advance approach" – aspects vary by railroad) showing that the next signal displays approach – and to begin slowing down.



Then still operating as the American Orient Express (AOE), the trainset that later became the GrandLuxe Express sits in front of Denver's Union Station, waiting for passengers to board on a westbound journey on the luxury train.

If all trains operate at the same speed, two or three signal blocks apart, the engineers on the following trains should never see anything other than green (“clear”) signals. However, if a following train is faster than the preceding train, it will catch up to the point that it gets an approach signal. It then slows down but may continue to get a series of yellow approach indications. This is described as “riding in a train’s (the preceding train’s) yellow block.” (The yellow block, of course, moves with the train.) If this situation persists, the following train may call the dispatcher to notify him or her of the situation – and the dispatcher would try to get the faster train past the slower train.

Fleeting is an efficient method of gaining track capacity on a single-track line. If the railroad has several northbound trains in the morning with only one or two southbound trains, it makes sense to put the southbound trains in the hole to let the other trains get between origin and destination as quickly as possible. Where possible, railroads will schedule directional departures from major yards to allow fleeting.

Intermodal trains operate at faster speeds than mixed freight trains (with tank cars, box-cars, hoppers, etc.) – or heavy coal trains. So, the railroad will try to use the following principles: After an Amtrak train (passenger trains have higher speed limits) passes a major yard, the dispatcher will then release an intermodal freight in the same direction, followed by a general merchandise train, and/or coal train.

As each of the preceding trains should be faster than the following train(s), the trains should not catch up with each other or at least stay a consistent distance apart. (Amtrak trains make station stops, while the following intermodal train stops only for crew changes.)

But, things don’t always go as planned.

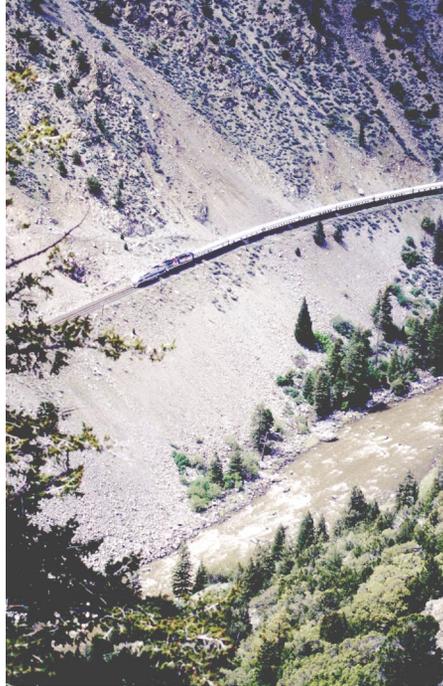
Putting Amtrak in the Hole

In almost all instances where I have followed the progress of a passenger train, either from onboard or trackside, dispatchers try to give the passenger train priority over other traffic. But, things are not as simple as they appear.

An often-heard complaint (from passengers) is that dispatchers put Amtrak trains into sidings to let freight trains get by. Well, sometimes, with a meet between a passenger and a freight train, putting the passenger train into the siding is the most efficient way of running the meet – for both trains.

The ideal situation is for the freight to arrive at the meeting site first and to be in the siding ahead of the arrival of the passenger train. That way, once the freight is clear of the main line, switches at both ends of the siding are lined for the through route, which can be taken at full speed by the passenger train.

But, consider the following example: On a CTC signaled line segment, the passenger train speed is 79 miles per hour; the limit for (non-intermodal) freight trains is 59 mph. The siding is two miles long and has #20 switches at both ends. The switches have a 45-mph speed limit through diverging route and full track speed on the main line. This time, the dispatcher knows



Behind two Amtrak locomotives, the American Orient Express heads west through rugged Gore Canyon in central Colorado.

that a seven-car Amtrak train will reach the meet point before a mile-long freight.

Because the passenger train gets there first, how fast it proceeds to the meet point is not a factor. So the dispatcher lines the passenger train into the siding, where it stops at the signal at the other end of the siding. The freight train remains on the main and does not have to slow down below 59 mph, getting by the meet point fairly fast.

Short passenger trains have good acceleration, but as the turnout route back onto the main is only a few hundred feet past where it had stopped, the 45 mph limit on the curved route of the turnout is not a factor. The train won’t reach 45 mph until the entire train is already past the turnout.

Keep in mind that the Amtrak train cannot depart the meet point until the entire freight is by that location. So, for the passenger train, it makes no difference whether it had stopped on the main or in the siding. But, if the dispatcher had let the Amtrak train hold the main and routed the freight through the siding, the freight would have had to slow down to 45 mph before it reached the turnout into the siding. And, as it could not exceed 45 mph at the switch on the other end of the siding, it probably would never get above 45. At that point, the freight needs longer to get by the meet point, delaying the passenger train.

Buttonhooks and Saw-bys

Suppose you need a faster train to pass a slower train and to have both of these trains meet an opposing train at a location that only has a single siding. That requires a “buttonhook” or “J” meet. Here’s how that works:

The opposing train arrives first, goes into the siding, and pulls down to the far end. The slower train (ahead of the faster train) goes past the opposing train on the main line and stops. The dispatcher then lines it into the siding and it backs in behind the opposing train.

The fast train runs past the meet point on the main line. As soon as it has overtaken the slower train, the dispatcher lines the switches at both ends of siding onto the main line. The opposing train departs and the slow short train now follows behind the fast train.

This requires the combined length of the slow train and the opposing train not to exceed the length of the siding – but that’s usually not a problem, particularly if the slow train is a work train consisting of an engine and a few cars. That also means that a crewman on the short train doesn’t have to do much walking, as railroad rules prohibit a “blind shove.” Someone has to be at the far end of a train backing up, guiding it by radio.



In Colorado’s Gore Canyon, the highly polished luxury train consist threads a short tunnel while headed west with a full load of passengers - back in better times in 1999.

During a simple meet, when one train exceeds the length of the siding and the other does not, that’s called a “saw-by.” And it’s not a problem. If the shorter train – whether passenger or freight – gets there first, it makes sense to put it into the siding. The long train then gets by faster by remaining on the main line. If the long train gets there first, its back end will still occupy the switch at the other end of the siding. If the crew of the shorter train is inattentive or operating too fast, it can run into the side of the longer train. This is how you get a collision with the front of one train and the middle of another. In Europe this is called a “flank collision.” I haven’t heard a term for this in the U.S.

If both trains exceed the length of the siding, they can still get past each other with a “double saw-by.” That requires a lot of switching maneuvers by both trains, and is avoided at all costs these days. (Explaining this requires a lot of space and some diagrams. You may find information with an Internet search on “double saw-by.” It’s also explained in older books on railroad operations.)

Once again, I’ve run out of space before running out of content – and that ensures that I’ve got a start on the next column, including another look at modern streetcars.

Books by Ernest H. Robl:

THE BASIC RAILFAN BOOK

UNDERSTANDING INTERMODAL

THE POWDER RIVER BASIN

Detailed descriptions at

<http://www.robl.w1.com>

Your Letters Addressed

As I mentioned a few issues back, this past DX season brought a huge increase in reader mail to the *Below 500 kHz* desk. This has been a welcome change, but it has been difficult to fit all of these letters into our one-page column. With this issue, we've finally worked our way through most of the backlog.

Don't forget to scan the longwave band during the warmer months. There's still plenty to be heard, although you may have to deal with static crashes on some days. Keep us posted on what you are hearing!

Longtime *MT* contributor **Perry Crabill** (VA) wrote about the LF broadcaster list we ran back in December. There, we reported a Russian broadcast station on 171 kHz with a power output of 6400 kW. The proper power should have been listed as 600 kW. Thanks for catching that error, Perry. It has been noted for our future listings.

Perry adds that when he was actively DXing LW he could often hear the carriers of these superpower stations, and when conditions were especially good, he could get their audio, even when they were co-channel with U.S. NDBs. Living in Winchester, Virginia, since 1982, Perry now finds that being so far inland makes these LW Trans-Atlantics much weaker than when he lived in the DC, area and was 70 miles closer to the coast. There, the French station on 162 kHz was often at "entertainment level" he reports.

Speaking of longwave broadcast stations, **Don De Caria**, NF7R reports hearing the following stations at his location in Nevada at about 0430 UTC. He used an Internet parallel to verify the Moroccan station on 171 kHz. Nice inland catches, Don!

- 153 kHz Chaine 1, Algeria ID based on Middle Eastern music and talk.
- 162 kHz France Inter, Allouis ID based on French Language talk.
- 171 kHz R Medi1, Morocco ID positive based on Internet parallel and format.
- 183 kHz Europe1, France ID based on French Language format.
- 189 kHz Unknown definite best station, but heavy QRM. (Possibly Iceland-K.C.)
- 198 kHz BBC 4 ID positive, based on good copy of English language programming.

At about 0500 UTC, Don reports that all stations faded into the noise with the exception of R Medi1, which is always first heard and last gone. Don uses an Icom IC-756 PROIII, with a Palomar VLF (to 4 MHz) upconverter. Antennas include a 40M vertical, 160M inverted vee, a small (90 foot leg) rhombic, and a long wire (quarter wave on 1550 kHz). All stations were about equal on the vee, rhombic, and longwire, with a slight edge to the LW. Don reports that winter 2008-09 was a great DXing season!



MT reader **Takahito Akabayashi** (Japan) sent this anniversary QSL card from *Time Station JJY, 40 kHz, in Hagane-yama, Japan.*

Robert Homuth, KB7AQD (AZ) did some DXing with an entirely indoor receiving set-up consisting of a Sangean AT5505 receiver and a Radio Plus Quantum Stick antenna. Although it was noisy around his apartment, he did manage to pull the following aeronautical beacons out of the mud.

- 206 kHz GLS Galveston, Texas, 2000W, a tower antenna, and a saltwater marsh next to the Gulf of Mexico helps this powerhouse signal.
- 245 kHz AVQ Marana Airpark, Marana, AZ. It's about 100 miles from Phoenix, but I can copy this one fairly easily via groundwave.
- 281 FFZ Falcon Field, Mesa, AZ. Another groundwave catch.

Robert also reports that he has a number of aeronautical beacon and lighthouse NDB QSL cards from 1985-1986 that he heard with a Radio Shack DX-400 and homemade loop antenna, including a nice letter from the Rarotonga airport, South Cook Islands, for logging "RG" on 352 kHz. After the DX-400 wore out, he didn't have any LF capable receivers until recently.

Welcome back, Robert, and how about scanning some of those vintage QSLs so we can run them in this column?

Daytime Loggings

Ron Bailey, AA4S (NC), sent in a list of his best daytime loggings heard in North Carolina (see Table 1) at around 1700 UTC. You may recall Ron's recent articles on MW DXing here in *MT*. It turns out, that he's also a longwave fan. I had originally planned to present these logs last month, but we ran out of room. Very nice catches, Ron!

See you next month!

TABLE 1. DAYTIME BANDSCAN FROM NC

FREQ	ID	ST	CITY
198	DIW	NC	Dixon
204	TWL	NC	Monroe
206	GLS	TX	Galveston
209	UKF	NC	North Wilkesboro
216	CLB	NC	Carolina Beach
219	AY	GA	Waycross
220	DCM	SC	Chester
221	BJT	GA	Athens
223	AZW	NC	Mount Airy
227	UZ	SC	Rock Hill
230	AQE	NC	Greenville
233	AG	GA	Augusta
242	CL	NC	Charlotte
245	UDG	SC	Darlington
248	FRT	SC	Spartanburg
252	SMS	SC	Sumter
254	GS	NC	Greensboro
257	CEU	SC	Clemson
257	ME	NC	Laurinburg
260	GHJ	NC	Gastonia
266	CQJ	NC	Asheboro
269	HLX	VA	Hillsville
271	HXO	NC	Oxford
275	RU	NC	Salisbury
278	EOE	SC	Newberry
278	HFF	NC	Hoffman
280	MQW	GA	McRae
287	GS	SC	Greer
309	EEX	GA	Swainsboro
317	IN	NC	Winston-Salem
326	UOT	SC	Union
326	ZEF	NC	Elkin
329	CH	SC	Charleston
332	DKA	NC	Kenansville
332	HK	NC	Hickory
335	FL	SC	Florence
335	MK	VA	Marion
338	GY	SC	Greenville
344	RFE	NC	Rutherfordton
347	AIK	SC	Aiken
347	AJR	GA	Cornelia
350	LE	NC	Raleigh/Durham
353	VV	GA	Greensboro
362	CA	SC	Columbia
365	FKV	GA	Gainesville
368	TEC	VA	Blacksburg
375	RCZ	NC	Rockingham
379	BRA	NC	Asheville
381	MNI	SC	Manning
384	JB	NC	Lumberton
385	EMR	GA	Augusta
388	RNW	NC	Chocowinity
391	FIQ	NC	Morganton
396	UV	VA	Martinsville
400	LKR	SC	Lancaster
408	LQK	SC	Pickens
414	FDW	SC	Winnsboro
417	SLP	NC	Shelby
423	SIF	NC	Reidsville
432	IZN	NC	Lincolnton
521	GM	SC	Greenville

Clandestine Broadcasting Robust, but Changed

Historically, one of the most interesting features of unlicensed broadcast DXing was a widespread incidence of clandestine stations linked with conflicts all across the Western Hemisphere. Anti-Castro clandestines, with either tacit support or actual operating and financial support from the United States government, were fascinating DX targets on the shortwave bands for decades. It started with **Radio Swan** that broadcast during the Bay of Pigs invasion of Cuba and was largely financed by the United States, and was later reinforced by the big anti-Castro signal on 6000 kHz every night from **Radio Americas**, such as **La Voz del CID** and **La Voz de Alpha 66**

At the same time, shortwave clandestines emerged in association with revolutionary civil wars in countries such as El Salvador and Nicaragua. Revolutionary rhetoric and bullet sound effects from stations such as **Radio Venceremos** and **Radio Sandino** spewed venom against these Central American governments. You can still hear these archived broadcasts on U-Tube, in case you missed this fascinating era in DX history.

