

Scanning -- Shortwave -- Satellites -- Ham Radio -- Computers



# Monitoring Times

A Publication of Grove Enterprises

Volume 23, No. 3  
March 2004

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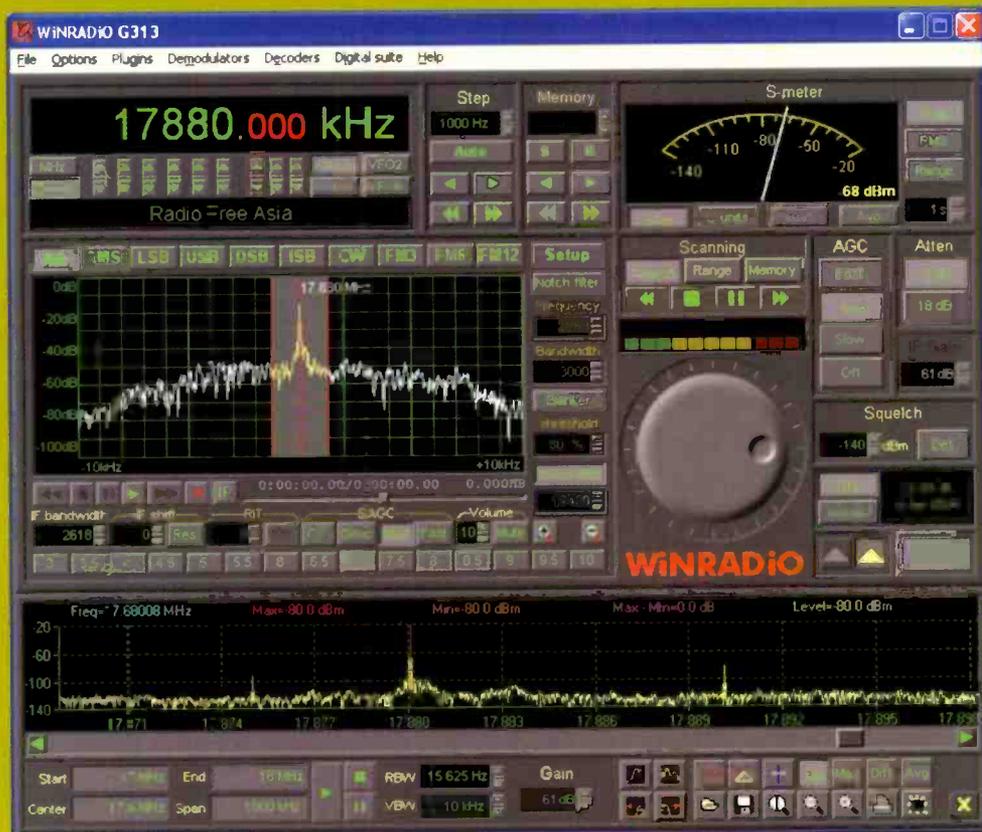
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Sensitivity:	0.25 $\mu$ V (A <sub>W</sub> , 10dB S/N)
S-meter sensitivity:	0.1 $\mu$ V





Vol. 23, No. 3 March 2004



*Cover Story*

**On Scene  
Monitoring at  
Air Shows**

by Ken Windyka

Air shows provide excitement and variety for young and old alike. An air show may range from a small exhibition with limited aerial performers and static aircraft displays to a large military base air show or open house with aerial performers plus large static displays of military and civilian aircraft, including World War II "war bird" displays.

The scanner hobbyist has a very distinct advantage over the general public at air shows. Not only can he see the action, but he can hear the radio transmissions directly related to the aerial performance, as well as the various support radio communications for the entire air show. Story starts on page 12.

*On our Cover:* photos by Kevin Burke,  
pho:oz01@netzero.com

**Dayton's Biggest and Best ..... 16**

By Kevin Burke

Last year the author attended one of the biggest airshows ever held at Dayton International Airport, near Wright Patterson Air Force Base. Here's a photoplay of the action and his impressions. This could be you, watching the action this summer!

**Radio France International ..... 19**

By Luc Gougeon

RFI is the voice of France abroad, directed toward expatriates, former colonies, and French-speakers worldwide. RFI also broadcasts in 19 other languages, primarily directed toward Africa and the Middle East. A station that is always open to new ideas, Radio France finds itself exploring new methods of transmitting while still dependent on analog technology. In this tour of RFI headquarters, the author finds RFI friendly, welcoming, and a station one should keep one's eye on for the future.

**Is It Broadcasting or Datacasting? ..... 22**

By D Prabakaran

In the digital world, broadcasting, communications, data, and video can make use of the same wires, optic fiber, or radio carrier. Content is not dependent on the media, and consumers have a variety of media options for the same content. In the new world of Digital Audio Broadcasting (DAB), there are two standardized modes – Eureka 147 and IBOC. The author explains the differences and strong points of each system and their basics.

**Sunday and the Philco ..... 24**

By Greg Petro

In this word picture we are taken back into our childhood when the world of grown-ups was somehow mysterious and intimidating – and a memory of being invited in, briefly, over a radio program.

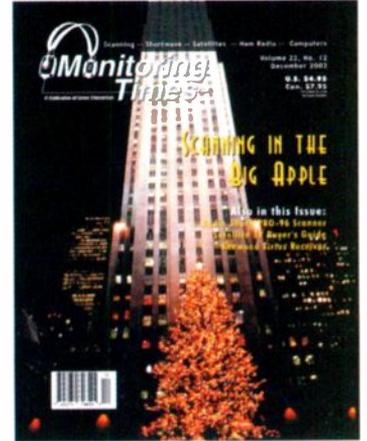
**Monitoring Military Flight Demonstration Groups..64**

Milcom's annual frequency, equipment, and schedule column. Here's where you get the frequencies to go with the great pictures in our feature stories.

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**MONITORING TIMES**  
(ISSN: 0889-5341;  
Publishers Mail  
Agreement #1253492)  
is published monthly  
by Grove Enterprises,  
Inc., Brasstown, North  
Carolina, USA.

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Periodicals postage paid at Brasstown, NC,  
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Brasstown, NC 28902-0098  
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Internet Address: [www.grove-ent.com](http://www.grove-ent.com) or  
e-mail: [mt@grove-ent.com](mailto:mt@grove-ent.com)  
Editorial e-mail: [editor@monitoringtimes.com](mailto:editor@monitoringtimes.com)  
Subscriptions: [order@grove-ent.com](mailto:order@grove-ent.com)

Subscription Rates: \$28.95 in US; \$39.50  
Canada; and \$58.50 foreign elsewhere,  
US funds. Label indicates last issue of  
subscription. **See page 91 for sub-  
scription information.**

Postmaster:  
Send address changes to *Monitoring Times*,  
7540 Highway 64 West, Brasstown, NC  
28902-0098.

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## Reviews:

Grundig's new **YB-550PE** is an attractive  
addition to the versatile Yacht Boy line, combin-  
ing an AM/FM and shortwave receiver in a light-  
weight, compact radio. Reviewer Gayle Van Horn  
discovered surprisingly good reception on all  
bands for an affordable portable (p82).

The **Sounds Sweet** speaker makes a lot of  
claims about its performance as an accessory  
speaker. Bob Grove puts it through its paces  
and compares performance to hype – and also  
compares it to a speaker half the price. **Sounds  
Sweet** comes off very well in the comparison –  
depending on what kind of listening you want to  
do and where (p.82).

A second shortwave radio reviewed this  
month is **Kaito's KA1102** portable, multiband,  
dual-conversion radio. Bob Grove checks this

one out and finds it equally impressive, with  
everything you could want in a "full-featured"  
shortwave portable for under \$100 (p.83).

John Catalano is flying high with AirNav's  
new **ACARS Decoder 2** – one of the best  
ACARS programs he has used (p.80).

Here's a great gadget – **PC NoteTaker** from  
Pegasus America is designed to quickly capture  
handwritten notes and drawings and make them  
instantly accessible on your personal computer.  
Don't believe it? Check out the Gadget Guy on  
page 86.

In addition to some useful construction  
projects, **Scanning Equipment** features a reader's  
real-world evaluation of the **Radio Shack PRO-  
96** versus equivalent scanners (p.79).

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# THE VERY BEST IN SHORTWAVE RADIOS



## YB 400PE AM/FM/Shortwave Radio

This high-performance PLL synthesized, dual-conversion YB 400PE receiver pulls in AM, FM-Stereo, Shortwave, and Longwave, including continuous coverage from 520-30,000 KHz. Even Ham radio two-way communications can be heard using the SSB circuitry. Its highly sensitive auto-tuning system stops even on weak stations within the international Shortwave broadcast bands. Its 40 programmable memory presets allow quick, easy access to your favorite stations. **Key features include:**

- Easy tuning with direct frequency entry, up/down buttons, and auto-scan
- Multifunction LCD displays time, frequency, band, alarm wake time, and sleep timer
- Sleep timer, dual clocks, and dual alarm modes wake you with beeper or radio play
- Built-in antennas for complete portability and socket for supplementary Shortwave antennas
- Includes AC adaptor, earphones, carrying pouch, supplementary Shortwave wire antenna, and batteries

**\$149.95**



## YB 550PE AM/FM/Shortwave Radio

Unique features define the model YB 550PE, such as 200 randomly programmable memory presets with user-defined memory page customizing, digital fine-tuning control, and favorite station wake-up memory. Through its PLL synthesized digital tuner, receive AM, FM-Stereo, and Shortwave with excellent sensitivity and selectivity. Enjoy the entire Shortwave spectrum that includes all 14 international broadcast bands and continuous Shortwave coverage of 520-29,999 KHz. Its auto-tuning system stops even on weak stations within the international Shortwave spectrum, or with the direct frequency entry system, go instantly to any frequency in its tuning range. **Key features include:**

- Signal strength and battery power level indicators
- Digital dock with selectable 12/24 hour dock display format
- LCD with display light that shows simultaneous display of frequency and clock
- Alarm with snooze feature and 10-90 minute sleep timer
- Includes built-in antennas, sockets for supplementary Shortwave and FM antennas, earphones, and optional AC adaptor

**\$99.95**



## S350 AM/FM/Shortwave Radio

Incorporating a sensitive, high-performance analog tuner with digital frequency readout, the S350 receives AM, FM-Stereo, and continuous Shortwave coverage of 3,000 to 28,000 KHz, including all 14 international broadcast bands. Its classic analog tuning knob with superimposed fine-tuning control makes it a pleasure to operate, and the variable RF gain control, wide/narrow bandwidth selector and low pass filter give you complete control over incoming signals. Operates on 4 'D' batteries for long battery life. **Key features include:**

- Multifunction LCD shows digital frequency, clock, and more
- Alarm and 1-90 minute sleep timer
- Variable, independent bass and treble controls
- Left/right line-level outputs (stereo in FM)
- Includes built-in antennas, sockets for supplementary Shortwave and FM antennas, convertible nylon handle/carrying strap, earphones, and optional AC adaptor

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## FR200 AM/FM/Shortwave Emergency Radio

Requiring no external power source, the FR200 is a versatile multi-purpose tool for keeping informed, entertained, and safe. Combining AM/FM/Shortwave radio and flashlight in one, the FR200 operates without batteries – powered by its built-in hand-crank generator – allowing you to listen to news, music, and international programming from anywhere, including places where power is a problem. **Key features include:**

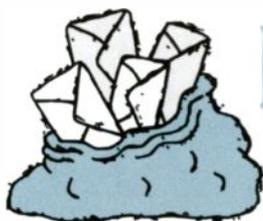
- AM/FM/Shortwave Tuning (SW1, 3.2-7.6MHz; SW2, 9.2-22MHz)
- Hand-crank power generator recharges internal Ni-MH battery
- Built-in flashlight perfect for emergencies or camping
- Splash-proof ABS cabinet withstands your adventures and abuse
- Can also operate on 3 AA batteries or optional AC adaptor

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# LETTERS TO THE EDITOR

## Radio Frustrations

In response to the January *Communications* column item entitled "Firefighting Radio Frustrations," we received the following response from Bob Studer, which seems particularly appropriate in light of this month's *Closing Comments* on interoperability.

"I find this article very ironic in that, at every major incident/disaster, the same problems have occurred with communications [or lack thereof] on a predicted basis. This occurs when agencies from different sectors and localities of government are not able to communicate with each other. It occurred at hurricane Andrew, the Oklahoma City incident, and the World Trade Center, to mention a few. Then after the fact, there are meetings after meetings to try to figure out what happened and attempt to fix the problem.

"One would think that by now, the techs and experts would have solved the problem, but I will guarantee that when the next incident occurs, it will be a mirror image of the past. Fact: every solution breeds a new problem, and can anyone dare imagine what a mess a statewide or regional incident or disaster would become?"

"Problems are: lack of common sense, backup equipment and resources, and long term planning; each agency being self-centered to their own needs, and sales people not considering the big picture. Interesting how all the latest high tech systems operate just fine on a regular daily

basis for local emergencies, but when subjected to a need beyond that, the sales people will say that, 'the system was not designed and or intended for this application.' Excuse me, but isn't that what a reliable system should be designed for?"

"It is ludicrous to believe that local, county, state and federal agencies will ever be capable of communications to satisfaction, and the general public will once again be duped. However, most could care less: just respond and take care of our needs when an emergency occurs. In my humble opinion, with trunked systems relying on computers, repeaters, and towers and with emergency power sources that are often not checked [on schedule] for backup, we have set ourselves up for failure. We have come to rely on the latest unreliable systems by the manufacturers and sales people.

"I have been around the emergency services before radios and incident command systems were in use or even thought of, and I wonder if anyone has ever considered how fires and incidents were handled. – prior to radio communications? They did it with the use of common sense, obviously uncommon today, and good leadership...not from [behind a desk] management. Maybe some tried and true evolutions should be part of the 'mock incident' training – of course 'just in case' the high-tech systems should fail – next time. This is a good example why the 'tried and true' Amateur Radio Service

is and always will be there when the chips are down next time. Just hide 'n watch....

– Bob Studer - N5VMP, Arlington, TX

## Streaming Scanners

"I'm a subscriber and have been for many years. I always look forward to and enjoy each new monthly issue! You all are doing a FANTASTIC job!

"I read with interest the information in regard to HIPAA and how it applies to live stream scanner audio such as those currently available on Shoutcast. (*Monitoring and the Law*, Jan 2004) I listened more closely to a local EMS response with HIPAA in mind and was really amazed at just how much patient information is exchanged... such as the patient's name, address, medical problem(s), medical history, medications being taken, treatment... etc.

"In fact... the article prompted me to change my format from the Lee County FD/PD/EMS trunked system(s) here in Ft. Myers, Florida, to air/ham/marine. I sure made some 'airplane folks' happy... but I've also heard the wrath from those who prefer listening to PD, FD and EMS channels!

"How about another article in the future when more information becomes available for us that live stream our scanners to the world?!"

– Ralph Stallsworth, N. Ft. Myers, FL  
<http://stallsworth.home.comcast.net/radio.htm>

## Scanning in South Dakota

"Terrific article on SD scanner statutes! (*Monitoring and the Law*; Vol 22, No12). I was aware of portions of 23-4-5 but not the part that specifically restricts 'possession' of a receiver in a vehicle. I have certainly unknowingly violated that statute many times while visiting SD as a tourist. Never been caught....would have played dumb!

"Now AWARE! I am somewhat concerned with what the word 'possess' is defined to be in SD law. Can the radio be transported....in the trunk of a vehicle....in the back seat? If an ounce or two of cocaine is in my trunk... am I not in possession? Does the same apply to a radio....if it is in my luggage?"

"Am I and other scannists no longer welcome as tourists in SD? Perhaps those of us wishing to travel to Aberdeen, SD, should write their police department requesting a 'visitor permit' for safe passage of our radio equipment through their jurisdiction. Others may wish to contact other SD localities wishing to comply with the state's wishes of controlling our hobby.. Does Custer SD have a police department?"

"I'm sure everyone of us could simply take the FCC ticket test and attempt to circumvent this law or those like them in the other 6 states who restrict mobile use/possession/transport of a scanner to some degree. However, since we only desire to listen and not transmit....Why should scannists be asked to dilute the amateur



Below 500 kHz columnist Kevin Carey says, "Shhhh...Don't tell anyone, but this weekend I operated above 30 MHz! Attached are some photos of my son, Bryan (left) and his friend Ray Dreimiller who helped me out during the ARRL VHF Sweepstakes event. We worked the 6m, 2m, and 70 cm bands, and got into PA, OH, Bermuda (VP9!) and Ontario! Bryan and Ray are currently enrolled in a ham class, and hope to obtain their tickets in the spring.

radio hobby (as welcoming as its membership can be)? I've never been able to find a spot to plug in a microphone on any of my scanners....but I'd still like to be compliant with this SD law if possible."

— Mark Bajek, Westland, MI

Mark emailed his questions to the South Dakota Attorney General and received a prompt reply. Mark comments, "No answers to the permit question other than, no YOU can't use a scanner in a car....and NO we don't offer permits. But they do seem to say it can be stowed in one's luggage and be transported through the state of SD." Here's the official reply:

Mr. Bajek:

First, it is the policy of the Attorney General to not answer speculative "what if" questions, especially in situations where we would be guessing on how a law enforcement officer in the field would react. Different officers would react differently to each of your scenarios. Second, South Dakota law does not allow us to issue you a permit or to give you permission to use a scanner in your motor vehicle. Permits are only authorized for fixed units in authorized places of business, and available from the law enforcement agency (you mentioned police or fire) whose frequencies you intend to monitor. Below is the applicable statute.

23-4-5. Unlawful possession of receiving set or converter without permission — Seizure by peace officer. The possession of any receiving set or converter described in § 23-4-2 in any vehicle or business establishment, without permission pursuant to § 23-4-3, will constitute prima facie evidence of possession for unlawful purposes, and such receiving set shall be deemed contraband and shall be confiscated by any peace officer of this state and delivered to the attorney general for disposition.

Our best advice to you, is to have your scanner stored in a location where you cannot use it while traveling in South Dakota. We hope you enjoy your trip and especially your time in South Dakota.