Radio Sandino can be heard at www.youtube.com/watch?v=6wTmdBjawEY,

and Radio Venceremos is archived at www.youtube.com/watch?v=HnVZ_N5xbco in fascinating U-Tube historic clips.

The February 1992 issue of *Monitoring Times* contained a fascinating article by Don Moore about the last days of Nicaraguan clandestine **Radio Impacto**. This voice of the Nicaraguan Contra forces had tangential links to the later Iran Contra scandal in the United States government. A slightly edited version of Don's 1992 article is still up on the internet at www.pateplumaradio.com/central/costarica/impacto.html

These various clandestine shortwave voices of both right wing and left wing political forces created fascinating listening on a daily basis on the shortwave bands for decades during the 1960s, 1970s, and 1980s. The run of the anti-Castro **La Voz del CID** lasted longer. Even today, the USA government broadcasts the quasi-clandestine **Radio Marti** and **TV Marti** programming toward Cuba.

Things have changed drastically in recent years and decades. Political and revolutionary conflicts have not vanished from the Western Hemisphere, but ongoing conflicts within Colombia, Mexico, and other regions have not produced much in the way of clandestine radio broadcasting. So, the clandestine DX scene has changed considerably from two decades ago.

We still have many political trouble spots in the world that are producing considerable activity by clandestine broadcasting stations. For instance,

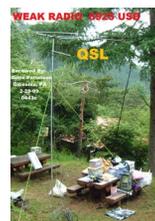
as NASWA executive director Rich D'Angelo pointed out in both the *NASWA Journal* and *DXplorer*, he recently received a no data e-mail QSL reply to a reception report from **Free North Korea Radio** via Gavar, Armenia after he sent an e-mailed reception report to Mini6915@hanmail.net after a wait of 48 days. Rich also has had recent loggings of the anti-Sudan **Radio Dabanga** on 7315 kHz at their 0430 UTC sign-on. That clandestine actually buys time on the Wertachtal, Germany powerhouse shortwave transmitter.

The technology and nature of clandestine broadcasting has obviously changed considerably from our experience in prior decades. But, a considerable volume of shortwave clandestine activity remains on the air. As we often do, we call your attention to the best summary of such activity that exists today. Nick Grace's Clandestine Radio web site at www.clandestineradio.com/ still is an outstanding information resource for those interested in monitoring clandestine activity. Martin Schoech's Clandestine Radio Watch web site at www.schoechi.de/crw.html is also useful. Neither site has been updated lately.

Despite the massive political and technological shift in recent years, not all unlicensed broadcasting is concentrated among pirates. A noticeable level of political clandestine broadcasting remains on the air today. The phenomenon is worth some effort by all DXers, since the programming and DX catches from contemporary clandestines are still fascinating.

WEAK QSL

As we see here this month, both Ed Moor and Gene Patterson got an "attractive" QSL from WEAK.



Major Pirate Busts

There were multiple pirate busts in March on both sides of the Atlantic Ocean. The FCC and the Orange County, FL sheriff's department conducted a raid on Street Heat, which had operated on 91.3 MHz FM from 30th Street in Orlando. Programming included ads for locations where listeners could procure both prostitutes and drugs. Despite numerous press accounts of this bust, as of press time for *MT*, a public notice of apparent liability was not published by the FCC in this case.

Meanwhile, the BBC reports that Ofcom raided 881 pirate radio stations in the UK during 2008, a 20% increase over the 707 pirates busted in the UK during 2007. The BBC reports that many

UK pirates remain on the air, but that Ofcom has a 100% conviction rate in these busts.

WHATWEAREHEARING

Monitoring Times readers heard nearly three dozen different pirate radio stations this month. You can hear them, too, if you use some simple techniques. Pirate radio stations never use regularly announced schedules, but shortwave pirate broadcasting increases noticeably on weekends and major holidays. You sometimes have to tune your dial up and down through typically used pirate radio frequencies to find the stations, but more than 95% of all North American shortwave pirate broadcasts are heard on **6925 kHz**, plus or minus 30 or 40 kHz.

Ann Hoffer Radio- Ann sings cover versions of rock hits by other artists over a pirate radio transmitter. (None known)

Barneyard Radio- Rabidly anti-female, with animal noises said to be the "Tijuana Donkey Show." (None known)

Channel Z Radio- Professionally produced rock music and jingles with pirate radio discussions. (channelzradio@gmail.com)

Dead Cat Radio- Rock music mixed with animal sound effects, especially cats. (cattus.mortuus@gmail.com)

Gaga Radio- Uncle Bob's new rock music pirate. (papeon-thepoint@gmail.com)

Grasscutter Radio- Veteran pirate transmits rock music. (grasscutterradio@yahoo.com)

KPR- Rock oldies format, using a slogan of "We Rock the Rockies." (None known)

Liquid Radio- Eclectic rock and dance music. Many pirates play music that you don't hear much on licensed stations. (wrwbfm@gmail.com)

MAC Shortwave- Paul Star moved most of his broadcasts to 6925 kHz lately, vastly increasing his audience for a very slick and entertaining replica of the old top 40 AM radio format. (macshortwave@yahoo.com)

Mystery Radio- Although summer is not the best season for Europirate DX, this one is still being heard in North America, with the best reception on weekends around local sunset near the east coast on 6220 kHz. Both voice and Morse Code IDs are broadcast. (radio6220@hotmail.com)

Numbers Parody- A parody of numbers stations on the pirate band, consisting of "nacho, hotel, porkchop, etc." (None)

Radio Azteca- Humor about DXers and Dxing is still Bram Stoker's strong suit. (Belfast)

Radio Chicken- Operated by a chicken who clucks a lot, but does not give out an address. (None)

Radio Free Speech- Bill O Rights' veteran freedom advocacy station is always entertaining. (Belfast)

Radio Jamba International- Pirate radio issues are their main fare, sometimes via a **WBCQ** relay. (Belfast)

Radio Free Euphoria- Captain Ganja is back with his marijuana advocacy programming (Belfast)

Radio is My Friend- This odd pirate tells the story of Graham Connors who is in the Cherokee mental asylum because he killed Abigail Walters. They now announce an address. (cherokeemental@yahoo.com)

Random Radio- Format varies on a random basis from show to show. (Asks for reports to Free Radio Network)

Special Ed- The announcer on this pirate is not noted for his brilliance He transmitted his annual Easter show about green eggs and green spaghetti. (Unknown)

Continued on page 61

The N2EI Power and Light Company

If you have been following the textual machinations of this humble columnist for any length of time, you know by now that one of my greatest joys in amateur radio is the act of turning sunshine into RF. While I have many radios and many modes to enjoy, at many power levels, my preferred way of playing ham radio is solar/battery low power (QRP) operation. Even through the relative HF doldrums of this bottom of the cycle, you will still hear Old Uncle Skip pushing his meager wattage across the bands, secure in the knowledge that my Carbon Footprint is at maximum minimum.

I first took my primary operating position "Off the Grid" on May 29, 2000 (it pays to keep good logs), and haven't turned back (or turned on the mains power supply) since. I still get a kick out of folks getting a kick out of working a solar based station.

My system is rather spartan as solar set-ups go. I run a relatively small 10 by 16 inch solar panel that I bought used at a flea market. It was originally designed for topping off an automobile battery. This feeds a sealed lead acid battery that is encased in a system designed to jump start cars. I bought my particular unit (a Jumper 850 by name) on a close-out sale at a local discount store. The power demands of my QRP station were so low and the charge rate of the small panel so slow that I was able to keep this system running with virtually no maintenance and no need for a charge controller.

This set-up became known far and wide amongst my regular radio contacts as "The N2EI Power and Light Company" – a reliable source of power for radio fun since the day it went live in May 2000.



Well, Old Uncle Skip's hair is a lot less red and a lot more grey since I put that system together. I am older and slower. No more or less could be expected out of my solar/battery system. I began to notice that The N2EI Power and Light Company was having a little trouble holding a full charge. A bit of poking around the Web clued me in to the facts about sealed lead

acid battery life expectancy. Under "normal" use, it appeared that most common SLA batteries could be counted on to last between 5 and 7 years depending on duty cycle and charging conditions. My system managed to keep the faith for 9 whole years! If I was willing to let things run a bit low, I could probably squeak another year out of this battery but it owed me nothing at this point. Time to put it out to pasture.

Just for comparison's sake, I did a little Web and window shopping to price what it would take to replace the Jumper 850 unit in total. Whew! I found that prices for these units were almost double what I originally paid almost 10 years ago. My cheapskate genes began to kick in very quickly.

So when in doubt, get the screwdriver out! I opened up the Jumper 850 to see what I could find out about its inner workings. Amazingly enough, this unit was so trouble free that, over the years, even my curiosity didn't get the better of me; I was going in for the first time.



What I discovered was a simple but obviously very effective set-up. The "jumper cables" were attached directly to a common 17 Amp Hour, 12 volt, sealed lead acid battery. This was supported by a small metering circuit consisting of a few LEDs that indicated battery condition (and gave me the indication that all was no longer well inside The N2EI Power and Light Company). Recharging occurs by applying voltage through a common automobile style power socket. The unit came with a "wall wart" for this purpose, but I put that aside in favor of using my solar panel. There was really nothing inside to go wrong but the battery itself. I ran a few simple voltage load tests to confirm the problem. Time to go battery shopping.

I made a few phone calls to my local battery suppliers and found the prices to be rather steep compared to internet prices posted for similar replacement batteries. I would have preferred to go with my local suppliers, but those cheapskate

genes kept kicking in. During the time I was performing the autopsy on the Jumper 850 unit, I was also talking over the problem (by way of online chat groups) with some folks in the QRP community who were running similar systems. This conversation was mainly about battery life and quality, but, at one point in the conversation, John N1OLO asked me if he could offer up a quote on a replacement battery.

For those of you that don't know John, he is on Staff at West Mountain Radio www.westmountainradio.com, makers of the RigBlaster line of interfaces, a great amateur radio company in its own right. But John also has a bit of a business of his own called Hamsource www.hamsource.com. He has many fine ham radio related products to offer, including batteries of all shapes and sizes. The price was right and a deal was struck. A few keystrokes to Paypal and my replacement battery was on its way.

Replacement was as simple as disconnecting the old battery and dropping in the new one. The new battery was rated at 18 Amp hours (up from the originals 17 Amp hour rating). My normal operating practices never taxed the full depths of the original, so the extra Amp Hour is not a big factor unless the power goes out for many days.

While I was making the battery swap, I did myself the favor of removing the jumper cables. This made the unit a bit more compact. Now that I have the lay of the land inside the unit, a future project will be to parallel Powerpole™ and Molex™ connectors to the automobile utility socket. This will make the unit more easily available for alternate use in emergencies.

The N2EI Power and Light Company is back in business and happily making solar power contacts, hopefully without fail, for another nine years.

Celebrating Earth Hour, Radio Style

I was very happy to have The N2EI Power and Light Company back up to speed in time for the Earth Hour Celebration. This event was held on Saturday 28 March at 8.30p.m. local time. During this hour, folks were asked to shut off their lights as a way of showing commitment to reducing energy waste and promoting sustainable energy systems.

While my XYL was downstairs reading by candlelight, I was upstairs enjoying off the grid radio contacts with my solar powered station, operating by the faint glow of the readout on my Elecraft K2. I had a blast talking to a few stations on 80 meter CW, including John K3WWP, Lukas WA3UEA, and Ted N1WPU.

There are a lot of different opinions about how we should maintain our relationship to our home planet and its resources. Hams, by and large, are respectful of differing opinions. But regardless of where you stand on the "big ticket" ecological issues, who can argue with saving an hour's worth of dough on their electric bill? Come to think of it, I should probably leave the lights off when I play radio more often. I could probably save enough money to cover the cost of that replaced sealed acid battery I just bought. Yep, it's those cheapskate genes kicking in again.

Power Saving Lightbulb Goes QRP

While we are on the topic of saving electricity, I want to let you know about a simple radio design that has taken the ham radio community by storm. Mike Rainey AA1TJ, like many folks, had switched his house lights over to the low energy compact florescent lights (CFLs). Being a rather typical ham, when one of these lights failed, he couldn't help but open it up and see what was inside. (Caution: these bulb's gas envelope contains a small amount of toxic mercury vapor: handle with care.) Mike found enough parts inside to make a viable 80 meter QRP CW transmitter which he dubbed "Das DereLicht."

You can see Mike's fine work at his Website: <http://mjrainey.googlepages.com/dasderelicht> Also, if you log into any of the QRP and Ham Radio Homebrew mailing lists or on-line chats, you will find his work being discussed far and wide. His full design article can also be found in the Spring 2009 edition of *SPRAT, The Journal of the G QRP Club* <www.gqrp.com>.

The next time one of my CFLs goes into failure mode around the shack, you can bet I'll have it down on the workbench in no time at all.

How interesting our hobby is. You can buy a many megabuck rig from a major manufacturer or put out a signal with the innards of a broken light bulb. Think about it. If both transmitters were putting out a clean CW tone and were adjusted to the same power level, into the same antenna, would the station on the other side really be able to tell the difference in the dollars spent to make the QSO happen? What other hobby can make such a claim to such a wide accessibility regardless of financial wherewithal?!

Book of the Month

At this year's Kulpsville Winter SWL Fest, I picked up a book that has given me many hours of fun reading and many, many great ideas.

TECHNICAL TOPICS SCRAP BOOK – ALL 50 YEARS
By Pat Hawker G3VA
ISBN: 9781-9050-8639-9
176 pages plus CD ROM

Published by The Radio Society of Great Britain
Lambda House
Cranborne Road
Potters Bar, Herts EN6 3JE
www.rsgb.org
£14.99
Or \$29.95 from
The American Radio Relay League
225 Main Street
Newington, CT 06111-1494
www.arrl.org/shop
1-888-277-5289



Pat Hawker G3VA was first licensed in 1936, and hi 50 years of comprehensive technical writing in the world of amateur radio is without peer. His *Technical Topics* column appeared monthly in the RSGB's version of *QST, RadCom* for 50 years.

This book collects all of those columns in a single place: 2005 through 2008 are printed in the 176 page book, and the previous columns, dating back to 1958, appear on a searchable CD ROM included with the book.

Fair warning...this is a dangerous book! If you pick it up you will be unlikely to put it down. On the other hand, it is not the kind of book you read cover to cover. You can flip randomly and find amazing information that will suggest ways to improve your amateur radio station. This time span covers vacuum tubes (known to our British brothers and sisters as valves) all the way up through learning how to do surface mount design and construction.

I have picked up so much information that the plans for what will happen on my workbench are laid out for many months to come.

Outer Limits continued from page 59

- Sunshine Radio**- A sister station to Grasscutter, featuring a female announcer; an unusual event in pirate radio. (grasscutradio@yahoo.com)
- Sycko Radio**- Rock music and comedy. (syckoradio@yahoo.com)
- Thinking Man Radio**- Rock music mixed with historical commentary. (Thinkingmanradio@gmail.com)
- Victory Radio**- When the University of Texas wins a ballgame, this pirate often comes on to celebrate. (None announced)
- Voice of KAOS**- Mixed format includes rock music, political commentary, and TV show audio. (voiceofkoas@gmail.com)
- Voice of Pancho Villa**- During his annual Winter SWL Fest broadcast, Pancho went to Washington where he and Sarah Palin worked to set up a new shortwave station in Equatorial Guinea, oddly with the assistance of MP's Larry Van Horn and Glenn Hauser. Pancho's ride is never to be taken seriously, and he does sometimes get relays later in the year. (Belfast)
- WBNY**- Commander Bunny's masterful Rodent Revolution parody of clandestine radio stations remains very active, despite his loss in the USA Presidential election. (Belfast and rodentrevolutionhq@yahoo.com)
- WEAK**- As we see this month, this rock music pirate is QSLing. Leonard Longwire reports that this is not his version of WEAK. (weak_chicago@yahoo.com)
- WFUQ**- Semi-profane rock music pirate (None)
- WMR**- This "We Monkeys Radio" offshoot from **WBNY**'s format is still heard occasionally. They play only portions of all their songs, so as to deal with short attention spans among their listeners. (None)
- WNKR**- This Europirate, Western North Kent Radio, was represented at the Kulpsville Winterfest, and it has received numerous North American relays lately around 6925 kHz. (wknkrw@gmail.com)
- WQAAZ**- This new one is mysterious so far, featuring rock music and comedy. (wqaz@gmail.com)
- Wolverine Radio**- Rock music. (None)
- WTCR**- "20th Century Radio" takes its name literally. Its music playlist varies, with music from all decades of the century. (Belfast)

UNCLE SKIP'S CONTEST CALENDAR

- ARRL June VHF QSO Party**
June 13 1800 UTC - June 14 0300 UTC
- Kid's Day Contest**
June 20 1800 UTC - 2400 UTC
- SMIRK Contest**
June 20 0000 UTC - June 21 2400 UTC
- West Virginia QSO Party**
June 21 1600 UTC - June 15 0200 UTC
- Run for the Bacon QRP Contest**
June 22 0100 UTC - 0300 UTC
- ARRL Field Day**
June 27 1800 UTC - June 28 2100 UTC
- QRP ARCI Milliwatt Field Day**
June 27 1800 UTC - June 28 2100 UTC
- His Maj. King of Spain Contest, (SSB)**
June 27 1800 UTC - June 28 1800 UTC
- Marconi Memorial HF Contest**
June 27 1400 UTC - June 28 1400 UTC

In addition to providing a great resource, I cannot let pass the fact that Pat is a wonderful and entertaining writer. I wish I could write as well as he does, or at least write for as long as he has.

For now, I am going to send this column in and then I'm going to take a tour around my house to see if any of my CFL light bulbs are starting to flicker. I'll meet you on the bottom end of 40 meters (80 meters if a bulb burns out). Have Fun!

QSLing Pirates

Reception reports to pirate stations require three first class stamps for USA maildrops or \$2 US to foreign locations. The cash defrays postage for mail forwarding and a souvenir QSL to your mailbox. Letters go to these addresses, identified above in parentheses: PO Box 1, Belfast, NY 14711; PO Box 109, Blue Ridge Summit, PA 17214; PO Box 146, Stoneham, MA 02180; and PO Box 293, Merlin, Ontario N0P 1W0. The best bulletin for submitting pirate loggings with a hope that pirates might QSL is now the e-mailed Free Radio Weekly newsletter, freeradioweekly@gmail.com. A few pirates will sometimes QSL reports left on the outstanding Free Radio Network web site, at www.frn.net on the internet. *The ACENow* has a good loggings section and a valuable archive of *Free Radio Weekly* issues on its www.theaceonline.com/ web site.

Thanks

Your loggings and news about unlicensed broadcasting stations are always welcome via 7540 Highway 64 W, Brassstown, NC 28902, or via the e-mail address atop the column. We thank this month's valuable contributors: Brian Alexander, Mechanicsburg, PA; Kirk Baxter, North Canton, OH; Artie Bigley, Columbus, OH; Jerry Berg, Lexington, MA; Wendel Craighead, Prairie View, KS; Rich D'Angelo, Wyomissing, PA; Ragnar Daneskjold, North America; C. W. Dikkers, St. Louis, MO; Bill Finn, Philadelphia, PA; Harold Frodge, Midland, MI; Captain Ganja, Belfast, NY; William T. Hassig, Mt. Prospect, IL; Kracker, Belfast, NY; Terry Krueger, Clearwater, Florida; Ed Kusalik, Camrose, Alberta; Chris Lobdell, Tewksbury, MA; Greg Majewski, Oakdale, CT; A. J. Michaels, Belfast, NY; Ed Moor, Chelmsford, MA; Don Moore, Davenport, IA; Gene Patterson, Gibsonia, PA; Tom Quinn, Wellington, OH; Mike Rhode, Columbus, OH; Lee Silvi, Mentor, OH; John Stoll, NY; Allan Weiner, Monticello, ME; and Joe Wood, Greenback, TN.

Antennas, Accidents, and Astronomy

Many of the major discoveries in scientific work have been made by workers seeking something quite different than the phenomenon which their efforts actually led them to discover. Accidentally finding one thing in the course of studying something else is known as “serendipity.” As we’ll see below, antennas have played important roles in some significant serendipitous findings in the history of science.

Radio Astronomy

A good example of serendipity which involved the use of an antenna is the unexpected discovery by Karl Jansky of radio waves coming from the center of our galaxy. In 1928 Jansky was assigned the task of finding the sources of the radio noises that were interfering with AT&T’s trans-atlantic radio communications.

He built a directional radio antenna approximately 100 ft long, and 20 ft high. The antenna, a Bruce Array, was mounted on automobile wheels so that it could be rotated to all points of the compass. By using its directional properties, he began to try to ferret out the sources of the received electrical noise.

After Jansky had determined the direction and source of the major interfering noises he was receiving, there remained one hissing

noise that, at first, seemed to come from that sun! However, as he continued to study the hissing noise, it became apparent that its source was not the sun, but was deep within the center of our Milky Way Galaxy! He had discovered the fact that in outer space there are sources of radio emissions (cosmic noise) which are generated by natural causes.

Jansky and his directional antenna had just accidentally founded the science of radio astronomy! As you can now guess, radio astronomy, in contrast to traditional astronomy, uses radio antennas called “radio telescopes,” rather than optical telescopes. These are the radio astronomer’s “eyes to the sky.”

In recognition of his work, astronomers named the unit of density of flux for radiation from space the “Jansky.”

Radio Jamming from Space

Sometimes our antennas capture sufficient cosmic noise to produce a noticeable result in our receivers. For instance, at times during the Second World War, British radar antennas were flooded with signals which effectively jammed their receivers and rendered the radar sets useless. The British assumed that their enemy, the Germans, had some new device for jamming the British radar sets.

Then it was discovered that the “jamming” occurred when the radar antennas happened to be pointed at the sun. The sun produces natural radio signals, and these were jamming their radar! So the radar-system antennas had accidentally become radio telescopes!

The Big Bang!

One important serendipitous discovery utilizing an antenna was the result of painstaking work by Arno Penzias and Robert Wilson. They were searching the sky to determine the sources of naturally-occurring radio emissions coming from space (cosmic noise). They used a large, directional horn antenna (fig.1), and carefully attempted to account for all possible sources of cosmic noise.

When all known noise sources were taken into account, there yet remained a very-low level background of noise whose source they could not identify. After considerable thought and discussion with colleagues, they decided that this noise is the radiation yet remaining from the Big Bang: the event thought by many scientists to have been the origin of our cosmos!

In 1978 Penzias and Wilson received a Nobel Prize for this work.

What Makes an Antenna a Radiotelescope?

In general, antennas with significant directivity and significant gain are chosen as radio telescopes. There are a number of antenna designs that are useful for radio astronomy, and much mapping of the sky has been done using these antennas.

However, single antennas used as radio telescopes have a restricted view of the sky. This is because radio waves are much longer than light waves. Due to this, we would have to have extremely large radio telescopes to “see” a field of view as large as we do with optical telescopes. Fortunately, using a technique called “radio interferometry,” it is possible to combine the output of multiple antennas to “see” a much larger field of view than is possible with a single radio telescope antenna.

Want to Build Your Own?

You can build a radio-telescope antenna using directions seen on the last two web sites referenced in the “Interesting Antenna-Related Web Sites” box. On the other hand, using a radio telescope antenna may take a bit of learning

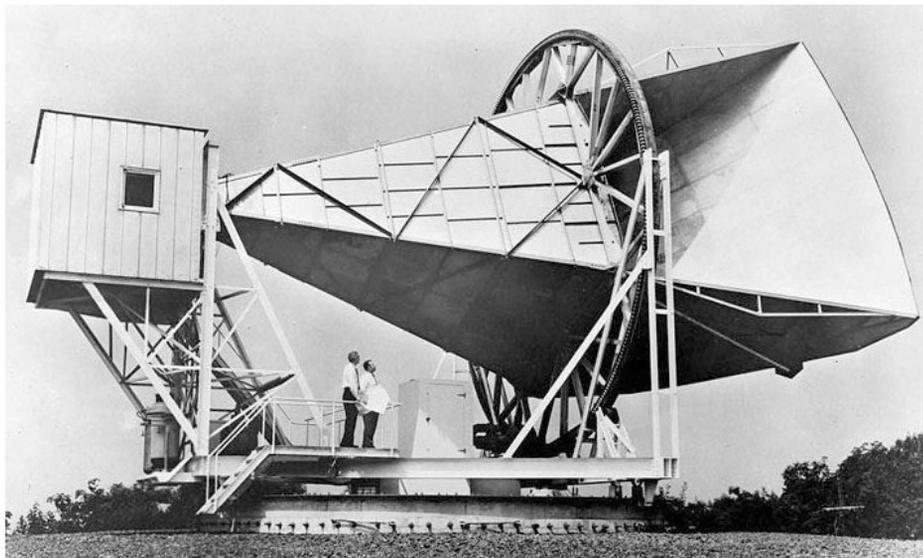


Fig. 1. The horn antenna used in the discovery of the cosmic background noise believed to be a residual from the big bang. Waves enter the large opening at the right, and are reflected to a receiver in the small room at the left. Both the antenna and its base can be rotated so that it can point in any direction.

This Month's Interesting Antenna-Related Web site:

- Want to hear some of the sounds of the natural radio waves from space?
<http://spacesounds.com/navigator/index.html>
- Or the sound of residual noise from the big bang?
www.npr.org/templates/story/story.php?storyId=4655517
- A discussion of the antenna which first heard the Big Bang's residual noise:
www.nps.gov/history/history/online_books/butowsky5/astro4k.htm
- An overview of radio telescopes and radio astronomy:
http://en.wikipedia.org/wiki/Radio_telescope
- How a radio telescope works:
www.astron.nl/p/WSRT3b.htm
- Helpful information on using a radiotelescope:
www.thrushobservatory.org/radio.htm
- The Radio Jove Project:
http://radiojove.gsfc.nasa.gov/telescope/testing_rcvr_ant.htm
- How to make a dipole radiotelescope:
www.rmc.edu/academics/physics/keeble/RadioTelescope/Telescope%20Poster%20Format.ppt
- A video showing making of a dipole radio telescope:
www.youtube.com/watch?v=Pndk80nGrBQ

about what you are listening for. Participating in a project with other interested amateur radio astronomers may make this easier. One such

RADIO RIDDLES

Last month:

The above discussion left out a couple of unusual kinds of antennas that hams, or radio technicians sometimes use. Although they can't be used to transmit or to receive stations off-the-air they are called "antennas." What are they?"