Charles D. McGuigan  
Assistant Attorney General  
500 East Capitol Avenue  
Pierre, SD 57501-5070

## To the Propagation Prof

Dear Tomas,

"Thank you for your very informative article on winter propagation in the November 2003 issue of *Monitoring Times*. One of the science teachers at the school where I work has been giving the faculty regular updates on solar activity this fall, so I was especially interested in how these events would be affecting propagation on the SW and higher frequencies. Your description of what's going on was well organized and very helpful.

"I can't wait to start throwing around terms

like 'auroral zone,' 'magnetosheath,' and 'Kp Index' in casual conversations."

— Tim Doyle WB2QMA, Dean of Students, The Lawrenceville School, Lawrenceville, NJ

## SWL Callsigns

Glenn Hauser forwarded the following email he received from Donna Slaughter in response to the lead story in Global Forum, December 2003 issue of *Monitoring Times*.

"I thoroughly enjoy *MT* and read it from cover to cover each month. This is the first time I have ever felt the need to write. The article on the SWL callsigns struck home with me as I have my original certificate signed by Hank Bennett on October 1, 1987. It is titled 'All-Band Radio Monitor Certificate of Registration.' Quite attractive with a red border. My name and monitoring location is listed on it and the callsign issued to me is 'WDX9KBM'. Hank Bennett's callsign is WDX2FT. It is also signed by Amelia J. Greenwald, WDX2BA.

"I do not agree with Duane Fischer that these callsigns served no other purpose than for personal ego, nor was it a SW 'gimmick' to make SWLs feel special. I can tell you from personal experience that QSLing SW stations got me a faster response whenever I used the callsign. Also, in many cases, I got a response when others did not.

"Nor do I agree with Damon Cassell that shortwave is a dying hobby. I listen almost every day. I started in the hobby in 1971, then got my Amateur Radio license in 1989. Don't get

me wrong, I'm proud of my Ham license, but I will continue to be a SWL till I die.

"Thanks for reading this and thanks for a wonderful magazine. Keep up the good work."

— Donna Slaughter, Amateur-N9HYI, SWL-proudly, WDX9KBM

## February Correction

On page 12 of "Monitoring the South American Military" a digit was dropped in the last frequency in the Planets net: it should have read 10135.0. Our apologies also to author Ron Perron for the misspelling of his name.

## MT Covers

"Just wish to comment about the great covers on the *MT* magazine every month. The "Fury of Fire" was truly captured on the January cover with its vivid colors. Splendid job! All the best in 2004."

— Al Zupan

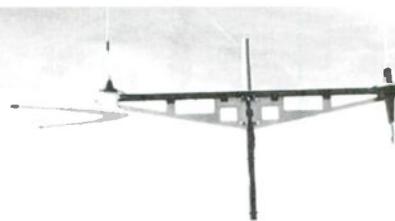
Thanks, Al. *Monitoring Times* is always looking for good cover photos — Do you have a candidate in your archive?

We welcome your ideas, opinions, corrections, and additions in this column. Please mail to **Letters to the Editor**, 7540 Highway 64 West, Brassstown, NC 28902, or email [editor@monitoringtimes.com](mailto:editor@monitoringtimes.com). Letters may be edited for length and clarity.

Happy monitoring!

— Rachel Baughn, KE4OPD, editor

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## Monitoring and the Law

# Kentucky Scanners: Use It and Lose It

In a few weeks on May 1<sup>st</sup>, the 130<sup>th</sup> running of the Kentucky Derby at Churchill Downs – Home of the Kentucky Derby near Louisville – will take place. Some of the visitors to this event, and certainly much of the media covering it, bring scanners to the event, but many are unaware of Kentucky's new anti-scanner law. Racing enthusiasts who visit the new Kentucky Speedway in Sparta about 40 miles southwest of Cincinnati, are even more likely to be unaware of the law revised by the Kentucky legislature in 2000, the same year the Speedway opened.

According to Mark Bajek, motorsports enthusiast and contributor to *The Paddock* (<http://motorsports.thepaddock.com>), a web site that caters to the motorsports fan and includes information on race scanning, visitors to Kentucky should be aware that "...officers are duly sworn to confiscate and destroy the radio on the spot." *The Paddock* in fact warns its readers, "[b]efore taking your scanner to a race, be sure you are familiar with the laws of the state you are visiting regarding the use of radio scanners." (See also Mark's "Letter to the Editor" on page 6.)

The actual text of the law in Kentucky that makes it illegal to possess a police scanner can be found at 432.570 entitled **Restrictions on possession or use of radio capable of sending or receiving police messages**. It states that: "(1) It shall be unlawful for any person except a member of a police department or police force or an official with written authorization from the head of a department which regularly maintains a police radio system authorized or licensed by the Federal Communications Commission, to have in his or her possession, or in an automobile or other vehicle, or to equip or install in or on any automobile or other vehicle, any mobile radio set or apparatus capable of either receiving or transmitting radio or other messages or signals within the wave length or channel now or which may hereafter be allocated by the Federal Communications Commission, or its successor, for the purpose of police radios, or which may in any way intercept or interfere with the transmission of radio messages by any police or other peace officers."

The law goes on to prohibit police scanners in certain vehicles. "It shall be unlawful for any car, automobile, or other vehicle other than one publicly owned and entitled to an official license plate issued by the state issuing a license for the car, to have, or be equipped with the sets or apparatus even though the car is owned by an officer. This section shall not apply to any automobile or vehicle owned or operated by a member of a sheriff's department authorized by the fiscal court

to operate a radio communications system that is licensed by the Federal Communications Commission or other federal agency having the authority to license same."

Probation and parole officers are excluded since, "[n]othing in this section shall preclude a probation and parole officer employed by the Department of Corrections from carrying on his person or in a private vehicle while conducting his official duties an authorized, state-issued portable radio apparatus capable of transmitting or receiving signals."

### ◆ Kentucky Penalties

Section 2 for the law states its penalties and provides that any person found guilty of violating any of the provisions of this section shall be guilty of a misdemeanor, and, upon conviction, shall be punished by a fine of between fifty dollars (\$50) and five hundred dollars (\$500), and / or imprisonment up to twelve (12) months.

Kentucky authorities are authorized by the



law to seize and ultimately destroy the police radio or scanner at issue, since the law provides that it shall be the duty of any and all peace officers to seize and hold for evidence any and all equipment used in violation of the provisions of this section, and, upon conviction of the person having, equipping or using such equipment, it shall be the duty of the trial court to order such equipment or apparatus destroyed, forfeited, or escheated to the Commonwealth of Kentucky.

Therefore, Mark Bajek's advice to motorsport enthusiasts is accurate, since the law provides without much explanation that police scanners and radios "may be ordered destroyed, forfeited, or escheated as above provided *without a conviction of the person charged with violat-*

*ing this section"* (emphasis added).

### ◆ Other Exemptions

The anti-scanner law in Kentucky has many of the usual exceptions seen in other state's laws, including licensed ham radio operators. "Nothing contained in this section shall prohibit the possession of a radio by: (a) An individual who is a retailer or wholesaler and in the ordinary course of his business offers such radios for sale or resale; (b) A commercial or educational radio or television station, licensed by the Federal Communications Commission, at its place of business; or (c) An individual who possesses such a radio, provided it is capable of receiving radio transmissions only and is not capable of sending or transmitting radio messages, at his place of residence; licensed commercial auto towing trucks; newspaper reporters and photographers; emergency management agency personnel authorized in writing by the director of the division of emergency management (for state personnel) or chief executive of the city or county (for their respective personnel); a person holding a valid license issued by the Federal Communications Commission in the amateur radio service; peace officers authorized in writing by the head of their law enforcement agency, Commonwealth's attorneys and their assistants, county attorneys and their assistants."

And then the Kentucky law adds what should have been the law here all along and what seemingly sticks out like a sore thumb in this part of the statute – "except that it shall be unlawful to use such radio to facilitate any criminal activity or to avoid apprehension by law enforcement officers." And again the law reminds folks that a "[v]iolation of this section shall, in addition to any other penalty prescribed by law, result in a forfeiture to the local law enforcement agency of such radio." Kentucky really wants to take away those illegal radios.

*continued on page 27*

### Disclaimer

Information in this column is provided for its news and educational content only. Nothing here should be construed as giving specific legal advice. Persons desiring legal advice about their specific situation should consult an attorney license in their jurisdiction.

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## ARRL Proposes Entry-Level License, Code-Free HF Access

The ARRL will ask the FCC to create a new entry-level Amateur Radio license that would include HF phone privileges without requiring a Morse code test. The League also will propose consolidating all current licensees into three classes, retaining the Element 1 Morse requirement – now 5 WPM – only for the highest class. The ARRL Board of Directors overwhelmingly approved the plan January 16 during its Annual Meeting in Windsor, Connecticut.

The proposals – developed by the ARRL Executive Committee following a Board instruction last July – are in response to changes made in Article 25 of the international Radio Regulations at World Radiocommunication Conference 2003 (WRC-03). They would continue a process of streamlining the amateur licensing structure that the FCC began more than five years ago but left unfinished in the Amateur Service license restructuring Report and Order (WT 98-143) that went into effect April 15, 2000.

### The “New” Novice

The entry-level license class – being called “Novice” for now – would require a 25-question written exam. It would offer limited HF CW/data and phone/image privileges on 80, 40, 15 and 10 meters as well as VHF and UHF privileges on 6 and 2 meters and on 222-225 and 430-450 MHz. Power output would be restricted to 100 W on 80, 40, and 15 meters and to 50 W on 10 meters and up, thus avoiding the need for the more complex RF safety questions in the Novice question pool.

Anticipating assertions that the new plan would “dumb down” Amateur Radio licensing, ARRL First Vice President Joel Harrison, W5ZN, said those currently holding a ticket often perceive the level of complexity to have been greater when they were first licensed than it actually was. “Quite frankly,” he said, “if you review the questions presented in our license manuals throughout the years, you will be surprised how they compare to those of today.”

“This structure provides a true entry-level license with HF privileges to promote growth in the Amateur Service,” Harrison said. “It also simplifies the FCC database by conforming to the current Universal Licensing System (ULS) structure and does not mandate any modifications to it.”

ARRL CEO David Sumner, K1ZZ, and Harrison say the current Technician entry-level ticket provides little opportunity to experience facets of ham radio beyond repeater operation. “The quality of that experience,” Sumner said, “often depends on the operator’s location.”

Among other advantages, Sumner said the plan would allow new Novices to participate in HF SSB emergency nets on 75 and 40 meters as well as on the top 100 kHz of 15 meters. The new license also could get another name, Sumner said. “We’re trying to recapture the magic of the

old Novice license, but in a manner that’s appropriate for the 21st century.”

### Technicians, Generals, and Extra

The middle group of licensees – Technician, Tech Plus (Technician with Element 1 credit) and General – would be consolidated into a new General license that no longer would require a Morse examination. ARRL already has proposed additional phone privileges for Generals in its “Novice reformatting” petition, RM-10413, but the FCC has not yet acted on that petition.

At the top rung, the Board indicated that it saw no compelling reason to change the Amateur Extra class license requirements.

### Hard Hit for Hubble

Two days after President Bush ordered the National Aeronautics and Space Administration to redirect its resources toward human exploration of the Moon and Mars, the agency’s administrator, Sean O’Keefe, told the managers of the space telescope that there would be no more shuttle visits to maintain the Hubble Space Telescope – one of NASA’s most celebrated successes.

A visit by astronauts to install a couple of the telescope’s scientific instruments and replace the gyroscopes and batteries had been planned for next year. Without any more visits, the 10-year-old telescope will probably die in orbit.

“It could die tomorrow, it could last to 2011,” said Dr. Steven Beckwith, director of the Space Telescope Institute on the Johns Hopkins University campus in Baltimore. The demise of the Hubble will leave astronomers with no foreseeable prospect of a telescope in space operating primarily at visible wavelengths.

Dr. David N. Spergel, an astronomer at Princeton and a member of a committee that advises NASA on space science, called it a “double whammy” for astronomy. Not only was a telescope being lost, but \$200 million worth of instruments that had been built to be added in the later shuttle mission will also be left on the ground, Dr. Spergel said.

The decision came on the heels of Mr. Bush’s directive to NASA to reallocate \$11 billion of its resources over the next five years into returning people to the Moon. Triple whammy. Trouble is, NASA is still committed to bringing Hubble back to Earth safely after its useful life ends.

Until the *Columbia* accident, NASA had planned to retrieve the telescope with a shuttle and put it in the Smithsonian. But since the shuttle is no longer allowed to travel to the Hubble, for safety reasons, the plan is now to build a robotic rocket that would go up, attach itself to the telescope, fire its engine to brake Hubble out of orbit and drop it in the ocean. The cost of developing the rocket? \$300 million or more, to also come out of the NASA astronomy budget. Make that whammy a quadruple!

### You Want Insults with That?

Drive-through customers at the Burger King in Troy, Michigan, were treated to more than fries with their orders on several occasions in

January. Many received insults and obscenities over the speaker, presumably from someone using a radio transmitter or walkie-talkie and hiding close enough to watch the reaction. No word on whether the heckler has been apprehended. Illegal use of a telecommunications device is a misdemeanor in Troy, carrying up to three months in jail plus fines.

### No Hiding Place

Recently, wireless companies have been putting into place expensive upgrades under a federal mandate requiring that cell carriers be able to pinpoint the whereabouts of any customer who calls 911 during an emergency – and they’re anxious to find a commercial application to turn their investment into a profit. Such commercial use could include the ability for restaurants and other businesses to send a solicitation by text



#### March 12-13: Kulpville, PA

17th annual Winter SWL Festival (Winterfest) sponsored by NASWA at the Best Western Inn at Towamencin (1750 Sumneytown Pike, Kulpville, Pennsylvania 19443 (215) 368-3800). Friday and Saturday forums include discussion of BPL/power line communications, long waves (with Kevin Carey), pirates (with George Zeller), National Association of Shortwave Broadcasters (Jeff White), Broadcasters’ Forum (led by Kim Elliott), Short Space Antennas (Greg Majewski), and much more, even ham exams led by Skip Arey’s VE team. Saturday features silent auction and banquet with prize drawings. Full registration at door \$55, rates available online at <http://www.swifest.com> or write for printed form to Winter SWL Festival, P.O. Box 4153, Clifton Park, NY 12065-4153, USA, or email organizers John Figliozzi at [jfiglio@swifest.com](mailto:jfiglio@swifest.com) or Richard Cuff [cuffest@swifest.com](mailto:cuffest@swifest.com).

#### March 13: Marietta, GA

Kennehochee Amateur Radio Club Homfest at Jim Miller Park in Cobb County on Callaway Road; Talk-in 146.880 (-)PL100; 8a.m.-3p.m., admission \$6. VE exams 9am or no-code training followed by test 8am-5pm (\$40). For more information <http://www.w4btj.org> and <http://qsl.asti.com/hootch/KARC.html> or Bob Butler W4RBB, 770-579-9420 or 404-217-1564; [w4rbb@arrl.net](mailto:w4rbb@arrl.net)

#### March 20: Brampton, ON

Ham-Ex 2004 sponsored by Peel and Mississauga ARCs, at Brampton Fairgrounds (Heart Lake & Old Scool Roads), 9am-5:45pm, adm. \$6, talk-in 146.880(-) 145.430(-). Information visit <http://www.peelarc.org>, email [ham-ex@sympatico.ca](mailto:ham-ex@sympatico.ca) or call Victoria 905-455 4625

#### March 26-27: Baltimore, MD

Atlanticon 2004 QRP Forum hosted by the NJQRP Club at the Holiday Inn Select just north of Baltimore and next to the state fairgrounds in Timonium, MD, during the weekend of Greater Baltimore Computerfest and Hambaree. \$10 registration to George Heron, 2419 Feather Mae Ct., Forest Hill, MD 21050, or by PayPal to [n2apb@amsat.org](mailto:n2apb@amsat.org). All those registered for Atlanticon receive badges and the famous “Atlanticon Kit” before the weekend, as well as the Atlanticon Proceedings (a printed set of the presentations). See <http://www.njqrp.org/atlanticon/> for more.

message to a cell phone when its owner wanders within range of those merchants. Other applications might include the ability to locate co-workers, customers, or family members.

While some cell phone users find it helpful to let others keep track of their movements or to be notified of nearby stores or services, most would probably rather not expose themselves to round-the-clock, everywhere-they-go surveillance. So cell-phone carriers are looking at program options to allow personalized preferences such as when, where and with whom to share location information. Bell Labs said it is testing a "rules-driven" approach which it hopes will be ready for commercial deployment next year.

## Magnetic Fluctuation

Scientists say the Earth's magnetic field is collapsing at a relatively rapid rate – 10 percent in the past 150 years. Most scientists think the magnetic field is produced by electric current generated by chaotic eddies in the molten iron of Earth's outer core, and random changes in the eddies cause actual reversals in the magnetic poles. It's happened before, they say – 780,000 years ago was the last flip. Though such a reversal may disrupt migratory animals which use the field to navigate, scientists have noted no species die-offs as a result of field reversals.

At the current rate of weakening, the field would disappear in 1,500 to 2,000 years. Chances are it would strengthen again with the poles reversed, but no one really knows.

## Weather Alert Standard Set

There is a confusing proliferation of radios on the market that carry the National Weather Radio broadcasts and those that claim to provide weather alerts. Early this year the Consumer Electronics Association (CEA) announced the adoption of a new standard for Public Alert receivers. The standard, titled CEA-2009, defines minimum performance criteria for consumer electronics products designed to receive digital alert signals broadcast by the National Oceanic and Atmospheric Administration's (NOAA) Weather Radio service and Environment Canada's Meteorological Services of Canada Radio network.

Specifically, it increases and standardizes the options available to consumers about when and how they are notified of these alerts, such as colored lights, LCD displays, etc. that will indicate a public alert notice has been issued even when the device is in standby. We assume "CEA-2009 compliant" is wording that consumers will want to watch for when buying a new weather radio.

## It's a Smart Watch ... Too Smart

Abacus, Fossil, and Suunto watches equipped with MSN Direct data service carry a rarely-read warning. The data service that provides news, weather, sports, stocks, personal messages, appointment reminders, and more is transmitted by FM subcarrier. Not a problem, until you wear it on board an airplane. The fine print advises "Airline Travel: The FM radio receiver in your device must be turned off while flying."

## Sounds of Silence

Is there a difference between "live silence" and "dead air"? On January 19, the BBC was gambling that there is when it broadcast the first UK performance of John Cage's 1953 composition 4'33" – four minutes and 33 seconds of silence – on January 19th. Engineers at Radio 3 had to shut off the emergency back-up system which would have filled up the "ambient silence" with (real) music.

"Communications" is compiled by editor Rachel Baughn KE4OPD (editor@monitoringtimes.com) from newspaper clippings supplied by our readers via mail and email. Warm thanks to this month's contributing reporters: Anonymous, NY; Leo Kusuda, VA; Doug Robertson, CA; Brian Rogers, MI; RC Watts, KY; via email: anonymous, Richard Dillman, Maryonne Kehoe, Rick Kissell, Sterling Marcher, John Moyson, Ed Muro, Jerry None, Francis Pacheco, Ira Paul, Doug Smith, Larry Van Horn, Barry Williams, and Robert Wyman.

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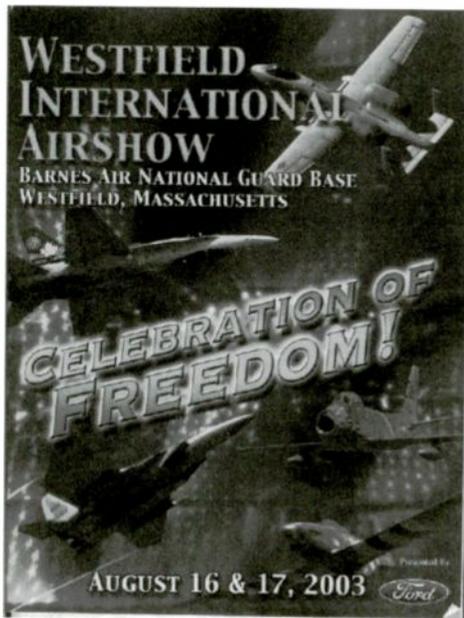
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## “On Scene” Monitoring at Air Shows

Story and Photos by Ken Windyka  
(ken.windyka@the-spa.com)



**A**ir shows provide excitement and variety for young and old alike. An air show may range from a small show with limited aerial performers and static aircraft displays to a large military base air show or open house with many military and civilian aerial performers plus large static displays of military and civilian aircraft. Additionally, World War II “war bird” static displays will be at many larger air shows. (See the companion story on the Dayton Air Show for an example of one of the largest.)

Approximately eighty U.S. shows each year feature major precision high performance military demonstration team aircraft such as the US Air Force “Thunderbirds,” US Navy “Blue Angels,” and Canadian Armed Forces “Snowbirds.” Many shows also have other military aircraft/helicopter aero demonstrations and flybys depending upon the availability of aircraft, as well as precision parachute teams such as the US Army “Golden Knights” or US Navy “Leap Frogs.”

Most larger air shows will also have civilian aerobatic performers such as Gene Soucy’s *Showcat*, Sean Tucker’s *Oracle Challenger II*, Mike Goulian Airshows CAP-232, Wing Walker Teresa Stokes, Mike Mancuso’s Extra 300L, Bob Cipolli’s S-300, The Flying Farmer’s L3 Piper Cub, Chuck Lischer’s F-260 Warrior, Dan Buchanan’s Pyro Hang Glider, Starfighter CF-104, Allen Smith’s L39 Albatross Soviet Jet Fighter, and the Heritage Flight (a combination of current military technology and past such as the P51 Mustang and the F-86 Sabre Jet), and many other performers that are members of the International Council of Air Shows.

Additionally, there can be a variety of ground demonstrations such as the “Super Shock Wave Jet Truck” or the “Flash Fire Jet Funny Truck” racing down the runway at 300 mph; “Mad Bomber” Pyrotechnics Demonstration in conjunction with A10 Thunderbolt simulated ground support mission; bomb squad remote control robot, police dogs search

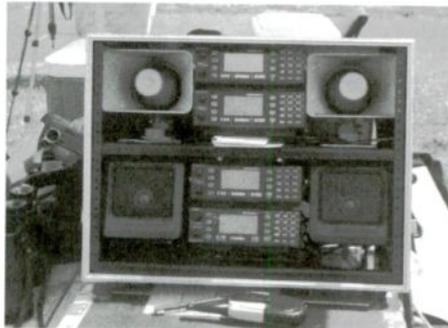
and apprehension; helicopter rescue operations; model aircraft, ultra light aircraft, etc.

### ◆ “At the Show” Scanning

The scanner hobbyist has a very distinct advantage over the general public at air shows. Not only can the hobbyist see the action, but he can hear the radio transmissions directly related to the aerial performance, as well as the various support radio communications for the entire air show.

At the larger shows, some hobbyists arrive one to three days before the show starts to participate in watching and monitoring radio communications for “preshow” aircraft arrival as well as the practice sessions of many military and civilian aerial performers. This preshow arrival activity allows time for “show and tell,” when hobbyists meet and discuss equipment issues, find show frequencies, and put faces to names from various hobby internet mailing lists. Preshow activities may also provide unique photographic opportunities.

The “on scene” military communications/aero monitoring hobbyists utilize a variety of radio monitoring equipment, ranging from small portables to mobile scanners operated from vehicles parked nearby. By far the most interesting scanner equipment setups at some of the Eastern United States “show lines” are the “wagon guys,” who bring many radios, antennas, speakers, and a power supply transported in wagons.



### ◆ Getting Prepared

In order to get the most out of scanning at air shows, it’s important to obtain as much information as possible before arrival at the show.

#### Obtain Air Show Information:

Most air shows will have an internet website active about one month prior to the show. If you know the name of the show or aero performers, you can perform an internet search using such search engines as “Google” (<http://www.google.com>). One of the best websites for finding an air show scheduled (small to large) close to where you live or want to visit, is the International Air Shows Inc website (<http://www.airshows.org/schedules.htm>). This site will provide extensive information on all air show performers as well as links to other websites relating directly to the show and performers at the show.

#### Obtain Potential Frequency Usage Information

Table 2 provides sources for frequency information. I’d classify the range of communications monitoring into the following:

ENROUTE TO THE SHOW – Depending upon how far you are traveling to get to the show this could be an extensive list of state, county, and local police, highway pa-



trol, fire and EMS, as well as specific toll road authorities. If radio systems are linked by repeaters, you may be able to monitor activity 20 to 30 miles away and have a good understanding of the traffic situation in the show area. *Note: it's very important to understand and comply with the laws of the various states you are traveling through and/or where the air show is located, since some may prohibit the use of a scanner in a motorized vehicle.*

**AERO COMS AT THE SHOW** – By far these are the most important aspect of your scanning/radio communications efforts, and can be placed into these major categories: Air Traffic Control, Show Control, and Aero Performers.

Monitoring ground control, tower, UNICOM (non tower operations), the air route traffic control center (ARTCC), and other low level approach controls will give you an excellent "heads up" to any flybys or inbound aircraft. The Show Boss frequency may be a discrete frequency (see table 1), as well as other various civilian aero performers tie-ins with their ground crews and the shows public address system.

However, there's a very good chance that



the normal tower or ground VHF and secondary UHF frequencies will also be show control and utilized by many of the performers. Refer to Larry Van Horn's *Milcom* column in this issue for the potential frequencies for major military performers. Additionally, the local military aero command post frequencies might also be used for air/air or air/ground communications.

**AIR SHOW GROUND SUPPORT** – There's a wide variety of frequencies that could be utilized, both military and civilian, depending upon the venue of the performance – for example, active military bases, guard/



**Blue Angels Comm Cart** - see p.64

reserve bases, joint military/civilian airports, or civilian airports.

At military bases, the usual security, fire/crash, medical, and base operations radio nets will be used for those functions. Other radio nets, such as civil engineering, aircraft maintenance, fuel, communications, and command nets, may be utilized for a variety of air show support as well as the nets' normal functions.

**Table 1 – Show Boss, Civilian Performers, and Air Support Discrete Frequencies:**

122.700	Unicom at airports with no control tower
122.725	Unicom at airports with no control tower
122.750	Private fixed wing aircraft air-to-air
122.775	
122.800	Unicom at airports with no control tower
122.825	Domestic VHF
122.850	
122.875	Domestic VHF
122.900	
122.925	
122.950	Unicom at airports with no control tower
122.975	Unicom at airports with no control tower
123.000	Unicom at airports with no control tower
123.025	Helicopter air-to-air communications
123.050	Unicom at airports with no control tower
123.075	Unicom at airports with no control tower
123.100	
123.125	Itinerant
123.150	Itinerant
123.175	Itinerant
123.200	
123.225	
123.250	
123.275	
123.300	
123.325	
123.350	
123.375	
123.400	Itinerant
123.425	
123.450	
123.475	
123.500	
123.525	
123.550	
123.575	
<b>Hot Air Balloon Ground Crews/Chase Recovery Teams:</b>	
151.625, 151.70, 151.805, 151.895, and 151.955	

However, last year at one active duty military Air Force base (Hanscom AFB, MA), most of the show support radios had been reprogrammed into new frequencies in the 148 to 150 MHz range, even though the base didn't normally operate very many radio systems in that frequency band. So, if you are on a military base and you are not finding any activity on known frequencies, it's time to place the scanner into the "search mode." Also, local, county, and state law enforcement may be assisting in certain aspects of on site security and vehicle traffic control.

At joint use military/civilian bases and civilian airports, there's most likely going to be an airport authority radio system. Furthermore, it's very likely that local, county, and state law enforcement agencies will be providing support and using the local and state police department's frequencies as well as a common local area coordination frequency.

In some instances, communities might have a special radio cache available for such large events that can utilize the 800 MHz nationwide ITAC frequencies (see table 3) for simplex and/or conventional repeater utilization. The local/county fire department may also be providing support (see table 3 for potential mutual aid frequencies).

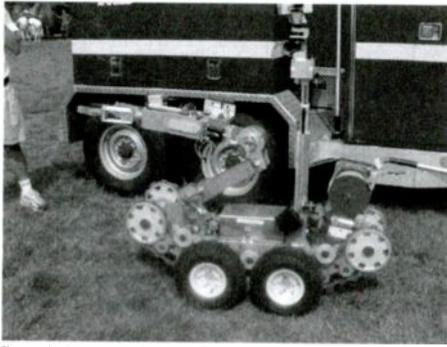
There may also be a local public or private ambulance/paramedic service available to provide transportation to emergency medical facilities if the need arises. Typical VHF and UHF medical assignments (See table 3 for examples) will be used for ambulance to hospital communications and also the ambulance company might have a business band frequency that might be utilized.

**PERSONAL COMMUNICATIONS** – Many commercial vendors at the air show will likely be using a variety of Family Radio Service (FRS), Multiuse Radio Service (MURS), and business band low power frequencies to coordinate their activities; so, again, placing your scanner in the search mode may uncover these active frequencies.

Some hobbyists may also utilize FRS, MURS, General Mobile Radio Service (GMRS), or Amateur Radio frequencies to coordinate meeting in the parking lot or on the show line. I know one hobbyist who uses a combination GMRS/FRS radio/GPS receiver so that he can find his car in the parking lot! A common usage by hobbyists in past events has been FRS Channel 14 (467.7125 MHz), PL code 38 (250.3 Hz) with alternate FRS/GMRS Channel 7 (462.7125 MHz), PL code 15(110.9 Hz).

### ◆ Other Considerations Security

Security policies will affect what you can bring into the air show area. Items that are typically banned include any weapons (e.g. guns, knives, mace, razor blades), coolers, large carry bags, glassware, drinks with ice, skate boards, roller skates, and pets. Usually there will be a sign posted at the entrance (and/or transportation pickup point) indicating what is prohibited. Also the show



**Bomb Squad Robot Demo**

website will normally have a security Frequently Asked Questions (FAQ) webpage.

At the show entry security control point, expect all your carry items to be thoroughly searched and perhaps you will receive an "electronic" or physical pat down. However, if you arrive early enough and get "on site" parking at air shows that have that option available, you can always return to your vehicle for refreshments and other food as necessary that were left in the cooler and also utilize your mobile scanner to monitor the action while relaxing in your vehicle. As you leave the security check point there will be

an opportunity to buy a show program guide as a memento of your attendance at the show.

**Static Displays**

Aircraft and other static displays can offer a wealth of information to the scanner hobbyist. Ideally a camera, especially a digital type (even at lower resolution of 640x480 dots per inch), will allow very easy documentation of such items as aircraft tail numbers, aircraft art work, radio communications cards (rare), aircraft interiors (including radio equipment) and other exhibits. There may also be information handouts that you can take



**Comm Card for USCG helo**

with you, and some units sell patches and other novelty items.

Furthermore, if static display aircraft have crew members in attendance, here's your chance to ask such questions as:

- How long have you flying in this type of aircraft?
- What was your most memorable experience flying this aircraft?
- What radio callsign did you use when you flew in?
- Will you use the same callsign when you fly out?
- Do your radio callsigns vary for local training versus cross country flying?
- When training, what tactical air/air frequencies do you normally use?

**Table 2: Air Show Frequency Information Sources**

**Local, County, State Radio Systems:**

Police Call (9 printed volumes for various geographic locations), which also includes (nationwide) CD-ROM (Hollis Radio Data and Pozilla Software). Available at Grove Enterprises and various Radio Shack stores.

**Military Frequencies and Selected Civilian Air Traffic Control Frequencies:**

Military Frequency Directory, 2001 edition, (Grove Enterprises, www.grove-ent.com, 800-438-8155)

**Federal Frequencies:**

Federal Frequency Directory, 2001 edition, (Grove Enterprises).

**Military and Federal Frequencies:**

The 'Top Secret' Registry of U.S. Government Radio Frequencies 8<sup>th</sup> edition" (Tom Kneitel, CRB Research Books, Inc)

**Civilian ATC Frequencies and selected civilian airport diagrams:**

US Government FLIP Airport/Facility Directory (7 volumes (Northeast, Southeast, East Central, North Central, South Central, Northwest, Southwest), National Aeronautical Charting Office <http://www.aco.faa.gov>.

**Hobby Internet Mail List Servers and Other Websites:**

<a href="http://www.qth.net">http://www.qth.net</a> .....	MILCOM and FEDCOM, as well as some geographic area general scanning lists.
<a href="http://www.yahogroups.com">http://www.yahogroups.com</a> .....	Wide range of scanner related hobby mail lists. Just do a search for "Radio Scanner"
<a href="http://monitoringtimes.com">http://monitoringtimes.com</a> .....	Late breaking announcements, airshow skeds, frequency listings.
<a href="http://164.214.2.62/products/digitalaero/index.cfm">http://164.214.2.62/products/digitalaero/index.cfm</a> .....	Military Flight Information Publications.
<a href="http://www.notams.jcs.mil/">http://www.notams.jcs.mil/</a> .....	Military Notice To Airmen. (e.g. runway closures, change of frequencies, hours of operations, etc.) up to the minute information.
<a href="http://www1.faa.gov/NTAP/index.htm">http://www1.faa.gov/NTAP/index.htm</a> .....	Notice To Airmen for the upcoming period including military aero demonstrations
<a href="http://www.airnav.com/">http://www.airnav.com/</a> .....	Information on civilian airports
<a href="http://svartifoss2.fcc.gov/reports/index.cfm">http://svartifoss2.fcc.gov/reports/index.cfm</a> .....	FCC site search
<a href="http://www.airshows.org/schedules.htm">http://www.airshows.org/schedules.htm</a> .....	International Airshows Inc, schedule of civilian air performers
<a href="http://www2.acc.af.mil/airdemo/links.html">http://www2.acc.af.mil/airdemo/links.html</a> .....	Military Air Combat Command's demonstration aircraft (A10's, F15's, F16's, and B1', B2', F117's ) scheduled for shows.
<a href="http://www.airshows.pa.hq.af.mil/eligible_events.html">http://www.airshows.pa.hq.af.mil/eligible_events.html</a> .....	Air shows approved for military aircraft participation
<a href="https://www.seal.navy.mil/leapfrogs/default.asp">https://www.seal.navy.mil/leapfrogs/default.asp</a> .....	USN Leap Frogs
<a href="http://www.airforce.com/thunderbirds/">http://www.airforce.com/thunderbirds/</a> .....	USAF Thunderbirds
<a href="http://www.navy.com/jsp/explore/comunity/blueangels/index.jsp?cid=28andpid=2">http://www.navy.com/jsp/explore/comunity/blueangels/index.jsp?cid=28andpid=2</a> .....	USN Blue Angels
<a href="http://www.armygoldenknights.com/">http://www.armygoldenknights.com/</a> .....	Golden Knights



### Staking out an area on the show line

What communications range do you normally achieve with Low Band FM, vs VHF aero, vs UHF aero ? (e.g. Army National Guard Helos)?

Do you use High Frequency Single Side Band to talk directly with your wing command post?

Where do you most of your local flying training?

At times, the crew members may politely tell you that they can't answer a particular question, but no one will be offended.

### Spectator Seating

The spectator show line is another very exciting aspect of the air show. This is the area parallel to the active runway/aerial show box area, and which allows easy observation of all aerial and most ground performances. With prior coordination (e.g. via FRS radio or internet mail list servers) with other hobbyists, it may be possible for you and/or your group to "stake out" your own area to beat the afternoon spectator crunch for the major performers. Here again, being with a group of like-minded hobbyists can greatly aid in your enjoyment, because with many folks monitoring the frequencies it's possible to discover new frequencies in use; it also allows you to take fairly close pictures of the air show performers while others monitor the frequencies.