Well, one kind is called a "dummy antenna," or "dummy load." A dummy load is used when we want to tune up a transmitter, but don't want to put a signal on the air. The RF signal from the transmitter is fed into a resistor inside the dummy-load case. The resistor dissipates the signal's energy primarily as heat rather than as radio waves. Only a small fraction of the RF is converted to electrical or magnetic fields that might launch as radio waves. But the metal case of the dummy load acts as a shield to keep most of the field's

energy from leaving the case.

Another kind of antenna that neither receives stations off the air nor transmits signals, is the "phantom antenna." A phantom antenna puts an appropriate load on a receiver's input circuit when adjusting the receiver's input circuits. During this tuning the received signal is furnished by a piece of test equipment called a "signal generator," rather than by an off-the-air station.

This Month:

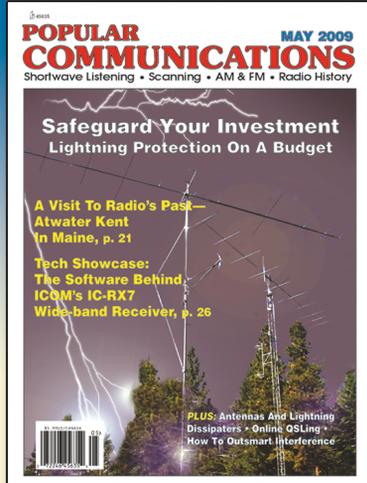
There were many sources of the noises picked up by the Big Bang researchers discussed above. Do you suppose that it's possible that one source of noise could have been the antenna itself? That is, could it be that an antenna generates within itself some of the noise for which the researchers had to account?

You'll find an answer to this month's riddle, another riddle, another antenna-related web site or so, and much more, in next month's issue of *Monitoring Times*. 'Til then, Peace, DX, and 73.

project is explained at: http://radiojove.gsfc.nasa.gov/telescope/ant_manual.pdf (See also a short article by Bob Grove in May's "Letters to the Editor" - ed.)

You can actually monitor some heavenly events using the antenna of your FM receiver. The web site <http://phoxes.com/> explains how

to monitor the occurrence of meteors with an ordinary FM receiver. Some amateur radio operators communicate by means of "meteor scatter." Using directional, high-gain antennas they bounce their signals off the trails of meteors allowing very-brief two-way communication.



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“Extracting” the S-20R Chassis

Retaining Ring Wrenches

First of all I want to thank the readers who answered my query about a special wrench for removing those annoying circular decorative lock nuts – the ones often used to secure toggle switches to panels. I had never seen such a tool and wondered if such had ever existed. Indeed it did – and after a quarter-century of writing monthly restoration columns I had somehow never needed or run into one. Possibly because most of my earlier subjects were home broadcast receivers.

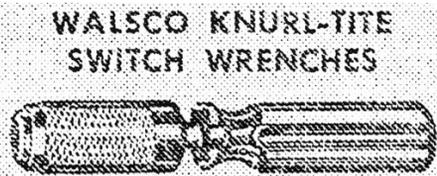


Fig. 1. “Ring nut” remover from an old Allied catalogue. This is the same model I received from Perry Crabill.

But as chance would have it, I was stymied both by an immovable lock nut in the previous project (the Globe Scout transmitter) and by several in the current Hallicrafters Sky Champion receiver restoration. Normally, I would loosen switches with such lock nuts from the rear by backing off the conventional retaining nut located behind the panel. Another trick is to grab the body of the switch from behind and rotate it counter-clockwise while holding the ring with padded pliers.

However, there was no room in the Globe Scout to swing a wrench or get leverage on the switch body. In the Hallicrafters, a wide cabinet lip effectively blocked any use of a wrench. I was able to grab the switch bodies with pliers – but found them immovable. I’ll explain why later. Working directly on the rings with padded – or even unpadded – pliers was useless, and the latter tactic threatened to chew up the ring and badly scar the panel paint.

When it came to the Globe Scout – which had a switch upside down in relation to the panel markings – I copped out of the problem by using a label maker to create temporary stick-on identification to cover the original markings. But I was getting nowhere with the Hallicrafters switches. All of the rings had to come off so that I could remove the panel and cabinet – absolutely necessary for carrying out the kind of restoration I wanted to do.

Through reader Perry Crabill, W3HQX, I was able to acquire a locking ring wrench for

my toolbox. Here, from his original e-mail, is Perry’s excellent description of the tool:

“... It is Walsco Pioneer Part No. 2583, with an amber plastic handle. The business part has a threaded sleeve that is turned to tighten down on the flared end of a cylindrical tube that has four segments with an internal knurled pattern. With the sleeve backed off, the end with the four segments is placed over the toggle switch’s locknut. You then twist the sleeve enough times to close the four segments down on the locknut until it is firmly gripped, then turn the handle counter-clockwise to remove the locknut.”

Later, on line, I found a drawing of the identical model from an old Allied catalogue (Figure 1) and discovered it had been available for three different diameter rings (3/8” [#2581], 1/2” [#2582], and the 5/8” model #2583 Perry sent me – which fits the common toggle switch size). Another reader, Pete Peterson, offered to loan me his wrench, a Waldom #348. He didn’t mention the size, but it was no doubt the standard 5/8” model.

Finally, James Williams, W7MBJ, did an internet search in my behalf and came up with an illustration from an old Motorola parts list – showing two wrenches, diameter not mentioned, but specified as “fine” and “coarse”! James’ search also netted mention of two GC/Waldom “toggle switch nut wrenches” available through a firm named Tessco. These are models 00-9358-0000 and 00-9359-0000 at \$15.75 and \$17.50 respectively. The difference in models is not specified – though they are likely two different sizes. Google the part numbers to access the right page in the Tessco on line catalogue.

At First – Frustration

Now let’s get back to the Sky Champion S-20R restoration. The first phase was to remove all the knobs and toggle switch locking rings so that the chassis could be removed from the combination cabinet/front panel. I was doing fine with the knobs – releasing their set screws and slipping them off one by one – until I got to the bandswitch knob. The screwdriver wouldn’t engage, and at first I thought I was dealing with a slot clogged by dirt.

But after scraping away all the dirt I found that I had only half a slot! The other half had somehow broken away. As mentioned in the previous column, I have another S-20R standing by as a parts set. I went to it to remove the bandswitch knob and immediately saw the reason for the broken slot on the original knob. No amount of reasonable screwdriver torque would

release the setscrew, and I was afraid if I persisted I would strip the slot or break half of it out.

Eventually, I have to remove all the knobs and switch nuts from this receiver, also, because it has a better cabinet, which I would like to salvage and install on the other set. But I do have time before I have to do this disassembly, and in the interim I plan to give the stubborn set screw frequent baths with WD-20.

Since I have a source of replacement knobs in the extra receiver, I thought that I’d remove the bandswitch knob with the broken set screw by drilling out the screw through the screwdriver access hole. Piece of cake, right? *Wrong!* While the knob bushing is made of brass – which should be fairly soft – the metal of the setscrew seemed to be extraordinarily hard.

I wore out three or four drill bits from my toolbox as well as another brand-new one that I went out and bought. Even after the screw seemed to have been entirely ground away, the knob stubbornly refused to come free of the shaft. When, finally, I was able to see the demarcation between the bushing and the shaft (which happened only after I had drilled partway into the shaft), I jammed a small screwdriver into the tiny crack and the knob finally dropped off.

I was only half through with this extensive drilling project (Figure 2) when the postman arrived with the welcome package from Perry. When I unpacked the tool, I was impressed with its ruggedness and by the generous size of the knurled cylinder that one grabs and turns to tighten the wrench segments around the ring to be removed. Delighted to have an excuse to take a break from the drilling, I lost no time in attacking the four toggle switch lock rings.

There’s no doubt that the wrench was applying a good amount of torque – especially when I tightened the cylinder with pliers instead of just my bare hand. But, on ring after ring (including the one on the Globe Scout transmitter), the wrench would lose its grip before any movement took place.



Fig. 2. It required extensive drilling and the ruin of about five drill bits to separate the bandswitch knob from the shaft.

A Ridiculously Simple Solution

Our readers seem to enjoy the fact that I don't wait to conclude a successful restoration before reporting on it. Instead, I allow folks to look over my shoulder as I proceed, sharing all of the fun, and sometimes frustration, that accompanies the various phases of the project. But this means that sometimes, in full view of my audience, I have to admit defeat and call a halt to a project that seems impossible.

I think I've only had to make such an admission once in my 9-year *MT* career, but I was about to announce number two when I discovered the solution – which turns out to have been absurdly easy. Thinking there might be some sort of special trick to using the ring wrench, I was browsing through a locking ring removal message thread in one of the antique radio news groups. Among the many posts stating the obvious removal techniques (use a wrench on the back nut, wiggle the switch, use padded pliers, etc.), I found one that actually solved the problem.

The suggestion was to position a fine center punch so that it would force the ring to turn counter-clockwise when tapped with a hammer. I immediately saw the sense of this idea. In fact, I had once used a similar technique to back out the remains of a threaded retaining rod that had broken off flush with the surface of a piece of hardware.

I didn't have a center punch fine enough for this work, but I decided to try a very fine-tipped jeweler's screwdriver that I didn't mind sacrificing. First, I gave it some smart taps at 90 degrees to the surface of the ring. The idea was to make a deep enough nick for the screwdriver to bite into when lowered to about a 45 degree angle to the ring so as to nudge it counter-clockwise.

A couple more smart taps at the 45-degree angle and the ring suddenly broke free! In another few minutes, the other four rings were broken loose and spun off (Figure 3). Not only that, but the only mark on each ring was the small nick made by the improvised "punch." This should almost disappear after the ring is cleaned and polished. Otherwise, I could simply turn the ring over so that the other side faced out.



Fig. 3. Thanks to the "center punch" trick (see text), all toggle switch locking rings were finally removed.

Although the ring nut wrench wasn't much help here, it will definitely come into its own during reassembly. Without it, the ring nuts could be installed only finger tight – and maybe not even that tight, considering how hard it would be to get a grip on the very thin metal.

I was delighted that I wouldn't have to abandon this project. I used to drool over cata-

logue pictures of the S20-R while still a pre-teen. Now I feel that the receiver has a charming and quaint 1930s retro look. I like it even better than its post-war version – the S-40 – which was tricked up in a "moderne" look by noted industrial designer Raymond Loewy. See last month's column for good pictures of both sets.

"Undressing" the S-20R

With all the knobs and locking rings removed, the chassis and cabinet could be separated. The "cabinet" is quite a tricky arrangement of sheet metal. The front panel, sides, and bottom of the radio are in one piece. Into this fits a piece that forms the top, with its hinged cover, and the back. Removing a few sheet metal screws frees the top/back, which can then be pulled away from the panel and sides. It fits rather tightly, so it needs to be "persuaded" a bit by prying with a screwdriver.



Fig. 4. A sight that, for awhile, I thought I'd never see: The S20-R chassis at last removed from its panel and cabinet!

With it off, one has access to a couple of long bolts that secure the chassis to the bottom frame. Once a couple more sheet metal screws are removed, the chassis is essentially free.

However, the speaker – which, of course, is wired into the chassis – has to be removed from the front panel. And the screw holding the hub of the main tuning dial to the shaft of the tuning capacitor needs to be loosened. This is so that the dial can be moved back slightly on the shaft.

The reason is that the back of the chassis has to be raised up slightly to clear a half-inch lip at the back of the cabinet bottom. If not moved back, the top of the dial would bump against the front panel before the chassis back could be raised up enough to clear the lip. The dial can be moved back only slightly before the bottom of the dial hits the front of the chassis. But the slight change in position is enough so that the

chassis can be tilted up and out.

At last, the S20-R is separated into its basic pieces and ready for restoration (Figure 4). And once I got a look at the front of the chassis, I saw the reason that I wasn't able to wiggle the backs of the switches – even with pliers. Besides the locking ring at the front of the panel, each switch has an extra lock nut on the front apron of the chassis (Figure 5). This holds it rigidly in place even with the front-panel locking ring removed.

See you next month, when we'll begin cleaning and recapping.

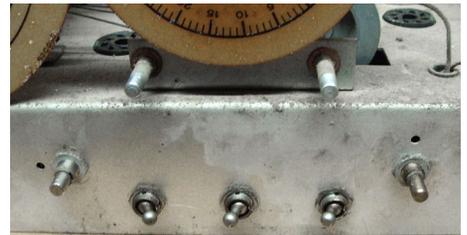


Fig. 5. Surprise! With removal of panel/cabinet, we could see that each switch had an extra lock nut on the chassis front apron.

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Working "RTTY"

By Carl Herbert AA2JZ

Despite all those new amateur licenses out there, many of you haven't tried "Radio TeleTYpe" (RTTY) yet. A simple isolation circuit, a personal computer, and some free software is all it takes!

Working RTTY isn't difficult and it can be fun to operate. Most, if not all hams have a personal computer on the bench. Those of you new to the hobby certainly are well indoctrinated in the use of a computer, and this project will combine your talents into a meaningful project.

The included circuit diagrams and photographs show the unit I assembled, using a salvaged mobile speaker case as my enclosure. Your choice of enclosure and required jacks and plugs are what "fits" your particular rig.