### ◆ Conclusion And Safety Reminder

Attending air shows "on scene" can be very exciting and informative. However, it's also important to address safety and health issues by wearing appropriate clothing to match weather conditions; liberally applying a high protection factor sun screen lotion to prevent sun burn, (even on cloudy days); drinking plenty of water; getting out of the sun for awhile (either returning back to your vehicle or finding a hangar or aircraft wing for some shade); and limiting



alcohol consumption.

Also follow the golden rule "treat others as you would like to be treated." Share your hobby "on the show line" with non-scannerists by letting them listen to the aero performers' communications. Finally, plan on arriving early and leaving late. Although public safety officials will do their very best to ensure effective traffic control, with tens of thousands of people and cars all trying to leave at the same time you can expect a fairly long wait. Some hobbyists may have a "tail gate" party in the parking lot after the show ends, and then 2 to 3 hours later drive out without any traffic. I've personally experienced waiting anywhere from only 15 minutes to approximately 2-1/

2 hours before getting out of the show parking areas.

Hope to see many of you in the upcoming year at some of the Northeast US air shows!

**Table 3: Common Public Safety Support Frequencies**

Frequencies	
Fire Departments:	45.88, 154.265, 154.28, 154.295
Law Enforcement:	155.475, 866.0125, 866.5125, 867.0125, 867.5125, 868.0125
Medical:	155.16, 155.28, 155.34, 462.95, 462.975, 463/468.0000, 463/468.025, 463/468.05, 463/468.075, 463/468.100, 463/468.125, 463/468.150, 463/468

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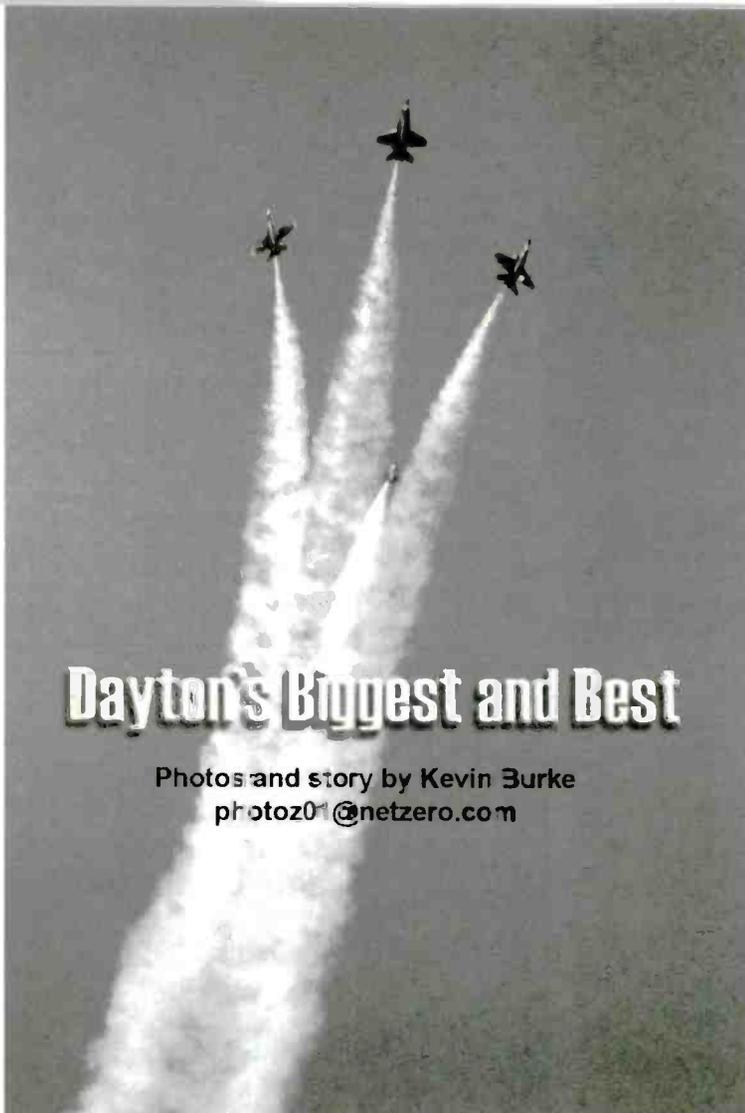
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## Dayton's Biggest and Best

Photos and story by Kevin Burke  
photoz01@netzero.com

**T**he 2003 Dayton International Airshow in mid-July was expected to be the best-ever show at Dayton. With the weather cooperating and all but a couple of the expected aircraft in attendance, it would have been impossible to have anything but the biggest and best.

By Saturday, the third day of aerial events, the announcers were starting to call it the Dayton MOA. To the pilots in the crowd, this meant "Military Operations Area," but for everyone else the acronym meant "Mother Of (all) Airshows."

They really did have everything there, from a replica of the Wright B Flyer to a flyby of a B-2 bomber. Also on static display were many unmanned reconnaissance and bomber aircraft.

All three jet teams were very good, although the Canadian Snowbirds seemed to draw more applause from the crowd, who seemed more impressed by the maneuvers and formations of the quiet CT-114 rather than the noise and raw power of the F-16s and F-18s flown by the Thunderbirds and Blue Angels.

I was very impressed by the Navy's F/A 18 Super Hornet. It's not easy to tell the difference between a regular Hornet and a Super Hornet, but once in the air it squeezes vapor off its wings on almost every turn, and those turns are so sharp you'd think it has thrust vectoring engines. I got the impression this jet is capable of much more than the Navy wants to show us yet — like perhaps a hammerhead stall, or a square loop tighter than Sean D. Tucker. (Which I think he can pull off inside of a one car garage.)

The Navy also showed off its P-3 and S-3, and the Harrier jet. It is interesting to see and learn about these aircraft. I think the Navy would have owned the show if they had also had the F-14 Demo Team flying. The F-15 Demo looked best when flanked by three P-51 Mustangs, and Sunday a P-38 was added to that formation.

The B-2 flew by only on Saturday. There was an F-117 flying each day. I personally complained to one of the Stealth pilots after Thursday's performance, "Three lousy slow flat passes!" The pilot explained that some Air Force Demo pilot had bent the rules lately and all demo pilots were told to keep it tight and by the book. I begged for at least a wiggling of the wings during those flat passes. Each day after that the F-117 demo got better.

On Saturday a U-2 did a flyby, and after climbing through the short-lived overcast, he called back to the announcer and calmly said, "I've got a problem, I've lost the engine."

A very well coordinated response followed. Fire trucks rolled to both ends of the runway, and the airboss put everything on hold. The U-2 had someone there with the announcer, with a book of procedures for the U-2. When the pilot said he thought it was a compressor stall the person on the ground was ready to read off a checklist for compressor stall problems.

The pilot was asked if he wanted to land at



Dayton or go to nearby Wright-Patterson AFB; he chose Wright Patterson. The person on the ground for the U-2 told the pilot he needed time to drive to that airport to guide him down to landing with a chase car. That was the last I heard of the U-2.

I listened mostly to the jet teams on the radio. The Thunderbirds make it easy by using two radios, one UHF and one VHF. I set up two scanners connected with an adapter that takes the feeds from both scanners and feeds the audio into stereo headphones by making one feed the left channel and one the right. So one scanner scans known Thunderbird VHF frequencies, and the other scans the UHF Thunderbird frequencies. (See page 64 for frequencies for all the military flight demonstration teams.)

I have heard that by setting up two scanners like this you can damage them but I haven't had any problems. An interesting note on this set-up is that many times I have heard both UHF and VHF frequencies used in the Thunderbirds' normal way of communicating. "Boss," the number 1 jet, will say something on the VHF frequency and the solos will answer on UHF.

The Snowbirds are easy to monitor. For shows it's pretty much 272.1 MHz.

The Blue Angels have to make it difficult, though. They use one frequency for start-up, and as they taxi down the runway they change the frequency; the solos have a frequency and the diamond has a frequency, *but* there's more to it. There is also what can be described as an "on stage" or "show line" frequency, that is, in front of the crowd. Whoever is performing the maneuver on stage uses the on stage frequency, and when they exit the stage, they go back to their other frequency, whether it's the diamond or the solos.

For one of their opposing passes one of the solos said, "Do you think Orville and Wilber envisioned this?"

Each day I was at the entrance gate by 7:30 am and had no trouble with traffic, but I heard reports that traffic was really bad later in the day. Though the planners of this show did everything they could to minimize traffic delays, the people just kept coming.

With four days of airshow flying I found it difficult to see all of the static displays. In between the military acts were great civilian performers like Patty Wagstaff, Julie Clark, and Sean Tucker, among others. Also flying was a Ford Trimotor and a replica of the Spirit of St Louis, as well as a mock air race with Mustangs, Corsairs, and others.

The 2003 Dayton International Airshow was by far the biggest and best airshow I have ever been to. You can check it out for yourself! July 17-18, 2004!

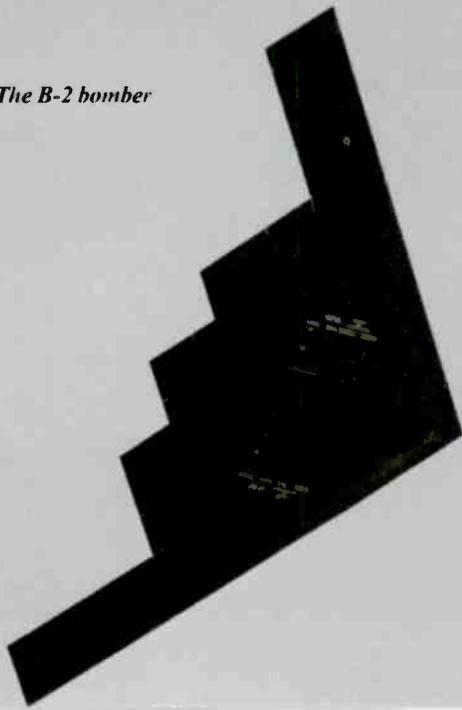


*An F-15 and P-51 in flight*

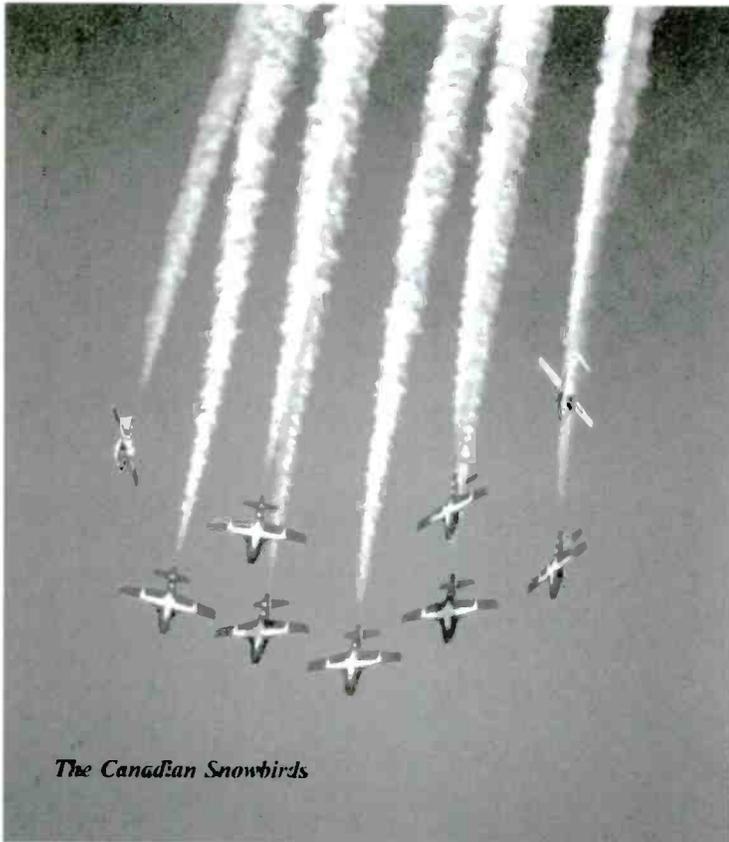


*The Blue Angels in maneuvers*

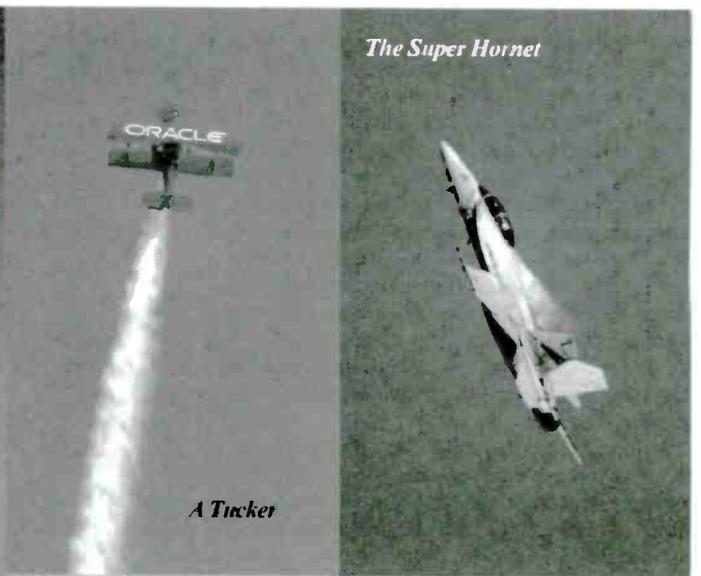
*The B-2 bomber*



*The Super Guppy*



*The Canadian Snowbirds*

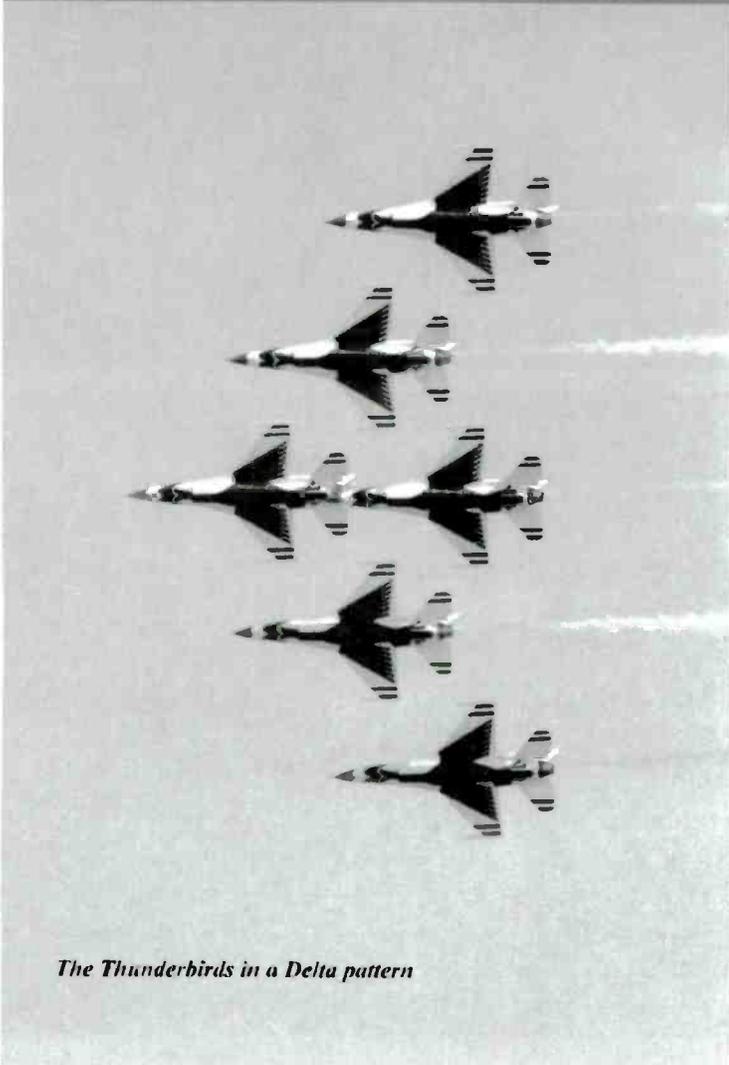


*The Super Hornet*

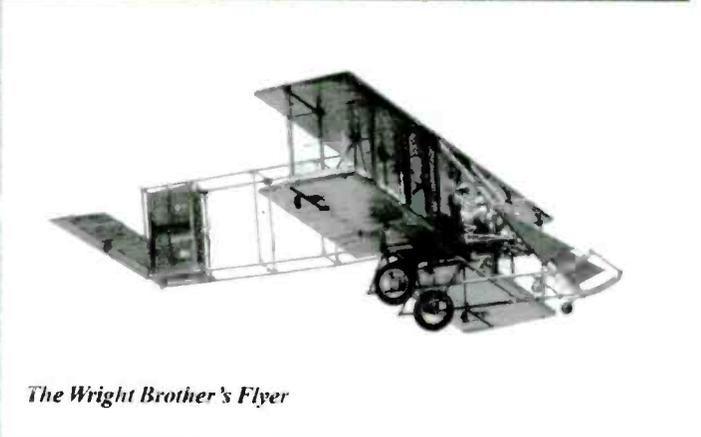
*A Ticker*



*The UCAV*



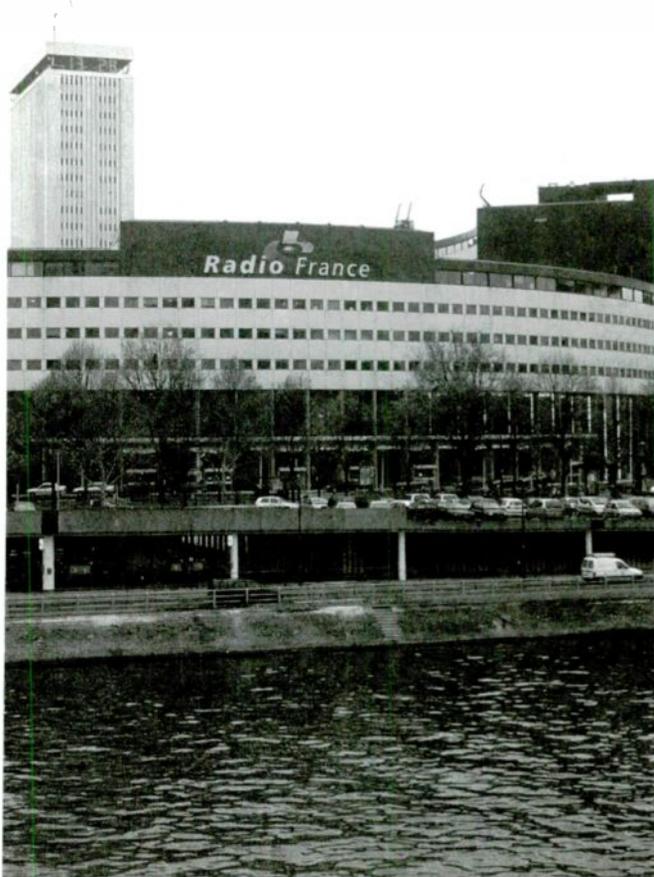
*The Thunderbirds in a Delta pattern*



*The Wright Brother's Flyer*



*A United States Air Force Thunderbird*



## Radio France International

By Luc Gougeon

to the shortwave transmission almost all day long.

One morning, one of the passengers on the cruise asked me "how the fishing was?" in reference to my radio. I handed him the radio so that he could put his ear up to the tiny speaker to hear the news. From that point on, I became the official news source for all of the 140 passengers aboard. Slowly cruis-

ing down the Volga River, everyone on the boat seemed to want to know how the Tour de France was progressing and any other news items that I could offer.

Most of the French passengers on the boat had no idea that RFI even existed. Radio listeners can pick up RFI either in Paris on 89.0 FM or anywhere outside of France. If you live in France but outside of Paris, your only option is to listen through the internet. Having lived in Paris for over three years, I almost always tune into RFI to hear the news because they offer a wide variety of international news provided by their correspondents throughout the world.

The Radio France Group was created in 1929 in order to control radio and television; the government at the time was the main broadcaster. The government of France is an active contributor to the provision of quality programming on public radio and television. Although primarily a public corporation with 86% of its funding received from the government, Radio France (unlike, for example, the United States' NPR), is permitted to run advertisements.

Radio France is a conglomerate of not only "Radio France International" but seven other radio stations as well. In 1963, the headquarters of Radio France was built in Paris in order to assemble all of the radio production facilities into one building. This modernistic building, which is located in the 16<sup>th</sup> arrondissement of Paris on the bank of the river Seine, is home to these seven major radio stations, sixty-one production studios and a concert hall for the Radio France symphonic orchestra.

It is possible to visit the radio museum of Radio France on weekdays between 10 and 11 a.m. or between 2:30 and 4:30 p.m.

The building is the headquarters of Radio France International and RMC-MO (Radio Monte Carlo Moyen Orient), a radio station oriented exclusively towards the Middle East. The seven other stations of Radio France are France Inter (news and music), France Info (24 hour news), France Culture (Cultural news, theater, etc.), France Musique (mostly classical music), France Bleu (national and regional radio system), Le Mou'v (station for young people) and FIP (music). All of these stations can be accessed on the internet on the Radio France web site <http://www.radiofrance.fr>

### Background on RFI

Let's go back to Radio France International, the station that is most definitely aimed towards an international audience. RFI was created by the Ministry of Foreign Affairs to send radio broadcasts towards Africa and the Middle East. France, like many European countries, used to have colonies all over Africa and was a major presence in Algeria, Tunisia, Morocco and Lebanon. French is still a popular language throughout a vast part of the African continent. Before RFI became a completely independent entity from Radio France in 1986, the station was of-

I regained my interest in shortwave radio about three years ago when I began my PhD in Paris. After hearing only French news, I was curious to see if I could catch the BBC or Radio Canada international. I'm a French-Canadian from Montreal with a passion for news; I guess you could even call me a news junky! Shortwave radio was just the thing I needed to keep me in touch with news broadcasts from home.

### Shortwave Fills a Vacuum

Most people don't really understand our passion for radios, antenna building, etc. Last summer, I took a cruise on the river Volga in Russia. During this cruise, I experienced the pleasure of introducing the miracles of shortwave radio to my fellow passengers. For most people, this eleven day cruise from St.-Petersburg to Moscow was not only a vacation from their normal lives but also a vacation from the unlimited sources of national and world news that we tend to take for granted. For me, however, it was a real pleasure to get out on the deck with my radio and enjoy the sun. I brought the very small and economic Grundig Mini World 100 PE radio which provided me with excellent reception. I normally use a Yaesu VR-500 radio, but I didn't want to risk losing it or having it stolen.

The VOA and the BBC came in very strong pretty much all day, but at the time I was mostly interested in listening to RFI (Radio France International). The Tour de France had just started and I wanted to follow Lance Armstrong's progress for what would become his legendary fifth win. While in St-Petersburg or Moscow, I was able to listen to the RFI radio relay on 1440 AM. Outside of those two cities, I could listen





ten referred to as the "colonial station."

France continues to be present in the Ivory Coast despite the civil unrest that is currently going on, so the importance of maintaining open communica-

tion with Africa is essential for the French government. The French and greater international radio community was recently reminded of the danger of working in Africa when the RFI radio journalist, Jean Hélène, was brutally murdered by police on October 21, 2003, while on a mission in the Ivory Coast. You can follow the actions of the "Reporters sans Frontières" (journalists without borders) against the Ivory Coast government on their website <http://www.rsf.org>. This French organization follows the liberty of press issues around the world. The web site is available in English.

RFI boasts an average of 45 million daily listeners and the RMC-MO, her sister station directed towards the Middle East, attracts about 15 million. On a weekly basis, RFI produces 112 hours of French programming and 340 hours of foreign language programming in 19 different languages. The English section of RFI produces 38 hours of weekly programs.

### A Visit to Radio France

I was fortunate enough to visit the office of Radio France Internationale and see for myself how this monster of a radio station works. The main office of Radio France International is located in the Maison de la Radio building in Paris. The Paris office gathers all of the information from its worldwide correspondents and offices. RFI also manages radio stations in Lisbon in Portugal, Sophia in Bulgaria, and Bucharest in Romania: all of these offices are directly connected to the Paris office and can easily transmit programs from Paris to all of these countries.

The ambiance of the Radio France office is quite casual and I immediately felt right at home. I visited the office on a Monday morning and I was rushed from the press department to a big conference room where once a week, the directors of each section of RFI meet to prepare the weekly schedule. About 17 people sat around this table and stated the weekly mission of their particular section; Africa, America, Asia, Eastern Europe, science and education, sports, poli-

tics, health, etc. During this meeting, they prepare the list of people that need to be contacted, journalists that need to be sent out on missions, and finally reportage to be written and produced.

I was told that daily meetings also take place at 9:30 a.m. and 3:45 p.m. to make sure that the radio programming is consistent with any breaking news. These meetings are naturally smaller and shorter in length as compared to the weekly meeting which normally lasts for over an hour.

After this very interesting meeting, many members of the staff told me that they were happy that an American magazine would be publishing an article about their radio station. The general consensus was that Radio France International could broadcast even more towards the United States if provided an audience.

I was taken by the press managers to where the real action takes place: the press room. The press room is where the television screens are broadcasting news from foreign stations and journalists are preparing the news that they are about to read in the various studios that spread out along a long corridor. Every section of Radio France International also has a smaller working space such as the Latin American room or the Russian room.

The studios of Radio France International are slowly moving towards digital technology. A sound engineer told me that the good old fashioned analog tape was still "king of the office" regardless of more modern options. Wherever you walk, you can see people hunched over analog equipment. The African studio is said to be the only digital workhorse so far.

It's in one of those studios that I was invited to sit during the only show oriented toward a North American audience. Since 2002, Radio France broadcasts a thirty minute American Journal, in French, between 1100 and 1130 UTC. I sat with Jaqueline Paré, the anchor of this show, who is married to a Canadian and has studied communication in Montreal. She explained to me the mission of Radio France International for the United States.

The show is considered a prestige operation for the Radio France International. The audience, I was told, is partly French government workers in the United States, United Nations staff in New York, French speaking diplomatic communities, Haitian, African and French expatriates and hopefully any Americans who may speak French. The show does not have an American content since American news is obviously more than sufficiently available throughout the United States. The show strives to not only review European and African news stories, but to also offer a different point of view to the American audience.

### Broadcasts and Schedules

The American broadcast is transmitted on shortwave, according to the latest schedule, on 15515 and 17610 kHz between 1100 and 1130

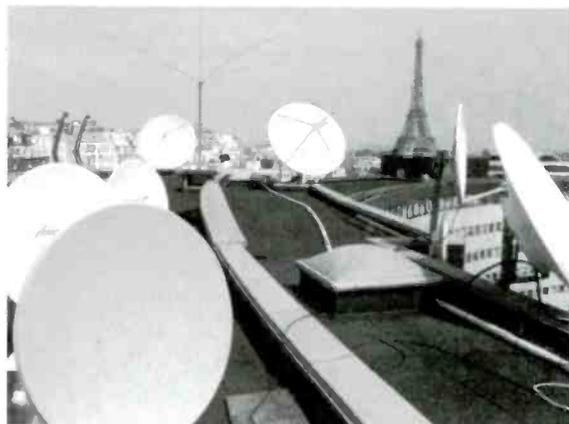


UTC. It's also possible to listen to RFI in New York on 91.5 FM WNYE, in Boston on 740 AM WJIB and in Washington DC on 1120 AM WUST. RFI is also available on the Dish Network channel 660 or in Canada on the Videotron or Bell Express Vu on channel 979. The complete list of frequencies can be found on the website or through the Relations with Audience Office (*service des relations avec les auditeurs*) which can be contacted at [courrier.auditeurs@rfi.fr](mailto:courrier.auditeurs@rfi.fr).

RFI also broadcasts towards the Caribbean from its transmitter located in the city of Montsinéry in French Guyana on 15515 and 17860 between 1230 and 1330 UTC, 9800 and 11665 between 0130 and 0200 UTC. Folks in the Southern part of the United States should try to listen to this relay.

RFI shortwave broadcasting is mostly targeted towards audiences in the African continent. The colonial past of RFI still has a direct affect on the mission of the radio as a whole. RFI has staff all over Africa who work with a network of 65 FM relays in major African cities. The news from Paris is added to local programming.

The transmission of Radio France International has also been vastly extended towards the Middle East through her sister station RMC Moyen-Orient. RMC was specifically created



to cater to the Arabic language population of Northern Africa and the Middle East. More information about RMC can be found at <http://www.rmc-mo.com>. An FM radio relay was recently powered in Baghdad on 93.5 FM. RMC can also be heard in Jordania, Qatar, Bahrein and Lebanon. For the soldiers serving in Iraq, the RFI English language broadcast can be heard on 17620 between 1400 and 1500 UTC or 11615 between 1600 and 1730 UTC.

### Future Possibilities

It is obvious that Radio France International is a major player with the BBC or VOA to a worldwide audience. Readers need to remember that RFI is largely financed by the French ministry of Foreign Affairs, RFI is the voice of France abroad. For the American listener, it's the perfect occasion to practice the French he or she may have learned in high school or college and also learn a fair amount about contemporary France and Africa.

RFI is exploring all the new methods of transmitting its programming: WorldSpace, DRM or DAB. Information about RFI programming by those means of transmission can be found on <http://www.worldspace.com> or <http://www.drm.org>.

The latest corridor hype at the headquarters of RFI is the creation of an International French News Network that could compete with CNN or the BBC World. RFI envisions itself as a future provider of news alongside the French press agency, AFP, and the France Television group for this new international broadcaster. TV5 which already broadcasts French television content worldwide could also participate. The 360 journalists of RFI could soon be helping to create a new TV channel and possibly make this radio group into an even more powerful French news provider to the world.

I hope that readers in the United States and throughout the world can enjoy and benefit from the services provided by Radio France International. I believe that this is one group to watch in upcoming years for new and interesting radio programming.



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# Is it Broadcasting or Datacasting?

By D. Prabakaran

**A**s broadcasting adopts digital delivery, one can see how quickly it evolves into something new. *Digital convergence* has blurred the borderlines between the conventional broadcasting industry and the communications industry. Content and service providers can deliver their services through multiple delivery channels: Consumers can access services via a variety of means. The future of media distribution is expanding in all directions.

A concrete example of this development is datacasting, i.e. the delivery of multimedia content and services via digital broadcasting networks. Industry has developed technologies that will finally make digital convergence a reality. Raw data consisting of multimedia-media, programs, newspapers, magazines, news, entertainment, art, graphics, alert and real time control systems are multiplexed together as part of an Internet or MPEG payload. Forthcoming digital enhancements could supercharge radio datacasting, providing feeds of up to 300kbps

## The DAB Revolution

Digital Audio Broadcasting is set to replace current analog radio using a revolutionary technology that allows CD-quality sound to be transmitted digitally along with text and other data, using terrestrial transmitters. Digital Audio Broadcasting is a "push" technology ideally suited for the 21st century. It was originally developed as part of a collaborative research program known as the Eureka-147 Project with the intent to supersede conventional analog AM and FM services, which suffer from interference due to high congestion and multipath propagation. When fully deployed, DAB will deliver high-quality audio similar to that of CDs to mobile and portable receivers, which typically experience greater reception difficulties than stationary receivers. And listeners will not have to change frequency as they travel.

But there is more to DAB than just audio: according to the Multimedia Object Transfer (MOT) specification, DAB can also carry text and graphics, including internet pages.

What kind of data can be transmitted? It can be material associated with a television program like *Nova* – biographies, statistics, websites, interview transcripts, still images – that enhances the content of that program. Or it can be material that has no connection with any program, material that you might otherwise get off a CD or download from the internet – educational materials, public agency documents, weather reports, software programs, or video clips of public meetings. The data that comes in today's analog signal isn't very flexible – one can't do much with it except view it on the screen at the

moment it's broadcast. Digital data, on the other hand, is highly flexible.

The data capacity in datacasting using present techniques on TV and FM ends at about 19 kbps; this, however, is where the capacity of DAB starts. This makes DAB a medium well suited for transporting data for data services. Data services for broadcasters of course can be song-, artist- and program information. Radio games and hit parades will get a new dimension using program-associated data to display questions or artists nominated for the hit parade. Traffic messages can be transmitted in speech, utilizing a 32 kbps subchannel, together with regional labels for the listener to recognize. The traffic messages can be stored into a memory for later play-back.

Other applications can be: file-transfer, software updates, real-time distribution of financial information, facsimile applications, database updates for public and semi-public spaces or even interactive multi-media applications with or without a return channel.

Also, DAB is perfectly suited for delivering high volume multimedia content, providing simultaneous reception at all locations and fixed distribution costs, irrespective of the number of receivers. Traditional providers can add a variety of textual or graphic data to their music programming – including advertising and lyrics for "karaoke" applications. But media migration will mean that newspapers and faxes can also be delivered by DAB. Traffic, weather and financial information can also be supplied in this way – either as text or as speech generated from text.

As providers explore the enormous potential of this new media, we will see DAB used for file transfer and software or database updates. Internet providers will display HTML encoded information, and interactive applications will also appear, using a back-channel for feedback, quiz games, etc. Selected information can be stored in the DAB receiver for later retrieval

Two types of DAB systems are currently in use.

1. EUREKA147 DAB - UK, Canada, Germany, Netherlands, Norway, Sweden, Russia, etc
2. IBOC DAB - USA only

The most advanced system, both with regard to deployment and to the features offered, is probably the European Eureka-147 digital audio broadcasting (DAB) system that is in operation commercially all over Europe as well as in the Far East (Singapore, Taiwan), Australia, and Canada. In the US there is the terrestrial in-band-on-channel DAB (IBOC DAB) system, promoted by iBiquity, and the satellite digital audio radio system (SDARS) by XM Radio and Sirius Radio. All these systems have in common that they broadcast digitally, and some of them –

Eureka-147 DAB and IBOC DAB – explicitly offer data channels.

## Eureka-147

The European Eureka-147 DAB utilizes two datacasting vehicles: Program-associated data (PAD) and data channels. The PAD feature allows us to piggyback data onto a broadcast audio stream. Applications for this include sending the cover image of the currently running soundtrack but also allows for scrolling text. The data channel provides a high-bandwidth (up to 384 kb/s per channel) delivery mechanism to the receivers.

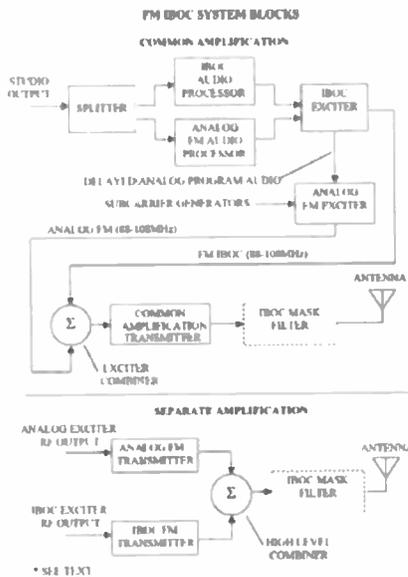
The OSI model for Eureka-147 DAB specifies seven layers, from the physical layer (actual radio transmission of the OFDM signal) to the presentation layer (final conversion and presentation of the broadcast information to the listener/viewer). An intermediate transport layer identifies the audio and ancillary data services and multiplexes them. There are two areas where such ancillary data may be carried within the system multiplexer:

1. **Fast information channel (FIC):** this carries information about the multiplexer, TMC, paging, conditional access (encryption), PTY, etc.
2. **Main Service Channel (MSC):** This can be used for general data services, including program associated data (PAD) – information directly linked to the audio program, such as song and artist identification, lyrics, and dynamic range control (DRC) data.

Eureka 147 DAB is a very flexible format. In particular, the framers of the specification were careful to include the ability to transmit data, either alongside and related to the digital audio, or as separate data broadcasting services. At the IBC2002 conference, Harris broadcast company demonstrated the results of a significant technological co-operative effort, with the broadcast of MPEG-4 video over DAB.

To broadcast realtime video on DAB, the best solution within the DAB specification is to use internet protocol datagram tunneling. To achieve this, Harris has developed an IP tunneling module, compliant with the ETSI TS 101 735 standard. MPEG-4 is rapidly becoming the preferred format for live streaming. The IBC demonstration used Envivio Live Broadcaster (ELB) to perform the MPEG-4 encoding from a live audio and video source or from pre-recorded material.