A Little History

In the past, teletype signals were created and received by special equipment that was both large and very heavy. Long ago when I was serving in the military, one of the more common pieces of equipment was the Model 19 machine. It weighed over one hundred pounds, smelled of lubricating oil, and was very noisy when operating. The teletype room was always separated from the remainder of the communications area because of the noise and heat generated by banks of machines receiving and sending messages over multiple circuits. Associated equipment added to the din.

There were banks of receivers, amplifiers, tuning devices, and more. All were "tube type" equipment and they worked. Thankfully, computers and modern software have made them

obsolete.

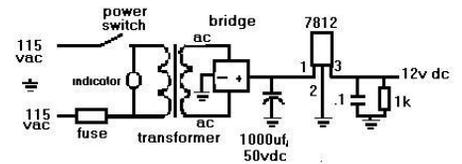
Teletype signals are an audio mode type of emission. Baudot RTTY coding is created by the software, and is used in the lower sideband (LSB) mode. If you want to know more about how the coding is created, etc. the "Amateur Radio Handbook" from the ARRL, (American Radio Relay League) has good information, as does the excellent "help" file included in the MMTTY software referenced below.

There is an abundance of software available for working RTTY, but the one I use, MMTTY, V1.65D, works great and it's free! I found a web site by AA5AU, called "Getting Started on RTTY," at www.aa5au.com. His site has an excellent tutorial on the downloading of the required software, and how to use it. An effort to rephrase his documentation here would be a waste of my time and yours. I'll concern myself with the building of the isolation transformer interface and a two to three kilohertz bandpass filter. I'm happier melting solder, anyway!

RTTY Isolation Interface

The associated schematics show a basic interface created by using two Radio Shack™ isolation transformers, part number 273-1374. The letters R, B, W, and Y, are the colors of the wiring for the transformers. Once you've loaded the software into your computer, T1 is interfaced – that is to say, placed between the transceiver's phone jack and the computer microphone input.

T2, the audio output transformer does the same in reverse. It passes the generated RTTY audio from the computer audio output jack to



Any small power transformer with approximately 15 volts AC out will suffice. The bridge is a .5 amp unit as is the fuse. The 1k resistor should be 1/2 watt rating.

the microphone input of the transceiver. After making these connections, one of the problems you will encounter is that you will no longer be able to hear the signal being received nor the signal being generated. Using the audio output jack on the rear of most transceivers provides a way of monitoring both of these.

On my Kenwood TS-830S, this audio level is low and not controllable. I overcame this by using a simple audio amplifier circuit, which provides adequate audio output. A simple "Y" splitter at the transceiver's audio output jack can also be used, but I opted for something better and controllable.

The method of building the circuit is not critical. Whether you use "point to point" wiring on perforated board as I did, or "Manhattan Style" of construction is a choice for the builder.

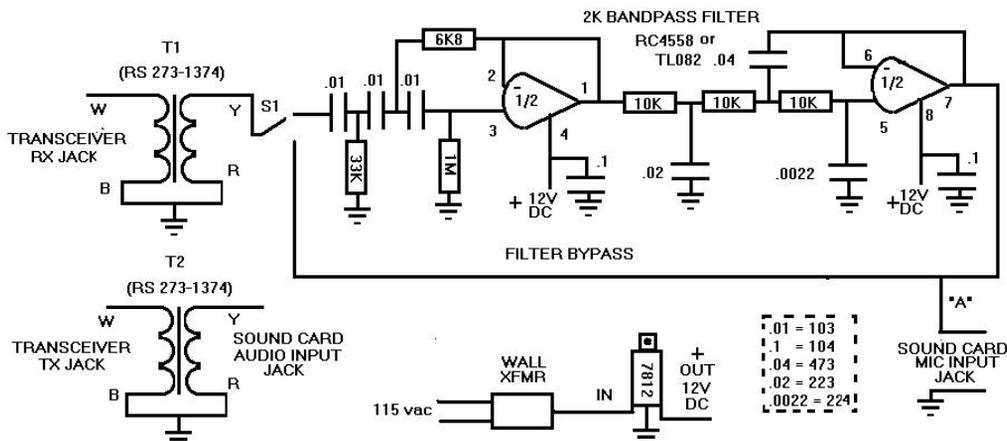
I do recommend using shielded wire for connecting your interface with the equipment. The shield (copper braid covering) provides a way to prevent noise from the surrounding equipment from entering the circuit.

Speaker

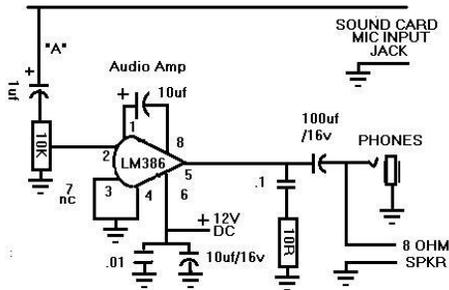
The speaker used in my project was removed from a defunct flat screen television. The isolation transformers are attached to the perforated board with a dab of hot glue. The "mounting brackets" for the circuit board are "grounding lugs."

Should you opt to use a salvaged mobile speaker enclosure as I did, be aware that the plastic used for molding this device is much thicker than sheet metal, or at least mine is. I was forced to use a motorized hobby tool to remove plastic from the internal locations for mounting the headphone jack, switch and volume control. The length of available threaded portion of these devices wasn't long enough to pass through the material and then allow the securing nut to be attached. To prevent accidentally pulling the connecting cables from the enclosure, I used a dab of hot glue to secure them.

Room for a power supply for the cir-



RTTY Isolation circuit. T1 and T2 provide isolation between your transceiver and computer. The 7812 voltage regulator was needed because the wall transformer, listed as 12volts was actually 19 volts output. Too great of an operating voltage for the op-amp. The letter "A" is where I cut the audio output from pin 7 of the bandpass filter and inserted an LM386 audio amplifier. I wanted to "hear" the audio being delivered to the sound card. Other op-amps could be used, just be aware that not all follow the same "pin out" configuration.



Here is the audio amplifier circuit I used with the isolation transformer interface. Using this circuit will affect the audio delivered to the sound card, and can be eliminated if not desired.

cuit wasn't available in the speaker enclosure, so I used a wall transformer. The problem with this is that the transformer was identified as AC INPUT 115 VAC, and 12 V DC OUT. This proved to be almost correct. The output was really 19 volts, far too much for the circuits. Simply adding the regulator brings the voltage down to an acceptable level. I've added a simple power supply circuit to the schematic should you need one.

Bandpass Filter

Switch S1 allows selection of the audio bandpass filter in to or out of the circuit. I used SPST (single pole single throw), but DPDT (double pole double throw) could have been used. The bandpass filter allows approximately two to three kilohertz of audio to pass. It narrows down the available audio for processing by the computer software. This "trims off" noise and unwanted, adjacent signals.

The circuit works fine as it is; the choice is yours whether to include the filter. The filter does affect the level of audio available for processing. As you become familiar with the operating characteristics of the software, you'll be able to overcome this problem. It's difficult to explain, but becomes readily apparent when put to use copying noisy RTTY signals.

I used a combination of ceramic capacitors and film capacitors for the audio bandpass filter. Using all film capacitors would have been a better choice. Lacking the needed values, I used what was available and it is functioning just fine. Someday I may change the ceramic ones, but I doubt it.

Tuning In

Once you've assembled the project and made connections to your equipment, some practice tuning and copying RTTY signals is next. The "tuning indicator" (right top corner of the screen presentation) is an invaluable tool. The two "peaks" of the received signal will be apparent. Use the "getting started" guide by AA5AU as a guide, and it won't be long before you're actually copying signals comfortably.

Some of the stations I've worked thus far are SP3GXH, I5DUK, HR2/LU1DY and K9IUQ on 20 meters. On 40 meters, I've worked K3MQ, J39BS, CO8LY, SV9CY, and YN2/EW1AR, just to name a few. RTTY stations gather in certain locations on each band. On 20 meters you'll find signals in the 14080 kHz area. On 40 they're in the 7080 kHz range. I'm using a vintage laptop, Pentium III with Windows98™ operating system for my RTTY adventures, so



I opted to use a recycled mobile speaker enclosure for my interface project. Operating space I have available is limited. The laptop screen shows a typical MMTTY signal. The top left corner is the "tuning indicator" (looks like a cross) and the next portion of the screen shows the two "peaks" and waterfall below. You will use these when tuning for stations.

having a super computer isn't required!

Another nice feature of this software is that you can create "canned" responses. That is to say you create "automatic" responses when you're ready to transmit. These can include your personal information such as name, location, equipment, and so forth. Many stations use this feature. It saves you from typing the same information over and over again. Logging, too, is almost automatic. You have the option of saving contact information in your computer with minimal effort. You really need to "practice" with some contacts (or even "make believe" contacts) to become familiar with all the options available.

Have fun! Build the interface and join in on the fun using RTTY. There are the usual awards available when working RTTY. A RTTY contest is something a person new to this mode has to experience for his or her self. The multitude of signals available during a contest can be unbelievable. By the way, this is where that bandpass

filter comes in mighty handy.

Happy building.

www.aa5au.com/gettingstarted/rtty_start1.htm Tutorial
www.arrrl.org RTTYinformation
<http://mmhamsoft.amateur-radio.ca/Soff-waredownload,etc>

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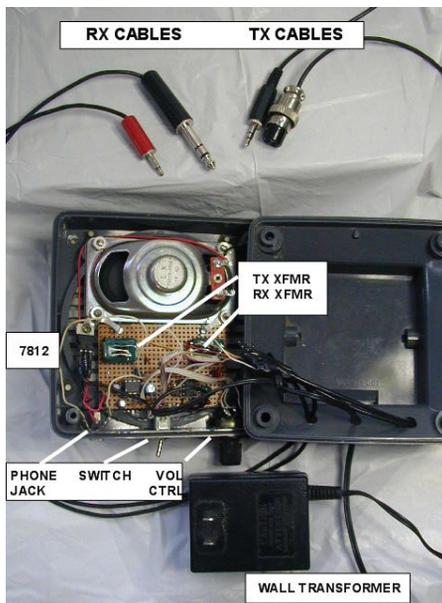
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The Best Just Got Better Uniden's BCD396XT

By Larry Van Horn, N5FPW

Bob Grove said the BCD396T handheld, "is the most advanced scanner ever designed." And when you looked at all the scanning capability built into that small package, no truer words were ever spoken. Now Uniden has released an updated version of the venerable 396 and it made a great scanner into a super scanner.

Case, Controls and the Antenna

The BCD396XT is a direct descendant of the popular BC396T handheld scanner. Many of the primary features found in the earlier unit apply to this new handheld.

The 396 case measures 2.40 (W) x 1.22 (D) x 5.35 (H) inches and weighs in at 9.6 ounces with batteries, and about four ounces without.

There is a multi-color backlight system for the 1-5/16 by 13/16-inch liquid crystal display.

There are four user-selectable menu options for display backlighting: backlight on for 10 or 30 seconds (push button selectable), squelch (backlight illuminates when the squelch opens and stays on for five seconds), keypress (backlight turns on when any key is pressed then stays on for 10 seconds), and infinite (backlight turns on when you press the multi-function power on/off key, then stays on until you press it again).

The screen backlight can be tied to a channel alert, so even though dark blue might not be good for normal viewing, it is useful to indicate a channel alert (the display briefly changes to the alert color, then reverts to the normal selected backlight color after the alert). Available LCD backlight colors include red, blue, magenta, green, white, yellow and cyan.

The keyboard backlight is not tied to the LCD backlight color selection; it is always white.

There is only one knob (scroll type) on the top of the unit that controls a variety of the scanner's functions depending on other controls being depressed. The multi-function scroll knob is used to set volume and squelch levels, adjust menu settings, enter text, change channels in the hold mode, resume scanning, and change display screens.

There are two push buttons on the side of the 396XT that perform the same operations as the buttons on the side of the 396T – function and menu selections. These controls are the

heart of the scanner's menu, display, and additional control functions in conjunction with keys on the front of the scanner.

The 396XT uses a flexible antenna with an SMA connector. They have included a BNC to SMA adapter for additional antenna connection options. Antenna jack impedance is 50 ohms.

It's what is under the hood that counts.

Given all of the recent concern over rebanding in the 800 MHz band, you won't have a problem with the 396XT. The memory unit can be re-flashed via your computer so it



MTRATING:43/4STARS



can handle any rebanding situation you might encounter.

Looking inside the radio, I found a world of scanning capability. Here are some of the features that BC396XT owners will be familiar with.