The ELB operates in real time and provides high quality MPEG-4 files for streaming by any compliant server. The result is a powerful demonstration of the capabilities of MPEG-4 video over DAB. It features broadcast-quality source material and encoding, and the receiver is



a handheld device, but the fundamental architecture allows any MPEG-4 encoder and decoder to be used.

Applications range from true video broadcasting over DAB – perhaps movies for children through special purpose video transmission; perhaps around special events and functions, through to new video applications. City taxi drivers, for example, could see for themselves the traffic flow through key interchanges before selecting a route.

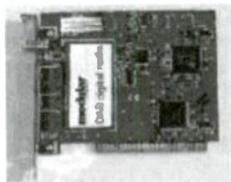
### DAB digital radio PCI card and software

A computer card capable of receiving the L-Band DAB signal could provide a fast route onto the information highway for digital radio. Similar to FM cards now available to receive music, the DAB card would create a new revenue stream for data delivery to the households that already have personal computers or personal digital assistants. There is now a wide range of slot-in cards for PCs that allow users to listen and receive DAB and Digital Terrestrial Television (DTT) radio stations.

The DAB digital radio card fits into a PCI slot in a PC's mother board; the supplied driver works with Windows-98, Me, 2000 and XP. The user interface provides full program information on screen, displays text associated with programs, allows recording at the click of a mouse, and gives users the ability to schedule recordings ahead of time from program lists. Recordings can be stored as MPEG-2 files, or in MP3 format for high quality sound downloads to MP3 players.

### Features of DAB Digital Radio PCI Card

- Look at the schedule for every station for the week ahead and select any programs to be recorded.
- E-mail a program presenter at the click of a mouse.
- Download recorded programs to most portable MP3 players for "listening on the move."



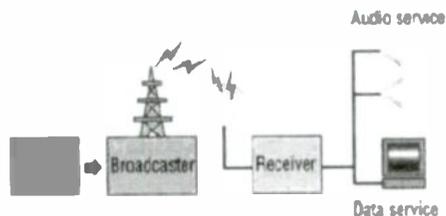
**DAB Digital Radio PCI Card**

- Easily link to the web site of the station you're listening to.
- Show all radio stations broadcasting a particular genre e.g. Sport, News etc.
- Play back high quality recordings made on the PC.
- Gain access to at least 18 radio stations, many of them exclusive to Digital. Set your PC's clock from the accurate signal broadcast as part of the DAB transmission.

### IBOC (In-Band On-Channel)

IBOC (In-Band On-Channel) digital radio technology, also referred to internationally as Digital System C, facilitates the introduction of Digital Sound Broadcasting (DSB) by allowing existing FM stations to broadcast the same programming in analog and digital without the need for new spectrum allocations for the digital signal. The IBOC technology developed by iBiquity Digital Corporation focuses on a transition to digital that works within existing broadcasting infrastructure. The IBOC digital signal is placed within the existing analog FM spectral emissions mask, and as a result IBOC is proposed as the digital solution which may be implemented without the need for new frequency allocations or without disruption to the existing broadcasting infrastructure.

IBOC DAB system has been designed to support the broadcast of data services in all modes of operation: FM hybrid and all-digital, and AM hybrid and all-digital. In the hybrid mode, broadcasters will continue to transmit an analog signal while adding the IBOC signal in the sidebands. Each mode will have different data throughput rates, but in each case a significant amount of data can be delivered, representing a substantial upgrade to the existing subcarrier services. The digital signal is modulated onto a large number of subcarriers, using orthogonal frequency division multiplexing (OFDM), and they are transmitted simultaneously.



*Courtesy Radio World Newspaper Online*

Due to the nature of the FM band, FM broadcasters will have the greatest potential to leverage datacasting opportunities. The FM hybrid mode can deliver up to 150kb/s of throughput. Current design has the maximum audio rate set at 96kb/s, which would result in 54kb/s being available for data services. This rate, while only a one-way transmission, far exceeds the throughput of other widely available wireless transmission systems at a fraction of the cost. In the all-digital mode, the capacity of the broadcast throughput roughly doubles to approximately 300kb/s, ample capacity to support five-channel surround sound and sophisticated data file transfers.

As IBOC receivers advance and manufacturers take advantage of enhanced displays, stor-

age capacity and in-vehicle applications, the utility of an IBOC data broadcast significantly increases. Broadcasters will be able to brand programming for display on rear-seat entertainment units, stream 800 numbers and URLs of advertisers for easy retrieval from a receiver, deliver valuable information inexpensively to a telematics provider's customers and update integrated navigation systems with real-time traffic conditions and location-based advertising. Couple these receivers with a return channel and listeners would be able to complete transactions for concert tickets, CDs or additional advertising information.

Thanks to the ongoing transition of analog to digital, it is now possible to combine video, audio and data within the same signal. This combination leads to powerful new applications that hold considerable commercial potential. Ongoing and future research will explore Datacasting with a backchannel: Quite a number of interesting and exciting applications become possible with even a small bandwidth backchannel such as the SMS (short message service) feature of the GSM networks.



*IBOC prototype radio and display, courtesy "Water Cooled Newsletter" SBE Chapter 124, Portland, OR*

Datacast framework is modular and can easily be extended and adapted to new applications (allowing experimentation) and new receivers (and transmitters). Part of the framework is a content-based subscription mechanism that utilizes the Smart card [like IBM's Javacard]. Using this smart card service, providers can implement a conditional access scheme that does not require a backchannel to some authorizing server. Also, mobile telephones can be combined with digital radio modules to provide an interactive return path allowing broadcasters to offer pull services (i.e., content requested by the user).

With the demand for Internet access and multimedia content growing at an explosive rate, datacasting is a way to compete with cable operators, phone companies and direct-broadcast satellite (DBS) in the broadband race. In particular, datacasting would allow broadcasters to deliver some of the most popular content on the Web, such as streaming media events that gobble up a lot of bandwidth and need to reach a mass audience.

Stay tuned – digitally tuned, that is: this is a medium whose potential is just beginning to be explored.

# Sunday and The Philco

By Greg Petro

**A**t a very tender age I became aware of the ritual of traveling to the city of Newark, New Jersey, for Sunday dinner at my grandparents walk-up apartment in the Clinton Hill section of the city.

From my earliest recollection, 213 Chadwick Avenue was a mystical and magical place. It was much like the black and white movies that I still watch, with actors from the thirties who were tough and rough, smoked cigarettes and drank whiskey by the shot. Chadwick Avenue was a tree-lined, cobblestone and brick city street, that made the car vibrate with a rhythm that I can still feel as part of the back seat ride to and from those Sunday excursions.

My maternal grandparents lived one story up, the apartment on the right, first door of 213 Chadwick Avenue. The steps from the front door foyer were wooden and old like they had never been new. The railings were wood with a heavy coat of wax that always had that stickiness about them. There was a light on each floor, high up in the ceiling and as a seven year old, I always wondered how the light bulbs would be changed, since they were so high and situated over the stairs.

My father would most likely park the car on the street in front of the walk-up, in a precarious position next to one of the mammoth oaks that lined the block every ten to fifteen feet. This alignment offered no access from the passenger side, so we would extricate ourselves from the car through the driver's side door with Mom sternly directing us to scurry to the sidewalk in between the swooshing cars, buses, and trucks that flew by during our musical chair exit.

Up the stone stoop steps, to the foyer, Mom would hit the buzzer, and we would magically be entered to the first floor. Up the stairs, lit by the single light bulb, and there at the top of the stairs was the source of the melodious smells of turkey, ham, roast beef and a host of side dishes that were never really explained as to their contents, and never discussed in terms of recipes.

A knock, "Come In!" and the apartment was alive with Grandma to the left, back in the kitchen, wearing a long bib apron from her neck to the floor, moving like a ballerina in the *Nutcracker Suite* on the stage of her kitchen. There was hustle and bustle like a train station. We learned at a very young age that everyone, especially the grandchildren, got a big hug within Grandma's ample bosom, and then we were to go visit with Grandpa, and stay out of the way of the final preparation of dinner, which at times resembled a swashbuckling sword fight with Grandma as Errol Flynn, swords ablazing.



*Philco 46-420 image used by permission of Phil's Old Radios, <http://antiqueradio.org/index.html>.*

At the age of seven, I would discreetly move slowly, cautiously, like a young pup approaching the alpha male, towards my grandfather. Joseph Aloysius Moran, Sr. was a small man, even to me. He had been in an auto accident years earlier and walked with two arm-length crutches that had metal bands that wrapped around his forearms. He was a beer drinker and pipe smoker, and the smells of the beer and pipe smoke hung thickly in his immediate area. Grandpa was my sage, storyteller, and expert on almost anything that I could conjure up to ask him. He spoke slowly and thought through what words he would use and then would stare at me, making me feel uncomfortable but important; he would speak "with me" as he spoke to the

grown-ups.

Dinner was served in the dining room, which was halfway between the front of the apartment and rear where the kitchen was. Grandpa sat at the head of the table, closest to the kitchen, while Grandma sat at the opposite end, farthest from the kitchen, which never made sense to me, since she was constantly commuting from the kitchen to the table. I sometimes got to sit next to Grandpa, to his right, but only on a few rare occasions.

Most of the time I sat on the far end of the table next to Grandma, and I always got to sit on the Newark phone book, a rather thick tome reflecting the importance of the City of Newark. The phone book was just the right size, and I was at just the right height to be at eye level with Grandma and everyone else at the table. It was like sitting on a hidden throne.

Of course, the tablecloth was white, starched, and we all had a matching white napkin, starched so stiff it would scratch my face. Sometimes I could smell Grandma in the napkin, and I knew she had just ironed them that morning or maybe just before we arrived. Dinner was served, eaten and cleaned away in the manner that everyone knew was the norm for my Grandmother, who had worked for many years as the head waitress at the Stork Restaurant, across from Military Park on Broad Street in Newark.

She moved with the grace of an Olympic figure skater, around, over and through the dishes, table, and even us, as we ate. I was always amazed how she could carry three, four, five dishes at a time and not one morsel of food would be disturbed. This was Grandma's Orchestra, and she was the conductor. Off with the apron, wipe her hands on the towel, fix her makeup while looking through the windowpane over the sink and Vroom! – There she was at the table "dining" with us all, looking like Marlene Dietrich, in that 1930s black and white movie I had fallen asleep watching, a week before.

There was always some elderly relative at Sunday dinner that I had never heard of; he

was usually very quiet with a white shirt and bow tie, slicked back hair and a tight moustache. This included Cousin Joe, Uncle Raymond or just plain "Vinnie." These relatives were never explained, nor were they ever seen, except at Sunday dinner. I never, to this day, have asked who they were, but they came, ate dinner, did not speak much and left quietly while never speaking to me nor I with them.

When dinner was completed, the table would once again be cleared as the head waitress conscripted the assistance of the other women to clear and present "the guests" (which included me) with some exotic dessert. These desserts were always sweet, with real whipped cream, but I never had any idea what they were. I have never had them since, but they were good. After dessert with coffee, I always got to share Grandpa's coffee with lots of milk, and the women would surrender to the kitchen. The men vacated to the front parlor, where they would smoke and talk about work.

About this time, I knew this was the moment for Grandpa and I to return to the dining room. At the head of the dining room table, against the wall, was a large, fold-out, hutch desk. This was Grandpa's desk. He would turn his chair around from the dining room table and it would match up right where his desk was. In the corner to the right of the desk was a chair with the back cut off, which was used as a combination table and telephone stand for Grandpa. He would clear off this stool and I would pull it close to him and sit watching him do "his work" which was

usually smoking his pipe and reading some "important papers."

One Sunday night we stayed a little later, because there was a fight to be broadcast on the radio, and I would get to sit next to Grandpa at Grandpa's desk and listen to the boxing match, with Grandpa, on Grandpa's radio. His radio sat on the top shelf of the hutch desk and it was all I could do to see it on the top shelf. It was a brown Bakelite Philco that crackled and hissed as he tuned it in. The yellow light and the dial had long been covered with pipe tobacco smoke but Grandpa knew just how far to turn the knob to bring in "his" stations.

This Sunday night Joe Louis, the heavy-weight champion of the world, was fighting. As Grandpa told me, Joe Louis was the best fighter ever, and as Grandpa put it, "he was fighting another bum this month." Everyone else was either in the kitchen or the "parlor," as Grandpa found the fight on the Philco. I sat like a young plebe at West Point, on the cutoff chair next to Grandpa as he filled his pipe from the round metal can of pipe tobacco. The fighters were being announced and I could hear the crowd yelling and cheering. It was as if Grandpa and I were at the fight, sitting in the front row.

Grandpa looked for one of his regular stick matches to light his pipe and none was to be found in the many cubbyholes of his desk. I heard him say, "I need a match!" He got up and lumbered with his crutches around the corner to the kitchen and returned within

thirty seconds with a book of matches. As he returned, I heard the radio announcer counting, "seven, eight, nine, ten, he's out." Joe Louis had knocked out his opponent within the first thirty seconds of the first round.

Grandpa looked at me and asked, "What happened?" I said, "I don't know." We listened as the announcer explained, that once again Joe Louis had knocked out the challenger in the first round and he was still the heavyweight champion of the world.

Grandpa looked at me and said, "Son, you know what you learned from this?" I thought, here was my sage and aged mentor asking me a question, an adult question that I should listen to for the wisdom he was about to impart to me. I stared up at him from the stool as he put his hand on my bushy blonde head. He looked at me over his steel rimmed glasses, and said, "Don't ever go get a match when Joe Louis is fighting, because you'll miss the fight." He smiled, chuckled, and reached over and hugged me.

That night after the fight we drove home from the city. I laid down and snuggled up on the back seat, a little cold, watching the shadows alternately through the window up in the night sky and the imprints made on the backseat floor from the passing streetlights. Today was a special day, most Sundays at 213 Chadwick Avenue were. But this Sunday, I got to listen to my first boxing match with Grandpa and learned a valuable lesson ... I think.

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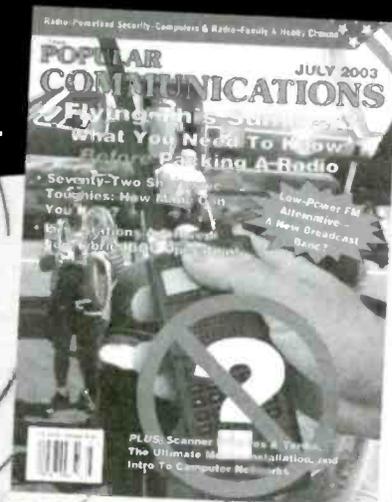
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### A Beginner's Look at HF Digital Modes

Anyone who's ever tuned around the HF bands will have come across the chirping and deedling sounds of digital communications. These sounds can be anything from crusty old hams pounding old time brass keys to tech-savvy operators using sophisticated computer-generated TV pictures. This month I'll take a beginner's look at the world of HF digital reception: the old, the new, the extremely expensive and the ridiculously cheap. But, first, the components.

#### ◆ Digital Receiving Basics

Naturally, you'll first need a decent shortwave receiver, but you may be surprised. I've had good results using an old Uniden 2021 portable shortwave receiver tuning in all types of digital modes. Of course, it won't be as selective or as sensitive as better receivers, but for the casual SWLer or beginner it's not a bad place to start.

If you're just starting out, look for a receiver with an adjustable BFO or a Single Sideband (SSB) switch since all digital action is transmitted in upper or lower sideband (depending on frequency). Also look for digital readout on the tuning display; this makes it very easy to tune in scheduled transmissions such as WIAW's RTTY and CW bulletins (see side bars). Look for external antenna terminals as an outside antenna will generally do a better job pulling in weaker signals and will pick up less interference than the built-in whip antenna.

And, when it comes to antennas for general all band HF work, it's hard to beat the Grove Tunerless All-Band antenna which I've mentioned many times in this column (see

*The Beginner's Corner* October 2000 pages 30 & 31). It's cheap, easy to build and does a very good job receiving from 160 to 10 meters and, when you get your ham ticket, you'll find it's a great transmitting antenna, too, for 80 through 10 meters. For antenna lead-in wire use RG/8 mini coax cable.

#### ◆ Digital Decoding Gear

Boiled down to the bare essence, there are two ways to decode digital HF transmissions. One is to use a modem interface which goes between the audio output of your receiver and your computer. This method uses software you can either download from the Internet or load to your computer via a floppy or compact disk. The second method is to use a stand-alone digital decoder which has all the necessary software built into a box which goes between your radio output and a video monitor. Let's look at some options:

#### Inexpensive Modem

Using widely available shareware, these simple modems plug into an available com port on the back of your computer with a small cable which plugs into the speaker or headphone jack of your receiver. Newer computers will require an adapter to switch from 25 pins to 9 pins. One of the most readily available of these is from Tigertronics (<http://www.tigertronics.com>) which offers its BP-2M multi-mode modem. This is the fastest, cheapest and easiest way into the HF digital side of shortwave monitoring. See the review of this unit which I wrote in the December '99 issue of *MT*. The BP-2M lists for \$69.95.

Tigertronics also offers their SignalLink SL-1+ which supports all available digital modes including voice. The addition of a front panel light display and digital voice capability makes this a great beginner's entry onto the digital scene. Hams will appreciate being able to send in all these modes as well as receive. The SignalLink SL-1+ lists for \$49.95.

MFJ Enterprises (<http://www.mfjenterprises.com>) also has a product similar to the BP-2M which covers FAX/SSTV/RTTY and CW in



*SignalLink Model SL-1+ receives and transmits many digital modes. It even does Internet Repeater Linking (Echonlink). (Courtesy Tigertronics)*



*MFJ's 1214PC FAX/RTTY/ASCII/CW reader. A medium priced model for hams and SWLers alike. (Courtesy MFJ Enterprises)*

a small plug-in modem. The model MFJ-1213 costs \$49.95.