- APCO25 Digital audio decoding
- Adaptive digital threshold that automatically sets the digital decode threshold for APCO 25 systems. Our field test indicates that this unit is a substantial improvement in this regard over the 396T.
- TrunkTracker IV trunk tracker technology with control-channel only scanning and I-Call monitoring.
- Close call signal capture
- Supports step sizes of 5, 6.25, 7.5, 8.33, 10, 12.5, 15, 20, 25, 50 or 100 kHz
- Fire tone out alert
- Motorola control channel only trunking
- DCS/CTCSS/NAC rapid decode
- Scan and (selected) service searches. You won't have to select just one or the other.
- A frequency/ID auto store function that automatically stores frequencies from a service or limit search into a conventional system or store talk group IDs into a trunked system,
- 16 character text tagging for each system, group, channel, talkgroup, search range, and SAME group
- Compatible with the Uniden BC-RH96 remote head accessory.
- Analog and digital AGC functions.
- Quick search; 12 service searches (Public safety, news, ham radio, marine, railroad, air (military and civilian), CB radio, FRS/GMRS, racing, FM broadcast, and special itinerant; and custom search that lets you program up to 10 search ranges.
- SAME weather alert and weather priority
- Priority scan with priority plus.
- Signal strength display, battery level display on the LCD.
- LCD and keypad backlight
- Adjustable (0 to 5 seconds) scan delay
- Adjustable Hold (scan duration 0 to 255 seconds) per system, custom or service search
- Strong signal attenuation
- Upgradeable firmware
- Channel alert
- Independent alert tone volume lets you set the volume level of the following tones: Key Beep, Emergency Alert, Channel Alert, and Close Call Alert
- Repeater reverse
- Broadcast signal ignore while searching (TV and radio station frequencies, pagers, etc)
- Duplicate channel alert
- Key Lock
- PC Programming and control
- Wired cloning (will only clone to another BCD396XT)
- A battery saver mode

New Trunk Tracking Capability

The BCD396XT is a Trunk Tracker IV® model scanner. This lets the user follow unencrypted conversations on the following trunk radio systems: Motorola Type I; Motorola Type II; Motorola Type III Hybrid; Motorola Type II Smartnet; Motorola Type II Smartzone; Motorola Type II Smartzone Omnalink; Motorola Type II VOC; EDACS Standard (Wide); EDACS Standard Networked; EDACS Narrowband (Narrow); EDACS Narrowband Networked; EDACS SCAT; EDACS ESK (will not decode ProVoice); LTR Standard; and Project 25 Standard.

The 396XT will receive the following voice systems: Analog; Analog and APCO-25 Common Air Interface (P16); and APCO-25 Common Air Interface Exclusive (P25).

Trunk systems in VHF, UHF, the new 700 MHz public safety band, 800 MHz, and 900 MHz bands can be programmed. This includes trunk systems now being installed by the Department of Defense in the new 380-399.9 MHz LMR sub-band. The scanner can also scan both conventional and trunked systems at the same time.

In addition, the 396XT can monitor certain trunk systems using control channel trunking. If the scanner is set to scan trunk frequencies, the user can track the trunk system using only control channel data. You do not have to program all of the system's voice channel frequencies into memory in this mode as long as *all* possible control channels have been programmed into the scanner.

So What Has Been Added?

So is it worth upgrading from your BCD396T to a new BCD396XT? With the new feature set listed below, the answer to that question is a resounding "Yes!" There are a lot of new features incorporated into the 396XT, a lot of them based on feedback from owners of the 396T scanner.

The ability to manually select a specific programmed channel in the older Uniden dynamic allocation memory scanners was one of the biggest complaints by the old channel and bank scanner crowd. With this new system/channel number tagging feature in the 396XT, you now have rapid access to a specific system or channel. More information is available on this at <http://info.uniden.com/twiki/bin/view/UnidenMan4/NumberTags>

Intermediate Frequency Exchange changes the IF used for a selected scanner frequency to help avoid image and other mixer-product interference on that frequency.

A new band scope provides a graphic representation of signal activity on the display. You can get more information on this feature at <http://info.uniden.com/twiki/bin/view/UnidenMan4/BandScopeMode>

Quick-Access Search Keys – This scanner has three search keys that you can assign to a special search range. More information is available at <http://info.uniden.com/twiki/bin/view/UnidenMan4/SearchKeys>

This new scanner has support for P25

MTFIRSTLOOKRATING(0-10SCALE)

Audio Quality	9
Audio Levels	10
Backlight/Display	7
Battery Life	8
Ease of Use	8
<i>(programming is much easier with computer software)</i>	
Feature Set	9
Keyboard/Button/Control Layout.....	9
Overall Construction	9
Overall Reception	9
Owners Manual <i>media on which it is presented...</i>	5
<i>content.....</i>	8
Sensitivity.....	8
Selectivity.....	7

conventional channel monitoring that includes NAC and talk group ID user differentiation (P25 One-Frequency Trunk).

Another new feature is Control Channel Data Output that permits the analysis of control channel data without the need to perform invasive modifications to the scanner. You can now use software programs such as Unitrunker and Pro96Com to analyze or monitor trunk radio systems.

Private Systems lets you flag a system so that it cannot be read out of the scanner or modified. There is also a Key Safe mode that, once set, lets you hand the scanner to a novice user without fear that they will modify the programming in the unit.

Other new features include:
 NAC decoding of all P25 signals
 Ability to tag a channel as digital, analog or all
 Multi-site system support like its 996T cousin
 Close call temporary store (last 10 hits)
 GPS support for location-based scanning, location alerts, and cross-country navigation. (Note: The GPS unit is not provided and must be purchased separately)
 Independent GPS control of sites and channel groups
 Fire tone out search has a built-in frequency counter to display the received tones
 A temporary lockout feature
 Startup configurations. You can learn more about this feature at <http://info.uniden.com/twiki/bin/view/UnidenMan4/StartupKeys>
 Individual channel volume offset
 Priority ID scan on trunked radio systems
 Preemptive priority on Motorola analog systems
 Negative channel dropout delay (forced resume)
 P25 Low-Pass Filter – On some systems you can hear a tone that is an artifact of the 4.096 kHz sampling rate. Turning this filter effectively filters out the tone

What's in the box?

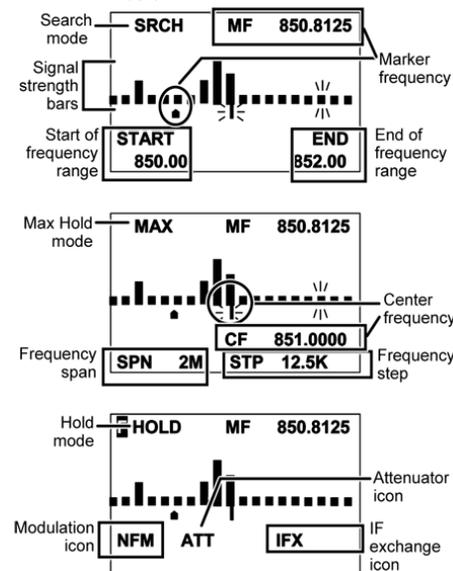
In addition to the BCD396T scanner, accessories included in the box include a PC interface cable, three "AA" 2250 mAH rechargeable batteries, wrist strap, AC adapter/charger, swivel belt clip, rubber duck antenna, BNC/SMA adapter, and an owners manual on CD.

Overall Rating and Final Thoughts

There is a lot to like about this handheld scanner. Even though the audio amplifier system supplies 90 mW less audio, Uniden has done some re-engineering and the audio is

definitely an improvement over the 396T. The 396T had a hissy and muddled sound, but I did not note that in the side by side test I conducted.

APCO25 digital audio was also a major complaint and Uniden seems to have put those problems behind them as well. The unit performed well on the four trunk/conventional systems on which I tested the unit. I did not hear any motorboating, and when compared with the 396T, I did note a definite reduction in watery audio. I also saw better rates and fewer drop outs on the 396XT.



The multi-colored backlight of the display is a neat feature, but, when using lower contrast settings, on most of the colors the display is hard to read. I would dump that lousy blue color in favor of a bright orange color as used on the BC-330 or BC-246.

There is no UASD programming software as of presstime, and without it, programming this scanner can be laborious. Based on our conversations with Uniden, UASD software will be available soon. In the meantime, I have published in our specifications table a couple of software packages that are available right now, including FreeScan. FreeScan works okay with the 396XT I tested, but I did get some timeouts from time to time.

On the VHF High bands and above, the receive sensitivity on our test unit was definitely better than the 396T and 996T units against which it was tested. No major intermodulation issues were noted at our rural location.

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Kevin Carey
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But there are a couple of negatives. There is NO printed manual. You do get a CD-ROM with the user manual and additional material on it, but you will have to have a computer in order to use it. There is an up-to-date manual online and changes are made to it as they are discovered by the Uniden team, but that also requires a computer and internet connection in order to use it.

I really think some sort of printed manual with at least the basics required to program the radio is important for users who do not have computer capability or access to one when they need to program the radio. Are you listening in Fort Worth?

As mentioned above, I still don't like the backlight colors. Fortunately there are more options on this unit than the cobalt blue colored screen on the 396T. The white color wasn't too bad, but it was a little hard on the eyes over time.

While not a Uniden problem, I could not get the 396XT to work with Unitrunker, even though that radio is listed as being supported. I understand that others have had the same problem.

Bottom line – Uniden has released yet another new scanner with cutting edge technology. No one in the scanner marketplace right now offers a scanner in handheld or base/mobile model that has the frequency coverage or the listening capability that this unit has.

The new Uniden BCD396XT handheld is truly another marvel of modern scanning technology. The best just got a quantum leap better.

The Uniden BCD396XT (SCN 53) is available from *Grove Enterprises* (1-800-438-8155 or <http://www.grove-enterprises.com>) for \$519.95 plus shipping and handling.

Table One: BCD396XT Frequency Coverage

Frequency (MHz)	Default Modulation	Step(kHz)
25.0000 – 27.9950	AM	5
28.0000 – 29.6800	NFM	20
29.7000 – 49.9900	NFM	10
50.0000 – 53.9800	NFM	20
54.0000 – 71.9500	WFM	50
72.0000 – 75.9950	FM	5
76.0000 – 87.9500	WFM	50
88.0000 – 107.9000	WFM	100
108.0000 – 136.9916	AM	8.33
137.0000 – 143.9875	NFM	12.5
144.0000 – 147.9950	NFM	5
148.0000 – 150.7875	NFM	12.5
150.8000 – 161.9950	NFM	5
162.0000 – 173.9875	NFM	12.5
174.0000 – 215.9500	WFM	50
216.0000 – 224.9800	NFM	20
225.0000 – 379.9750	AM	25
380.0000 – 512.0000	NFM	12.5
763.0000 – 805.99375	NFM	6.25
806.0000 – 960.0000	NFM	12.5
1240.0000 – 1300.0000	NFM	25

Note: The scanner's frequency coverage is not continuous and does not include the cellular telephone, UHF TV bands, or the 960-1240 MHz ranges.

Table Two: Scanner Specifications (Manufacturer Supplied)

Sensitivity (nominal) 12dB SINAD/Signal Noise Ratio (nominal)			
Sensitivity Ratio	Signal Noise MHz	Frequency Range	Mode
0.4 μ V	50 db	25 – 27.995	AM
0.3 μ V	41 db	28 – 53.98	NFM
0.5 μ V	55 db	54 – 71.95	WFM
0.2 μ V	47 db	72 – 75.995z	FM
0.4 μ V	60 db	76 – 107.9	WFM
0.3 μ V	50 db	108 – 136.9916	AM
0.3 μ V	41 db	137 – 173.9875	NFM
0.5 μ V	55 db	174 – 215.95	WFM
0.3 μ V	40 db	216 – 224.98	NFM
0.3 μ V	51 db	225 – 379.975	AM
0.3 μ V	40 db	380 – 512	NFM
0.3 μ V	41 db	763 – 960	NFM
0.5 μ V	37 db	1240 – 1300	NFM

Close Call Sensitivity (nominal)

350 μ V	VHF Low 1 Band
160 μ V	VHF Low 2 Band
70 μ V	Air Band
60 μ V	VHF High 1 Band
56 μ V	VHF High 2 Band
100 μ V	UHF Band
200 μ V	800 MHz and above

Heterodyne System (triple conversion)

1st Intermediate Frequency:	380.7 to 380.8 MHz/265.5 to 265.6 MHz
2nd Intermediate Frequency:	10.8 MHz
3rd Intermediate Frequency:	450 kHz

System Performance

Attenuation:	20 dB nominal
Audio Output Power:	310 mW nominal into a 24-ohm speaker and 20 mW nominal into a 32 ohm stereo headphone.
Scan Rate:	100 channels per second (conventional mode)
Search Rate:	300 steps per second (using 5 kHz steps)

Dynamic Memory Allocation

Systems:	500 maximum
Groups:	20 per system maximum
Site:	1,000 maximum (all), 256 per system
Channels:	25,000 maximum (40128 memory blocks)
Channels per trunked system:	500 maximum
Talkgroups per trunked system:	500 maximum
Channels per conventional system:	1,000 maximum
System Quick Key range:	0-99
Group Quick Key range:	0-9
Startup Keys:	10
System Number Tagging:	999
Channel Number Tagging:	999

External Jacks

Antenna Jack:	SMA Type
Phone Jack:	3.5 mm (1/8 inch) stereo type
DC Power Jack:	EIAJ type center positive
GPS/Remote interface jack:	Four pin mini type

Miscellaneous Specifications

Internal Speaker:	24-ohm, 0.8 Watts maximum (1.26 inches)
Power Requirements:	Three AA size rechargeable Ni-MH batteries (2250 mAh) included; three AA size alkaline batteries (not included)
AC Adapter:	6 Volts DC, 800 mA regulated (AD-1001)
Operating Temperature:	Nominal: -20°C to +60° (-4°F to +140°F)
Close Call:	-10°C to +60°C (+14°F to +140°F)
Size:	2.40 inches(wide) by 1.22 inches (deep) by 5.35 inches (high) without antenna
Weight:	0.37 lbs (without battery and antenna)
Remote Functions:	Direct PC control, database management and wired cloning
Display:	64 by 128 full dot matrix LCD with multi-color back light

Special Functions

Band Scope Function:	Frequency span 0.2 MHz To 500 MHz with 5 kHz to 100 kHz frequency steps
Two-Tone-Sequential:	250.0-3500.0 Hz, 0.1 Hz programmable steps
Weather alert:	1050 Hz tone system with NWR-SAME system (Warning/Watch/Statement alerts)

Supporting Software (at presstime)

Freescan	http://scannow.org/
ProScan (shareware, 30 day free demo)	www.proscan.org/

Note: Features, specifications, and availability of optional accessories are all subject to change without notice by the manufacturer. Review presented above was based on the test unit provided by the manufacturer.

- N020YN Scotia, NY
- N040CN Latham, NC
- N070EN Lincoln, NE
- N080DN Bismark, ND
- N060MN Santa Fe, NM
- N090VN Carson City, NV
- O050HN Columbus, OH
- O060KN Oklahoma City, OK
- O100RN Salem, OR
- P020RN San Juan, Puerto Rico
- P030AN Annville, PA
- R010IN Cranston, RI
- SO40CN Columbia, SC
- S080DN Rapid City, SD
- T040NN Nashville, TN
- T060XN Austin, TX
- U080TN Draper, UT
- V010TN Colchester, VT
- V020IN St Croix, US Virgin Islands
- V030AN Fort Pickett, VA
- W030VN Charleston, WV
- W050IN Madison, WI
- W080YN Cheyenne, WY
- W100AN Tacoma, WA

HQ703N National Guard Readiness Center (Arlington, VA)
 HQ701N National Guard Bureau HQ (Arlington, VA)

The participants in the network are also known to pass short text messages among each other using the AMD facility of ALE. Here are a few examples exchanges of both types of traffic:

[TO]HQ703N [LQA] MULTIPATH - SINAD 11 BER 02 [THIS IS]T040NN
 [TO]T040NN [LQA] MULTIPATH - SINAD 12 BER 00 [THIS IS]HQ703N

[TO]HQ703N [AMD] HOWDY FROM WYOMING PARDNER [THIS IS]W080YN

Is there more than just ALE?

What appears to have been missed by all the previous reports of the state HQ network, is that the ALE often triggers MIL-188-110A high-speed modem activity.

Having logged 110A modem activity from this network in the past, I noted that the initial traffic passed between the stations seemed to have elements in common with the Swiss Diplomatic Service's HF network. Spurred on by some success in unraveling the Swiss MFA traffic (see this column's edition in the MT April 2009 issue), I decided to look at this network in more detail.

Just like the Swiss MFA network, the majority of traffic is encrypted. However, there are some leaky parts of the system that reveal the sender and receiver of the high-speed traffic and the email addresses used by the underlying encrypted messaging software.

Here's a typical opening exchange between two stations after the ALE trigger, as viewed in 8 bit synchronous mode using the Hoka Code300-32 software.

DATA RATE 300 SHORT INTERLEAVER
 \\i:07QH010N8PN3NHA#A] v-
 [EOM]

DATA RATE 75 LONG INTERLEAVER
 \\i:807QH010V8AN3NTAA#i
 [EOM]

Reading backwards, you can see four letters of the ALE identifiers of the two stations involved: HQ07 and V010 after the opening "\i".

This same "header" scheme is preserved when the traffic proper starts:

DATA RATE 2400 LONG INTERLEAVER
 \\i:07QH010V8&N3NTA'-m±&ú]wmtuser@
 HQ703N.ngb.hf.army.mil±=
 =%Fwmtuser@V010TN.ngb.hf.army.
 milY#G•VkiçH"°F-Yg\$\$p2*&ç{ç[Acð7&iΣ
 etc
 [EOM]

Here you can clearly see the email addresses used by the stations, in this case the Readiness Center at Arlington and the Vermont HQ. The format of the addresses seems consistent across all stations:

wmtuser@ALEID.ngb.hf.army.mil

Some concentrated monitoring of a number of frequencies has revealed nothing more enlightening with the traffic between stations which, in general, seems fairly light at no more than a few messages between Arlington and outstations each day. Perhaps some more interesting things will appear during the next emergency or training exercise.

If you have a Windows PC, try the free RFSM2400 software (See Resources) and decode some of the high-speed modem traffic yourself.

That's all for this month. See you next time.

RESOURCES

RFSM2400 MIL-188-110A Software
rfsm2400.radioscanner.ru

Uniden BCD396XT

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Monitoring Times, June 2009

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Two Free and Useful Radio Tower Applications

Every day I peruse a myriad of technical publications and websites for possible material for this column. Many times I find applications that would be interesting to radio people, but would not fill a whole column. This month we will fill the column with two free, interesting, and potentially useful radio applications.

As usual, we will be using our Radio Friendly PC (RFPC). The RFPC has an Atom 230 1.60 GHz processor running Windows XP Home Edition SP3, with a bus speed of 533 MHz, 160G SATA hard drive, 2 Gig DDR2 RAM, DVD/CD writable drive, Realtek ALC662 audio sound ports and a video port using the Intel Graphics Media Accelerator 950. The RFPC is available at <http://hcss.webs.com/>. OK, let's get going.

FCCinfo: Seeing is Believing

It has been over two decades since Grove released their first Frequency Database Program. Since its inception in 1982 Grove has added new features with each new version. I distinctly remember the year they added station mapping to their line-up of features. That was quite advanced for radio database programs. In fact I believe it was a world "first". Clicking on a station entry displayed a map with the station's exact location. That was the 20th century.

Now, in 2009, a free program comes along that displays the location of all stations (at least all stations found in the FCC database) on a

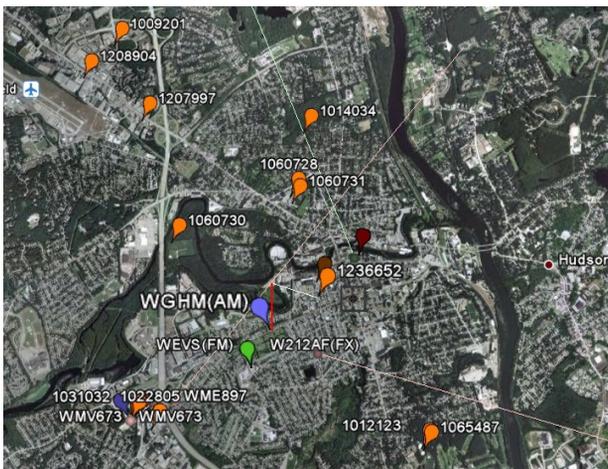


Figure 1 – FCCinfo displaying AM, FM, TV and Broadcast microwave towers and stations located around the city of Nashua, New Hampshire

high-resolution satellite Earth image map. Very cool! This program from **FCCinfo.com** is an add-on to the popular Google Earth program.

Clicking on a station's name brings up all the FCC file data for the station. Strictly speaking, since FCC info is only geographically driven, it is not a true frequency database.

If you have not yet downloaded and installed the free Google Earth, do yourself a favor and do it. You can find it at www.earth.google.com. Once installed and operational, follow the eight (actually only six) instruction steps at www.fccinfo.com/fccinfo_google_earth.php.

Look in the Google Earth "Places" menu to make sure you now have a place folder named "FCCInfo". Put a check in this box. That's it. You're ready to explore.

What Can It Do?

Figure 1 shows all the AM, FM, TV and Broadcast Microwave towers and stations located around the city of Nashua, New Hampshire. In addition, a fifth category, Antenna Structure Registration (ASR) can be displayed. This shows registered tower information, some of which have multiple antenna arrays. Each of the five different types of stations is color coded for easy identification.

Using Google Earth's "Places" window, the user can select which sub-types of stations are to be displayed. For broadcast microwave stations, the choices include UHF, 950 MHz, 2, 2.5, 6.5, 7, 13 and 18 GHz stations. For TV, the choices are analog, digital and low power, and for FM, it's FM stations and FM translators.

Take a look at WGHM (AM) located at the lower left of Figure 1. If we left click on its name, an information box, shown in Figure 2, displays detailed information about WGHM. Here we can see that this location has one tower and a 0.91 kW AM (medium wave) transmitter. This box also contains four hyperlinks that display just about everything about WSMN, except the

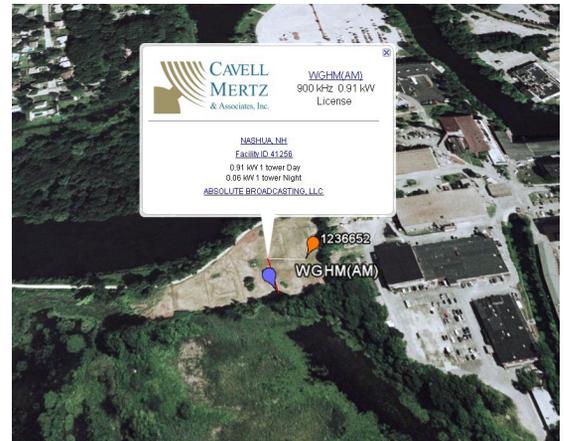


Figure 2 – The first screen of station details... Keep clicking for much, more

owner's bank account!

The quality and quantity of detailed information is impressive and includes: frequency, power day, power night, antenna pattern type, number of towers, signal field strength, station schedule, station class, exact station coordinates, antenna (phasing-orientation-electrical height), diagram of tower array orientation and pattern, licensee information, associated microwave licenses, and much more. Many of these are hyperlinks which lead to even higher degrees of station detail. For example, clicking on the call sign digs into the FCC database and shows a listing of all the AM stations in Nashua.

The Provider

The large name at the top of the box, "Cavell Mertz" is the gracious provider of FCCinfo, free to private users. Their website is www.cavellmertz.com/.

If you want to "see" the details of stations and radio towers in any USA location, this is the program for you. Just for fun, take a look at all the stations that reside on New York's Empire State Building. Now that's tech art!

ZIPSignal: How Strong is That Station?

Would you like to have software that gives you the signal strength of commercial AM and FM stations at your USA monitoring station? That could be quite helpful. But can it be customized to a specific ZIP Code location? Will it give me the signal strengths of border stations in Canada and Mexico?

According to our next program's website,

Signal in dBu	mV/m	Call Sign	Principal City
111.6	381.54	WEVS	Nashua
98.9	88.20	WGHM	NASHUA
95.1	57.12	WSANN-N	NASHUA
95.1	57.12	WSANN	NASHUA
87.1	22.62	WGHM-N	NASHUA
86.4	20.90	W212AF	Nashua
82.9	13.98	WFNQ	Nashua
75.5	5.99	WZID	Manchester
75.4	5.88	WGIR-FM	Manchester
75.1	5.72	WCRB	Lowell
73.4	4.69	WFEE-N	MANCHESTER
73.1	4.51	WFEE	MANCHESTER
72.4	4.18	WCAP	LOWELL
71.6	3.81	WXRV	Andover
71.5	3.74	WRKO-N	BOSTON
71.3	3.66	WRKO	BOSTON
71.2	3.62	WDER	DERRY
69.0	2.83	WXLO	Fitchburg
68.1	2.54	WCCM	SALEM

Figure 3 – Zip-Signal displaying the first strongest nineteen stations we could monitor at our Nashua, NH QTH.

the answer to all these questions is ... yes! When I tell you that the program is free (for private use), I'll bet you cannot resist giving it a try.

Zip-Signal is another on-line application that is incredibly easy to use. It can be found at www.v-soft.com/ZipSignal/default.htm.

Go to the bottom of the page and select "Click Here to enter a zip code." Enter the ZIP Code of your location of interest in the box that appears. To get a more exact location, you can use a nine-digit ZIP Code, the usual first five digits and then four more localizing digits. This will define your location more accurately. If you don't know the full nine-digit zip code for your desired location, no problem. The first screen of Zip-Signal has a link to the United States Postal Service website which can provide it. However, some locations have only five digits assigned to them.

Give It a Try

We used Nashua, New Hampshire for our example in FCCInfo, above. Let's stay with that location, zip code 03064. Figure 3 shows the first nineteen stations of the 38 stations that

Zip Code	Signal in dBu	mV/m
03061	105.1	180.19
03060	99.9	99.44
03064	98.9	88.20
03063	91.4	37.36
03062	87.3	23.26
03051	85.6	18.96
03049	75.4	5.91
01827	73.1	4.51
03052	72.6	4.26
01879	71.6	3.79
03054	70.9	3.52
03076	68.8	2.74
01463	67.1	2.26
03031	65.9	1.97
03087	65.5	1.88
03033	65.3	1.84
03053	65.3	1.85
01863	65.3	1.85
01826	64.8	1.74

Figure 4 - WGHM's signal strength at various ZIP Code locations

result. Starting from the left, the first two columns represent the stations' signal strength, descending from the station with the strongest signal.

Why two columns? Both measure the same parameter. The first column uses the relative signal strength units of decibels, dB. The second column is the signal's field strength expressed in millivolts per meter, mV/m. For these columns, the greater the number, the stronger the signal.

The third column displays the call letters of the particular station. Notice that our old friend WGHM is listed as the second strongest station with an 89.9 dB signal strength. The call letters are hyperlinks to the stations' website, if one exists. And, finally, the last column is the location of the station.

Another Way

Zip-Signal can also be used in a reverse manner. If you are interested in how the signal strength of a specific station varies at various zip codes, click on "Click here to look up zip code signal locations by station call sign." On the next screen enter the call sign of the station of interest. For nighttime AM signal strengths, add an "-N" after the call letters. This will take into account night power reduction mandated by the FCC for some AM stations. For FM stations, add "-FM" to the station's call letters.

In Figure 4 we can see how WGHM's signal strength varies with ZIP Code location. Figure 4 only shows a small part of the actual display. Four more columns are displayed: station's city, state and frequency. The last column, Facility ID, is a hyperlink, which brings the user to a screen with very detailed station information pulled from the FCC database.

How Well Does It Work?

Zip-Signal is a good tool for finding local AM and FM stations at a given location. It also works well for finding the signal strength of a given station at locations around the station. But it does have its limitations.