#### The Middle Ground

MFJ Enterprises offers other multi-mode decoders capable of sending and receiving in the popular digital modes. Some models include built-in memory keyers for CW transmitting. The MFJ-1278B copies eleven digital modes including PSK31, Packet, PACTOR, AMTOR, RTTY, SSTV, WXFAX, ASCII, Navtex and CW. A model with built-in digital signal processing (DSP) is also avail-

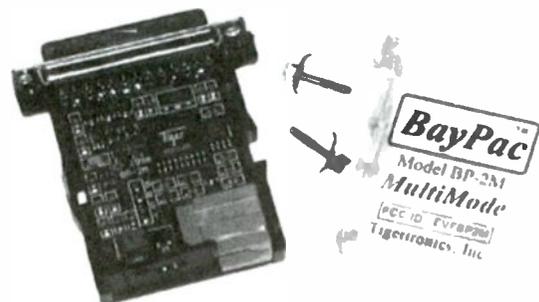


*MFJ's 1278B multi-mode handles 10 digital modes, is GPS compatible and is available with built-in DSP filters. (Courtesy MFJ Enterprises)*

able. This option is very useful when trying to tune in weak signals or on crowded bands. Prices for these models start at \$309.95.

#### The Stand-Alone Option

These units are for serious digital hobbyists who have exhausted the use of the



*BP-2M from Tigertronics does it all and at a reasonable price. Shown here with the cover removed to display the surface mount parts packed into the tiny modem. (Courtesy Tigertronics)*



**Universal M-8000, the legendary full-featured digital demodulator comes with a legendary price tag. To do more you'd probably need top secret clearance! (Courtesy Universal Radio)**

cheaper and less able models. Universal Radio sells several different models including the legendary M-8000 which carries a legendary price tag as well (discounted at \$1,299.00). The M-8000 does it all, but it's no place for a beginner. Still, it's good to know it's there in case you find yourself needing the ultimate in a digital demodulator or you win the lottery and there's no point in scrimping. Universal also sells used equipment and it's well worth checking out their web page for the latest bargains: <http://www.universal-radio.com>.

### The Retro-Digital & DIY Option

For those stuck in another era there is the option of genuine Radio Tele-Type machines which have real keyboards and whose receivers clack away pounding out the copy on rolls of paper just like in the days of old. These machines are strictly for those with plenty of time on their hands and who have an interest in keeping these antiques going.

And, for the antique computer lover, check out the capabilities of the old Commodore C-64 and the Microlog SWL cartridge which decodes CW, RTTY, and ASCII. Try e-Bay or your local hamfest for these items which are typically priced under \$20. While writing this I had my old C-64 with the SWL cartridge plugged in and was monitoring CW and RTTY contacts on various bands. Viewed through a small TV set, it did quite well despite being 20 years old!

There are plans available to build a small modem device similar to the ones I first mentioned. *QST* magazine has an article entitled "A Flexible Digital-Mode Interface" which is found in the November 2000 issue pages 39-42.

### ◆ Getting Started

All you have to do is decide which option you want and go for it. I like the BP-2M in particular for ease of operation, versatility and price. And, as a casual digital mode user it's all I want: CW, RTTY, FAX and SSTV. Monitoring the basic digital modes is a lot of fun and brings a new dimension to shortwave listening, one you've only heard before, but now you get to see.

And, finally, be sure to read Mike Chace's *Digital Digest* column each month on page 37 in this magazine. While it's written for the seasoned digital enthusiast, you'll learn a lot just by reading it every month. And now that you're a digital enthusiast yourself, why not go back over the previous issues of *MT* and find out what you've been missing!?

### W1AW CW/Teletype Schedule

The American Radio Relay League (ARRL) headquarters operates amateur radio station W1AW from Newington, CT, and sends Morse code (CW) and radio teletype (RTTY) on a regular schedule. Content is often news of interest to all hams and includes updates on DX action, current solar conditions and general amateur radio news.

CW bulletins are sent each week day at 5, 8 and 11 pm (ET) and teleprinter bulletins are sent at 6 and 9 pm (ET). CW bulletins are sent at 18 wpm and it's one of the best ways to up-grade your code copying skills. They also send slow code practice runs each day with speeds ranging from 5 to 15 wpm. Frequencies for CW are: 1.8175, 3.5815, 7.0475, 14.0475, 18.0975, and 28.0675 MHz.

RTTY frequencies are: 3.625, 7.095, 14.095, 18.1025, 21.095, and 28.095 MHz. A complete schedule of all transmissions can be found at <http://www.arrl.org/wlaw.html#wlawsked>.

### Amateur Radio RTTY & SSTV

With even the simplest of equipment you can tune in ham Slow Scan Television (SSTV) and RTTY QSOs from all over the country and the world. Follow the directions which came with your digital equipment for proper tuning and look for ham RTTY activity on the following band segments and frequencies based on FCC rules and ITU Region 2 band plans:

- 180 meters: 1.800-1.840 MHz
- 80 meters: 3.500-3.750 MHz (RTTY DX channel is 3.590 MHz)
- 40 meters: 7.080-7.100 MHz (RTTY DX channel is 7.040 MHz)
- 30 meters: 10.130-10.140 MHz. (300 baud in AMTOR, ASCII and Baudot only)
- 20 meters: 14.070-14.095 MHz
- 17 meters: 18.100-18.105 MHz (300 baud in AMTOR, ASCII and Baudot only)
- 15 meters: 21.070-21.090 MHz (300 baud in AMTOR, ASCII and Baudot only)
- 12 meters: 24.920-24.925 MHz
- 10 meters: 28.070-28.189 MHz

Look for SSTV in the HF ham bands centered around the following:

- 80 meters: 3.845 MHz
- 40 meters: 7.171 MHz
- 20 meters: 14.230 MHz
- 15 meters: 21.340 MHz
- 10 meters: 28.680 MHz

Law continued from page 8

### ◆ Legal Afterthoughts

Realizing that they exempted most of the legal and legitimate users of police scanners, but neglected to protect their own, the law winds up with further exclusions for law enforcement agency chiefs, fire department chiefs, ambulance service directors, and paid or volunteer members of a fire department and paid or volunteer members of a public ambulance service licensed in Kentucky who have been given permission in writing by the chief of the fire department. These persons may possess a radio capable of receiving on a frequency allocated to a police department or law enforcement agency, whether the radio is in a vehicle or not.

The law concludes with what may perhaps be a loophole for all. The secretary of the Finance and Administration Cabinet is allowed to exempt the possession and use of any radio communication equipment that he finds the general public and other non-police persons may need for the proper operation of the NOAA weather radio system.

Whether such an order has been issued remains undetermined as we go to press, but, curiously, the exemption does not seem to require the equipment to be of the alert or alarm type that can be activated by a remote NOAA signal in times of weather emergency. Therefore, if such an order is issued, simply having the various 162.400 to 162.550 MHz frequencies in a scanner may possibly qualify it to be used for this NOAA radio exemption.

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**Q.** Does the wind chill factor apply only to humans? Does this factor affect the temperature, say, of my car radiator? (Mark Burns, Terre Haute, IN)

**A.** Wind chill factor is based on a normal (rather arbitrary) human skin temperature of 92 degree Fahrenheit (33 degrees Celsius). The normal evaporation of the skin's surface moisture is a cooling process – that's why we sweat – and it's accelerated by cold, dry wind. But for the wind to have any cooling effect beyond its lower air temperature, there must be surface moisture present on the surface to be cooled; there is on skin, but there isn't on your car's radiator. Thus, in the same wind, you will become chilled more than your car's radiator.

**Q.** I have scanners capable of 2.4 GHz reception; can I receive 2.4 GHz phones on them? I am looking to buy a new cordless phone, and some sales people say they are all digital spread spectrum (DSS), but when you read the ads for different 2.4 GHz phones, some say DSS and some don't. So are some secure and others not? (Garth, email)

**A.** By now, virtually all 2.4 GHz cordless phones are digital, and no, you can't eavesdrop on them with a scanning receiver. If there are any of the older, cheaper analog phones in operation, then yes, you can hear those. Before buying, read the specifications in the manual to determine whether it is a secure digital phone.

**Q.** I just purchased a JRC NRD-545 shortwave receiver, H-800 Skymatch active antenna, and a Timewave ANC-4 Noise Cancellor. While the H-800 outperforms my outdoor long wire antenna (fed by coaxial cable), both antennas are besieged by electrical noise interference.

My equipment is in the basement adjacent to my electric furnace, hot water heater, load cen-

ter, etc. The ANC-4 works great with the longwire; can I use it with the H-800? (Rowland, email)

**A.** Since the ANC-4 works well with the outdoor wire antenna, we know the noise isn't penetrating the receiver through its case or other wiring; it's coming from the antenna. It would be best to put the ANC4 before the H800 amplifier unit in order to prevent noise pulses from overcoming the preamp's gain stage(s), but you can't do that, so try connecting it between the H800 output and the receiver.

And, as you are currently doing, always use coax cable between the radio and your outdoor antenna; that's the first line of defense against electrical interference.

**Q.** My dad used to tell me how he would alligator-clip the antenna lead from the old Philco to the finger hook of a dial telephone to improve reception. He said the phone lines acted as a huge longwire antenna. Is this still possible today, even without that fingerhook? (A. Peterson, Washington, DC)

**A.** Actually, the technique still works fine – if you can find a metal point on a modern phone to connect the antenna wire. Even though phone wires are grounded at various points, from a wavelength standpoint, the ungrounded lengths do a fine job of intercepting signals.

Look for a metal screw that may go into the phone's metallic mass, loosely (or even directly) coupling it to the phone lines. If that doesn't work, you can use a modular connector with a series capacitor as a voltage block (any nominal value .01 to .1 microfarad will work just fine), and tap an unused phone jack. Try each of the four different wires for best reception.

**Q.** I have an old Emerson table model radio with a square loop antenna glued to its back. I can only pick up stations when I place my hand on the back. I had previously taped down some of the wires that had come loose. Any ideas what the problem could be? (Dave Dameron, Iowa)

**A.** These old loop antennas are actually part of the tuning circuit. There should be a trimmer capacitor, either on the loop itself, or on the chassis where it connects. To tune it properly, tune in a weak station at the top of the dial (1400-1700 kHz region) and peak the signal for maximum.

If you can hear background noise but the tuning capacitor has no effect, it's possible that:

- (1) Some of the turns of the coil may be touching and electrically short-circuited, and they will need to be separated from each other with tape, wax or glue; or
- (2) A wire lead either to or from the loop may be broken; or
- (3) In an effort to "fix" the loop, some of the turns may have been removed; or
- (4) You are in a mobile home or distant from the broadcasting stations; or
- (5) The RF amplifier stage (assuming it has one) may be defective or need a tube replaced.

**Q.** We recently bought a Radio Shack 2.4 GHz digital cordless phone. Even though it is not being used, it causes interference on a nearby AM radio. Does the phone emit a radio signal even though it is not in use? (Gene T. Schaeffer, Towanda, PA)

**A.** No, but the microprocessor apparently does. Modern computerized electronics all utilize an internal time generator which is actually an oscillator. Depending upon the amount of shielding (or lack of it), unintentional signals may be radiated throughout a house.

You might try wrapping a few turns of the phone cord around a ferrite toroid or rod; such radio-frequency-interference (RFI) filters are available from Radio Shack and computer outlets as well.

Questions or tips sent to Ask Bob, c/o MT are printed in this column as space permits. If you desire a prompt, personal reply, mail your questions along with a self-addressed stamped envelope (no telephone calls, please) in care of MT, or e-mail to [bobgrove@monitoringtimes.com](mailto:bobgrove@monitoringtimes.com). (Please include your name and address.) The current Ask Bob is now online at our website: <http://www.monitoringtimes.com>

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17

Last month I mentioned that an empty potato chip dip jar had potential for the radio desktop storage of parts, AA batteries etc.

One jar for those already charged, and another with those waiting to be recharged. But I noticed when only a few batteries remained in the jar, they fell over helter skelter. I found that a rubber band will hold the batteries upright, even with just a few batteries. Yes, I labeled the jars. I also found that an extra jar works to hold my cordless phone upright, and easy to grab. I am staying with my CIA coffee mug to hold my pens and rubber duck antennas. The jars are too short for that purpose.

18

A friend brought over his radio and complained that it had gone "deaf." Before I reached for the tool kit, I checked it by changing to a different rubber duck. If there was still no audio, then I went to the basic external troubleshooting list:

- Will the radio send audio out thru the speaker jack?
- Has the BNC or SMA pin fallen out from the original rubber duck?
- Has the female BNC/SMA receptacle wall been damaged?
- Does the volume control work normally, or has it been "locked out?"
- Try fresh batteries

During all troubleshooting work, I keep the radio tuned to a strong station with continuous audio, such as the local 162 MHz NOAA weather channel. If it turns out to be any of the above problems, it is fixable. For example, if the BNC pin fell out, I cut off the end of a safety pin and it works fine. You just have to remember not to remove the antenna again! Damaged female receptacles can be bent inward, but be very careful on this process.

If the easy fixes are not the answer, one must ask if it is worth repairing at a professional repair shop or worth opening up the case yourself. If it is an old radio, it probably is not worth the effort or risk. It can then be "parted out" to your repair bench for future projects. The empty shell case might be a worthy addition to your collection of old scanners. Needless to say, I have quite a few in my collection.

19

If you are about to buy a new rubber duck for your handheld or a mobile antenna, check out these websites: <http://www.northwestradio.com/interceptnw/antennas.htm> or

<http://www.strongsignals.net/access/content/antenna.html>. Remember to check that the BNC or SMA pin makes solid contact with your radio. If it does not, the gain in

your new antenna is worthless and may actually lessen your reception. There is no guarantee that the antenna from a third party vendor will mate up perfectly with your radio.

20

In a recent column I noted the arrival of a *new and updated* version of the DC power distribution strip from West Mountain Radio. Another source is newcomer Saratoga Radio Products from <http://www.hamstop.com>. MFJ has awakened from their slumber, and has responded with their new version of a DC power strip utilizing Anderson Power Poles. Next month, I will have a side by side evaluation of all three products.

21

Last month I noted the arrival of the new Red Cross Emergency Communications Response Vehicle to the Spokane, Washington, chapter. This is one of nine located around the country. I am writing a feature article about this vehicle. Watch for it! Here is another teaser: the vehicle comes

complete with several new nationwide frequencies. The list includes 453.425, 453.475, 453.525 and 453.575 along with their 458 input partners. These public safety frequencies are issued with a nationwide callsign, with secondary use status.



22

I downloaded a radio cheat sheet that someone put up on the web. It was very compact and crammed a lot into a small credit card size. It came with four point type. (Ouch, that is pretty small) Nevertheless, I printed it out. I found it very useful, and decided to adapt some of my own cheat sheets to this smaller size. But alas, my Word 2002 program has no font sizes smaller than eight points. I went back to the original download, and copied the four point size template, and used it as the basis for my new cheatsheet. I also saved it to a template file called "four point font." Does anyone have a better workaround?

23

If you are a ham radio operator, or really into radios and electronics, you probably do a fair share of wire stripping for variety of needs. I use a quality, commonly available, wire stripper to

make the job quick and easy. But I noticed that my "cuts" were not as clean as I prefer. I took a look at the wire stripper tool and discovered a great deal of grime and dirt in the cutting channel, and also in the moving parts. Using an old toothbrush dipped in rubbing alcohol, I thoroughly cleaned the tool. I used a rag and then a cotton swab to make certain the area was clean and dry. I then added a couple of drops of gun oil into the critical moving parts. Whoa, it works better than new!

If you don't own such a tool, you should. And remember that buddy that spent a whole Saturday helping you install a radio in your car? What a nice gift for any man who already has most things. Don't look at Radio Shack, but Graybar and their electronics parts/tool supply houses. Don't scrimp on this important tool: Buy the best! Here are some sources:

<http://www.graybar.com>  
<http://www.mouser.com/>  
<http://www.ssejim.co.uk/>  
<http://store.yahoo.com/nsiradio1/>

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Back up your valuable data files and frequency lists by sending them email as an attachment to a friend. Obviously, you need to work this out with your friend who can then store these files on his/her computer. I also make a backup on a ZIP Disk and store it at another physical location.

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Do you hold an FCC Extra class amateur license or know somebody that does? The ARRL offers a special 8x11 frameable certificate for those who have earned the Amateur Extra class license: <http://www.arrl.org/news/stories/2001/06/22/1/>. Cost is \$7.50 for a ARRL member or \$10 for others. Contact the awards branch at ARRL with name, callsign, address, and year the Extra was earned. It makes a great special gift. I am still waiting for mine. (Hint, hint)

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I often recommend the use of plastic freezer bags for traveling with radio accessories. I used a black permanent marker to label the contents. Here is an update: I bought a package of assorted brightly colored paper. I use the computer word processor to type up the contents using the largest print size available (72-point type in my word processor). I then insert the sheet into the one gallon size bag (yes, it fits). It's a whole lot easier to read, with the contents in large type face.

## Choosing a Scanner

**S**canners that can monitor trunked radio systems continue to be the hot topic as public safety agencies transition from conventional analog systems to new trunked radio networks. This month we'll take a look at the difference between various types of scanners and what it takes to monitor these new systems. We'll also check in on Nebraska and Michigan as we answer reader mail.

### Scanner Types

Dear Dan,

Can you update a Bearcat 200xlt scanner to make it a trunk tracker? I didn't know if there were any modifications ...or if I would have to purchase one of the new Uniden models. Also, of the trunk trackers on the market, which one would you recommend? It's just for the home so I would like a base unit. I do attend NASCAR races but my BC200xlt works great for that. Thanks for the info.

Jeff via the Internet

Despite being more than 15 years old, I like the 200xlt and still use one. It works well, sounds great and is very easy to program. There are several modifications available for the Bearcat 200xlt, but unfortunately turning it into a portable trunk tracker is not one of them. The 200xlt is a *conventional* scanner, meaning it can scan a list of stored (programmed) frequencies but can only provide audio for analog signals on a single channel. It is not able to follow a trunked conversation that may jump from one radio frequency to another. Conventional scanners have three basic functional sections – manual control, allowing the user to enter frequencies, scan ranges, and other commands; a radio section capable of tuning across various frequency bands; and an audio section to deliver sound to the user.