Its biggest limitation is its 50 dB cut off. This means once the program's routine predicts signal strengths below 50 dB, it no longer displays these stations on its output list. This makes this feature of Zip-Signal useless for "DXing" where weak signals are our objective.

I noticed another quirk of Zip-Signal. Let's say we are checking a very strong station that is located in New York City, for example, WCBS. New Jersey is actually within sight of the station, but when we use Zip-Signal to find WCBS' signal strength in surrounding zip codes, only New York zip codes are listed.

In fact, if you look at a map, Weehawken, New Jersey is much closer to the stations than many of the New York zip codes on Zip-Signal's resulting list. Notice not one New Jersey zip code is listed. Therefore it appears that the program will only list zip codes which are in the same state as the station.

Tweaks

I'll bet that with very little program modifi-

cation (or perhaps none), some of the programs' parameters could be made user programmable. For example, wouldn't be nice if we could reduce the 50 dB signal strength display cutoff? It might take a really long time to generate a huge list. But the results would be worth waiting for to radio monitors.

In a similar manner, if the user were given a choice of which states' ZIP Codes to display, the table in Figure 4 would list more than New York ZIP Codes.

These two program modifications would make this interesting, good program into a great monitoring application. How about it, VSoft Communications? Can you give the user control of program variables?

That's pretty ungrateful of me: VSoft provides this useful program gratis, and I complain... My apologies to VSoft. But with some very simple modifications your program, Zip-Signal, could become the quintessential tool for all AM and FM commercial broadcast monitors in the USA! Give it some consideration.

Here Comes Summer

So there you have it. Two free radio-related programs that you might find interesting and useful. With the on-set of summer, get outside and do some local fieldwork. Find some antennas and stations. Now armed with these programs you'll be in the know.

'Til next time ...enjoy!

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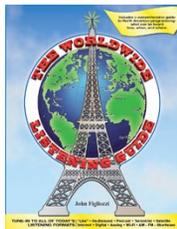
Tell them you saw it in *Monitoring Times*

The Worldwide Listening Guide by John Figliozzi

Listeners seeking an alternative to repetitive programming on shortwave, may find an alternative source in *The Worldwide Listening Guide* (WWLG).

Modeled on the author's popular *Worldwide Shortwave Listening Guide*, this new 112 page book, published in December 2008, explains radio listening using all of today's delivery format, such as on-demand, podcast, terrestrial, satellite, internet, digital, analog, AM, FM, shortwave and WiFi.

The introductory section explains these delivery methods of radio and the devices used for broadcast across the globe during a 24 hour period. This new book also shows the reader how to access all of these delivery methods of audio using different delivery platforms.



Program listings are first presented by UTC time, station, days of broadcast, program type, frequency and web address. The "How to Use" section explains the contents of each of the columns, and a station identification list identifies station call letters, full station name and country of origin. The second half of the book classifies the programs into areas of specific interest, such as arts, music, news, documentaries, etc.. The WWLG focuses on listening to, from, and in North America. The shortwave listings (which are all analog), cover broadcasts beamed to North America from all over the world.

The Worldwide Listening Guide is wire-bound to open in a flat, has an easy-to-use format. You can order it online from The W5YI Group at www.w5yi.org (800-669-9594) or Universal Radio www.universal-radio.com (800-431-3939) for \$ 24.95 plus shipping.

New iPhone App Finds DX Openings

ARRL LifeMember, Danny Goodman (AE9F), announced the release of BeaconAid-HF, a \$2.99 application for the iPhone and iPod touch, available now on Apple's iTunes App Store. The program helps HF amateur radio operators and shortwave listeners take full advantage of the NCDXF/IARU global beacon network to determine actual propagation conditions.

"I use the beacons all the time," said DXer and contester Goodman, "but I always have to look up a table and calculate which station is supposed to be transmitting its 10-second signal on any given band at any given moment. BeaconAid-HF shows me exactly where on the clock and VFO the beacons are supposed to be."

The program provides two different views of the changing data, depending on whether the user is interested in seeing to where a particular band is open, or which band might be open to a specific

beacon location. "Within three minutes sitting with BeaconAid-HF in front of your receiver, you know how 20 through 10 meters are," Goodman added.

In addition to showing current beacon schedules, BeaconAid-HF provides a gateway to viewing graphical charts posted by live beacon monitor stations around the world. A list of monitors is presented with the one closest to the user in the top position. Availability of monitor reports is shown in real time (WiFi, 3G, or Edge internet connectivity is required). The current solar-terrestrial indices (solar flux, A-index, and K-index) are also displayed with the monitor pages.

Each time a beacon station shows itself in the program, the user sees the distance from the user, short-path and long-path beam headings, and the operational status of the beacon. BeaconAid-HF users receive these automatic updates directly from Goodman's server at no additional charge.

You can get more information or order this iPhone app at the iTunes App Store <http://itunes.apple.com/WebObjects/MZStore.woa/wa/viewSoftware?id=307460004>. You can also get more information on the author's website at <http://danny.com/iapps> or on the application webpage at <http://danny.com/iapps/BeaconAid.html>.



Sold On Radio

By Jim Cox

Jim Cox is a retired college professor and an award-winning author. He has written definitive books on radio soap opera, radio sitcoms, radio music, radio audience participation shows, and several other books in that genre. One of his latest is *Sold On Radio, Advertisers in the Golden Age of Broadcasting*.

We all know that advertising is not unique to radio, but radio and advertising have cut quite a cultural path, in tandem, since the first radio commercial which occurred soon after the beginning of radio programming in the 1920s.

Although at one time, some government officials and some radio pioneers felt that radio broadcasting in the United States should be above commercialism, reality soon prevailed. Although we have all been irritated by radio commercials at one time or another, I think the compromise in this country has worked well enough. Alternatives include annual receiver licenses, as in the United Kingdom, fund drives as practiced by most educational stations in this country, or government sponsorship or control *a la* Radio Havana Cuba and China Radio International and all the stations in those countries.

Jim's book summarizes advertising and marketing history before radio, and segues into

the radio advertising record during the years of the Golden Age of radio, beginning in the twenties and continuing, to some degree, up to the sixties. The roles of sponsors, advertising agencies, networks, stations, program personalities, and listener-consumers are explored.

The author's love of radio data is almost as great as it is with some of us. He met my needs in this book by covering the history of the 24 largest sponsor companies of radio network programming, size determined by amount of time purchased. Eight of those sponsors still exist as independent companies – Proctor & Gamble, for example. Eight operate under different names than they did during the radio era covered. Two are still in business under the same name now as then, but are subsidiaries of other companies.

Six of the 24 largest advertisers no longer exist in any form, although in some cases one or more of their product lines may still be around as a shadow of the company that they used to belong to. Somewhat interestingly, three of the six survivors are tobacco companies.

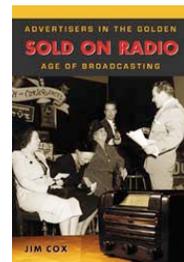
For these 24 major sponsors, virtually every network program sponsored by them is listed by name, years broadcast, network, and specific products paying for that program. For example, the Proctor & Gamble segment lists 87 programs – an amazing number even for those who know all about soap operas and P & G products. The history of the companies, before the Golden Age of radio and since, is reported, as well as other interesting bits of data, such as which sponsors seemed to favor certain networks or shun certain networks.

In addition to the 24 major sponsors, an appendix devotes a paragraph to each of 100 other advertisers, describing type of company, its brand names, and significant radio programs sponsored. Another interesting appendix is a glossary of advertising and broadcasting jargon.

This was an enjoyable book for this old time radio fan, and if you are interested in OTR or some popular cultural history of the middle of the last century in this country, you will find it diverting, if not fascinating.

This 322-page book is a McFarland publication. The publisher can be found at www.mcfarlandpub.com and their order line is 800-253-2187. *Sold on Radio* sells for \$39.95 plus shipping.

– Review by Andy Ooms, Pine, Arizona oomspine@msn.com



Books and equipment for announcement or review should be sent to What's New, c/o Monitoring Times, 7540 Highway 64 West, Brasstown, NC 28902. Press releases may be faxed to 828-837-2216 or emailed to Larry Van Horn, larryvanhorn@monitoringtimes.com

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 Size: 6¹⁵/₁₆" Wide x 6⁹/₁₆" Deep x 2³/₈" High

Frequency Coverage: 25.000-512.000 MHz., 806.000-956.000 MHz. (excluding the cellular & UHF TV band), 1,240.000-1,300.000 MHz.

When you buy your Bearcat 796DGV TrunkTracker package deal from Communications Electronics, you get more. The GV means "Great Value." With your BC796DGV scanner purchase, you also get a **free deluxe scanner headset** designed for home or race track use. Headset features independent volume controls and 3.5 mm gold right angle plug. The 1,000 channel Bearcat 796DGV is packed with features to track Motorola Type I/II/III Hybrid, EDACS, LTR Analog Trunk Systems and Motorola APCO 25 Phase I digital scanner including 9,600 Baud C4FM and CQPSK. Also features control channel only mode to allow you to automatically trunk many systems by simply programming the control channel, S.A.M.E. weather alert, full-frequency display and backlit controls, built-in CTCSS/DCS to assign analog and digital subaudible tone codes to a specific frequency in memory, PC Control and programming with RS232C 9 pin port (cable not supplied), Beep Alert, Record function, VFO control, menu-driven design, total channel control and much more. Our CEI package deal includes telescopic antenna, AC adapter, cigarette lighter cord, DC cord, mobile mounting bracket with screws, owner's manual, trunking frequency guide and one-year limited Uniden factory warranty. For maximum scanning enjoyment, order magnetic mount antenna part number ANTMMBNC for \$29.95. For complete details, download the owners manual from the www.usascan.com web site. For fastest delivery, order on-line at www.usascan.com.

Bearcat® BCT8 Trunk Tracker III

Manufacturer suggested list price \$299.95
CEI Special Price \$169.95
 250 Channels • 5 banks • PC Programmable
 Size: 7.06" Wide x 6.10" Deep x 2.44" High

Frequency Coverage: 25.0000-54.0000 MHz., 108.0000-174.0000 MHz., 400.0000-512.0000 MHz., 806.0000-823.9950 MHz., 849.0125-868.9950 MHz., 894.0125-956.0000 MHz.

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



Bearcat® BCD396T Trunk Tracker IV

Suggested list price \$799.95/CEI price \$519.95
 APCO 25 9,600 baud compact digital ready handheld TrunkTracker IV scanner featuring Fire Tone Out Paging, Close Call and Dynamically Allocated Channel Memory (up to 6,000 channels), SAME Weather Alert, CTCSS/DCS, Alpha Tagging.
 Size: 2.40" Wide x 1.22" Deep x 5.35" High

Frequency Coverage:

25.0000-512.0000 MHz., 764.0000-775.9875 MHz., 794.0000-823.9875 MHz., 849.0125-868.8765 MHz., 894.0125-956.0000 MHz., 1240.0000 MHz.-1300.0000 MHz.

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



Bearcat® BC246T Trunk Tracker III

Suggested list price \$399.95/CEI price \$214.95
 Compact professional handheld TrunkTracker III scanner featuring Close Call and Dynamically Allocated Channel Memory (up to 2,500 channels), SAME Weather Alert, CTCSS/DCS, Alpha Tagging.
 Size: 2.72" Wide x 1.26" Deep x 4.6" High

Frequency Coverage:

25.0000-54.0000 MHz., 108.0000-174.0000 MHz., 216.0000-224.9800 MHz., 400.0000-512.0000 MHz., 806.0000-823.9875 MHz., 849.0125-868.9875 MHz., 894.0125-956.0000 MHz., 1240.0000 MHz.-1300.0000 MHz.

The handheld BC246T TrunkTracker scanner has so many features, we recommend you visit our web site at www.usascan.com and download the free owner's manual. Popular features include **Close Call Radio Frequency Capture** - Bearcat exclusive technology locks onto nearby radio transmissions, even if you haven't programmed anything into your scanner. **Dynamically Allocated Channel Memory** - Organize channels any way you want, using Uniden's exclusive dynamic memory management system. 1,600 channels are typical but **over 2,500 channels are possible** depending on the scanner features used. You can also easily determine how much memory is used. **Preprogrammed Service Search (10)** - Makes it easy to find interesting frequencies used by public safety, news media TV broadcast audio, Amateur (ham) radio, CB radio, Family Radio Service, special low power, railroad, aircraft, marine, racing and weather frequencies. **Quick Keys** - allow you to select systems and groups by pressing a single key. **Text Tagging** - Name each system, group, channel, talk group

ID, custom search range, and S.A.M.E. group using 16 characters per name. **Memory Backup** - When power is lost or disconnected, your BC246T retains the frequencies that were programmed in memory. **Unique Data Skip** - Allows the BC246T to skip over unwanted data transmissions and birds. **Attenuator** - You can set the BC246T attenuator to reduce the input strength of strong signals by about 18 dB. **Duplicate Frequency Alert** - Alerts you if you try to enter a duplicate name or frequency already stored in the scanner. **22 Bands** - with aircraft and 800 MHz. The BC246T comes with AC adapter, 2 AA 1,800 mAh nickel metal hydride batteries, belt clip, flexible rubber antenna, wrist strap, RS232C cable, Trunk Tracker frequency guide, owner's manual and one year limited Uniden warranty. For more fun, order our optional deluxe racing headset part #HF24RS for \$29.95. Order now at www.usascan.com or call 1-800-USA-SCAN.



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