Trunked radio systems transmit two basic kinds of information: voice traffic and control messages. The voice portion may be analog or one of several types of digital; the APCO-25 digital voice standard is one of those types. The control information requires a special decoder in order for the scanner to be able to interpret it. This is what the 200xlt is lacking – a control message decoder. It is possible to use a personal computer to perform this interpretation by connecting it to the dis-



criminator output of the scanner (the scanner requires a physical modification to do this), but the 200xlt would be a poor choice for this task. Current trunk tracking scanners have the control message decoder built-in, programmed for several different types of radio systems, and they are easier to carry around.

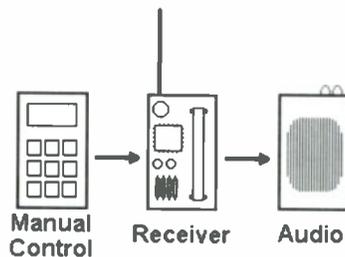
There are really two kinds of trunk

tracking scanners available today. The first type will automatically retune the radio to follow conversations on a trunked system though the use of an additional trunking controller section. The Uniden Bearcat 245xlt and the Radio Shack PRO-92 are two examples – they can track trunked systems but can only provide analog audio.

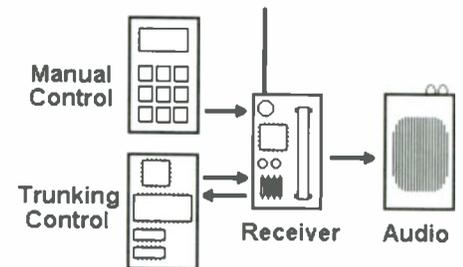
The second type of trunk tracker is a digital scanner, such as the Uniden Bearcat 296D and the Radio Shack PRO-96. These radios have yet another section, this one capable of decoding APCO-25 digital signals. In the first Uniden digital scanners, the 250D and 785D, this section was in a separate card, designated the BCi25. More recent models have the section already installed. In addition to following trunked conversations, these scanners can provide both analog and digital audio.

As far as a recommendation, I can say that I own a Radio Shack PRO-96 and I'm pretty happy with it. I live in an area with a number of busy APCO-25 systems and the PRO-96 does fine. I haven't had a chance to try out a Uniden scanner side-by-side, so I can't give you a first-hand report.

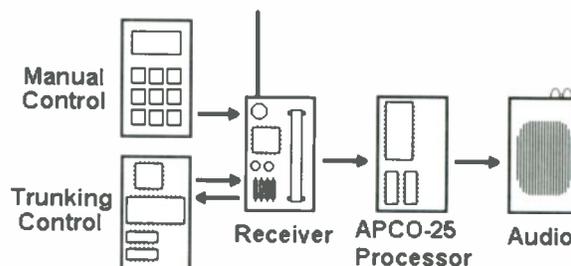
### Conventional Scanner



### Trunking Scanner



### APCO-25 Digital Trunking Scanner



If you're not in an area with APCO-25 digital systems, or you don't have the interest in listening to them, you wouldn't go far wrong with a Uniden 245xlt or a Radio Shack PRO-92. I own both of these trunk-tracking scanners and each works well, but there are a few differences between them. For instance, the 245xlt has computer control while the PRO-92 can monitor LTR systems. Ultimately, the choice of scanner will depend on what you want to monitor, what type of communications systems those agencies use, and what scanner features are most important to you.

### ◆ Firmware Updates

The APCO-25 decoder sections used in digital scanners are controlled by microprocessors. A microprocessor uses *firmware* (computer software stored in hardware) instructions to properly decode digital signals. As bugs are discovered or different trunked radio systems come into use, manufacturers may choose to update the firmware for a particular scanner. The firmware in these scanners is stored in *flash memory* and can be updated through a personal computer, similar to the way photographs can be downloaded from digital cameras.

### Uniden Bearcat 296D and 796D

The Bearcat 296D is a new handheld digital scanner capable of monitoring APCO-25 systems. The 796D is the mobile/base version with identical capabilities. Back in early December some 296D and 796D users in Minnesota reported to Uniden that their scanners couldn't track conversations in the Hennepin County Sheriff's Department, which uses relatively high talkgroup numbers.

Uniden engineers confirmed that the scanners were unable to properly track any APCO-25 talkgroup greater than 4096. According to Uniden, at present only Minnesota uses talkgroup numbers that high. The engineers have created a fix that should correct the problem, but it requires an updated BCi96D digital card. Uniden promises to have more detailed information in the product support section of their website, which can be found at <http://www.uniden.com>.

At press time the download section of Uniden's web site listed a file named BCi96D.ZIP that contains a loader program to update the digital card. The loader data file had a date of December 24th, so presumably it contains the proper fix. I don't have a 296D or 796D so I haven't tried the fix myself, but I'd love to hear from someone who has applied the update.

### Radio Shack PRO-96

There is also an effort underway to complete a firmware update for the Radio Shack PRO-96 scanner.

The vast majority of existing APCO-25 systems transmit information using a method called C4FM. The PRO-96 handles this method just fine. However, a handful of systems use a different method, called CQPSK. The PRO-96 doesn't handle this method very

well at all. Users typically experience a few seconds of clear audio, then garbled sounds and finally silence.

There is word that GRE (the manufacturer of the PRO-96) has been working for several months on an update that will allow the PRO-96 to operate properly with CQPSK systems. The developers have apparently run into a few problems but are confident that they will eventually find a solution. As of now, however, PRO-96 users trying to monitor CQPSK systems are out of luck.

### ◆ Nebraska

*Happy New Year, Mr. Veeneman!*

*Just a quick note to let you know that APCO P25 digital has come to Nebraska...*

The county of Douglas, through a bond issue, recently upgraded its radio system to 800 MHz. The new system went up around mid-December 2003. It was an APCO P25 digital system and all conventional VHF/UHF frequencies went silent. Further, the county is allowing the licenses of the old frequencies to lapse.

Motorola is the service provider. I am not sure of what kind of system it is, though it is probably a safe bet to say it is a 9600 baud, second-generation P25 system. Four towers are expected to provide countywide coverage.

As far as I know, three FCC licenses were taken out for the system with a combined 50 frequencies in the 820/860 regions. Maybe one or two control channels.

The Douglas County Sheriff's Department took the initial step. The city of Omaha (the largest city in the county and state) police/fire/emergency are scheduled to go on-line sometime this month followed by other departments in the county's remaining cities.

Sarpy County, immediately south of Douglas County, already has in place a Motorola 800 MHz analog trunked system. The Douglas County system is designed to allow these transmissions to be integrated into their radio plan.

Further, the state of Nebraska continues to be in discussion about planning a new statewide radio system, presumably 800 MHz, to replace the old Low/High VHF systems currently in use by the state/county enforcement officials. 95% statewide coverage is expected when a new system is installed as well as interoperability with the Motorola 800 MHz systems in Douglas and Sarpy Counties and the 800 MHz Ericsson system in Lancaster (Lincoln) County.

Regardless, scanner enthusiasts in the state's most populous county with soon be unable to monitor public services frequencies with conventional scanners. Although, I do not know if Omaha will gradually phase out its UHF system until the switch actually occurs. Sarpy County still retains its old

frequencies and is still heard.

I'm not a die-hard scanner enthusiast and am unable at this time to have more definitive info for you. I believe, however, it is important to monitor public safety systems. Going all digital does seem a bit extreme. The Omaha Fire Department has one channel that can be encrypted for sensitive info. Douglas County and the City of Omaha, obviously, think otherwise. Until the price of digital scanners drop – and can monitor this system – I will wait in silence until I can purchase such a system.

As an aside, the Radio Shack Pro-96 digital scanner is available through special order at the stores in Omaha.

*...Hope some of this can be useful to you and others. Thanks.*

*John in Omaha*

### Sarpy County, Nebraska

Sarpy County operates a Motorola system carrying both analog and digital traffic and uses 3600-baud control channels. The following frequencies are active: 856.2375, 856.9875, 857.2375, 857.9875, 858.2375, 858.9875, 859.2375, 859.9875, 860.2375 and 860.9875 MHz.

Here are some talkgroups on the Sarpy County system:

DEC	HEX	Description
48	003	Police - East
80	005	Police - Information
112	007	Police - West
144	009	Police - Common
176	008	Bellevue Police Dispatch
208	00D	Police and Fire - 1
240	00F	Bellevue Police
1296	051	Papillion Police
1776	06F	LaVista Police (Dispatch)
2256	08D	Sheriff (Dispatch)
2288	08F	Sheriff (Tactical)
2608	0A3	Bellevue Police
3216	0C9	Fire East
3248	0C8	Fire West
3280	0CD	Bellevue Fire (Dispatch)
3408	0D5	Emergency Medical Services
3440	0D7	Emergency Medical Services
3952	0F7	Papillion Fire and Rescue
4496	119	Gretna Fire and Rescue
4528	118	Gretna Fire and Rescue
4656	123	Gretna Fire and Rescue

Three 800 MHz frequencies are reported to be operating conventionally (not part of the trunked system). 866.0125 MHz



covers the central area of the county around Papillion and La Vista, 866.5125 MHz in the east and 867.0125 MHz on the west side. The county also does fire paging on 453.90 MHz and county-wide paging on 155.55 MHz.

### Douglas County, Nebraska

Douglas County operates a fully digital Motorola system, operating APCO-25 protocols and using 9600-baud control channels. It's licensed for the following frequencies: 866.2375, 866.2750, 866.5375, 866.5625, 866.5875, 866.7875, 866.9500, 867.2250, 867.4125, 867.5875, 867.7125, 867.9625, 868.2125, 868.4500, 868.4750, 868.5125, 868.7000, 868.7250, 868.7625 and 868.9500 MHz.

The Omaha Police Department switched to this system in January, but apparently not many talkgroups are known.

DEC	HEX	Description
2	002	Sheriff (Dispatch)
3	003	Sheriff (Information)
5	005	Omaha Police (Northwest)
6	006	Omaha Police (Northeast)
7	007	Omaha Police (Southeast)
8	008	Omaha Police (Southwest)
11	00B	County Courthouse
12	00C	County Courthouse (Security)
60	03C	Ralston Police
602	25A	Omaha Police (Information)

### ◆ Gaylord, Michigan

Hi Dan,

*I just bought a new Uniden BC895XLT trunk tracker scanner. I live in Gaylord, Michigan, and was wondering if you knew any of the channels or frequencies that cops may be using.*

Thanks, Don

In July of 2001 the dozen or so public safety agencies in Otsego County joined Michigan's Public Safety Communications System (MPSCS). MPSCS is a statewide digital trunked radio system that follows the APCO-25 standards. More than 10,000 radios are on the system, spread across 300 federal, state and local agencies.

More than 180 repeater towers provide coverage to about 97 percent of the state. Each tower will have anywhere from five to twelve frequencies, all transmitting in the range between 851 MHz and 869 MHz. One

of these towers is about seven miles northeast of Gaylord and is licensed for five frequencies: 866.0125, 866.3875, 866.8875, 867.3875 and 868.8875 MHz.



So, if you have one of the new digital scanners (Uniden BC250D, BC296D, BC785D, BC796D or Radio Shack PRO-96) you can program in those five frequencies and hear all the traffic, police included, that comes across the Gaylord tower. Below you find a list of police talkgroups that might be active in your area.

DEC	HEX	Description
1006	3EE	State Police (District 1)
1007	3EF	State Police (District 3)
1008	3F0	District 1 (Statewide)
1009	3F1	District 3 (Statewide)
1261	4ED	State Police (Aviation)
2005	7D5	State Police (District 2)
2006	7D6	District 2 (Statewide)
3003	BBB	State Police (District 5)
3004	BBC	State Police (District 6)
3005	BBD	District 5 (Statewide)
3006	BBE	District 6 (Statewide)
4002	FA2	State Police (District 7)
4003	FA3	District 7 (Statewide)
5027	13A3	Otsego County Police - Dispatch
5043	13B3	Gaylord Police
6002	1772	State Police (Upper Peninsula)
6003	1773	District 8 (Statewide)

Gaylord is also home to one of seven communications centers spread across the state; the others are located in Bridgeport, East Lansing, Negaunee, Northville, Paw Paw and Rockford.

If you're interested in other activity, I'm also informed that Gaylord schools can be heard on 155.235 MHz and that the County Hospital uses 155.280, 155.340, and 155.400 MHz.

### ◆ San Diego, California

For those of you in southern California, the San Diego Metropolitan Transit Development Board has awarded Motorola a \$19 million contract to design and install a regional transit management system. The contract includes a digital radio network operating in 800 MHz that will support voice and data communications, vehicle location and tracking, and automated mapping. The first users of the system are expected to be 500 buses run by the San Diego Transit Corporation and the North County Transit District. Eventually it may expand to include all bus and rail service in the greater San Diego area.

### ◆ Kosciusko County, Indiana

Perhaps most famous for having a jail that outlaw John

Dillinger broke into in 1934 (where he stole handguns and bulletproof vests), Kosciusko County in northern Indiana is asking the Department of Justice for \$500,000 to get them onto an 800 MHz radio system. Indiana is implementing a statewide system in phases, and Kosciusko County wants to be ready as soon as possible. A new system would also allow police, fire and other emergency services to talk with each other, both within the county and with neighboring jurisdictions. The initial grant, however, would be used to get the sheriff's office and emergency management personnel onto 800 MHz. Fire and other services would come later. Long-term goals include the ability to transmit and receive data as well as voice, allowing text messaging and mobile access to criminal and other databases.

Under the plan the county of 75,000 people would have two repeater sites.

Currently the Kosciusko Communications Center in Warsaw dispatches all police, fire and emergency medical services in the county, with the exception of Syracuse. Interestingly, all 911 calls are recorded on DVD and are available for immediate playback. In the "old days" calls were recorded on reels of magnetic tape and it could take quite some time to retrieve a particular call.

Until the 800 MHz system is in place, you can check the following frequencies. County Sheriff dispatch is on 154.845 with additional traffic on 154.150, 154.890, 156.150, 155.130 and 158.865 MHz. County fire is dispatched on 154.340 MHz, while Warsaw Fire is on 151.460, 153.890, 154.280 and 155.340 MHz. Warsaw Police use 155.670 and 155.970 MHz.

### ◆ Washington, D.C.

Dear Dan,

*The description of the upgraded police communications system for Washington, D.C. in your column in the December 2003 Monitoring Times was especially interesting to me. As a teenager living in D.C. in the 1930s I used to monitor the Metropolitan Police station WPDW on 2,422 kilocycles (not kilohertz!). I used a Philco Model 635 all-wave receiver that I had modified with a relay squelch circuit to mute the audio when no signal was received.*

*Initially, the Washington system was one-way, with no transmitting capability in the squad cars. WPDW at times transmitted messages to cruisers in the adjacent Maryland county of Prince Georges. Eventually the cars were given talk-back capability via FM transmitters on 37.220 megacycles, with the dispatcher still transmitting on 2,422 kilocycles. I believe that this transmitter was located at the 10th Precinct, somewhere in northwest Washington.*

Perry in Winchester, Virginia

Thanks Perry! I'd love to hear about other police radio systems from before World War II, so if you have a story to tell or photos to send in, please drop me a line!

That's all for this month. More information is available on my website, including detailed APCO-25 information and links to Uniden for scanner firmware updates. Please send your questions, comments and frequency lists to me at [danveeneman@monitoringtimes.com](mailto:danveeneman@monitoringtimes.com). Until next time, happy scanning!



## Ham-Ex Time Again



The OBRV tracks and the hairpin at Forks of the Credit.

**D**espite continuing uncertain weather we Canadians know that spring is just around the corner. One of the harbingers of Canada's shortest season is that growing annual hamfest known as Ham-Ex. Formerly a modest amateur radio flea market in the northwest suburbs of Toronto, it has grown into a major event attracting hams, shortwave listeners, scannists and CBers from all across Central Canada.

Ham-Ex is sponsored jointly by southern Ontario's Peel and Mississauga Amateur Radio Clubs. Prior to last year the event was a morning flea market running in parallel with a seminar program and amateur radio examinations. Taking their cue from a steadily growing attendance, the organizing committee decided to expand the event into an all day affair.

The new format saw its debut in 2003. Committee members and volunteers were at their posts before seven in the morning. The doors were flung open to an eager crowd of flea market bargain hunters at nine. Pickups, vans and car trunks filled up with the spoils of the first major flea market of the year until around noon, then the program of seminars was fired up to keep enthusiastic radio aficionados busy until the end of the afternoon. Following a short break, an evening banquet with guest speaker Jim Dean, Vice President of Regulatory Affairs with Radio Amateurs of Canada, closed off the event some fifteen hours after the first volunteers arrived.

This year Ham-Ex once again headlines the opening of the amateur radio spring season. If you can make the trip to the Brampton Fall Fairground in Caledon, Ontario, on Saturday March 20th you will be most welcome. I'll be there and I look forward to meeting some *Monitoring Times* readers at the event. I'll be wearing my callsign name tag (VA3KOT). If you manage to find me among the milling through please introduce yourself.

The event site is on Heart Lake Road which is the continuation of highway 410. The Brampton Fall Fairground is just a few short kilometers north of the end of the highway. Ham-Ex will be well signposted, but the army of callsign license plates and mag-mount vehicle roof antennas in the large free parking lot on the west side of the road will be a dead giveaway that you have arrived.

This year's format will be a repeat of last year's successful event with a morning flea market, all-day exhibits from AMSAT,

ARES (Amateur Radio Emergency Service), the Canadian Red Cross, St John Ambulance Brigade and other emergency service groups. Amateur radio examinations will be held starting in the morning. (Come on, SWLs and scanning enthusiasts, make this the year you take the plunge and get licensed). The evening banquet will feature a keynote address by Donald Courcy, Spectrum Management Officer of Industry Canada. Here is an opportunity to put the fed's spokesman on the spot and get answers to your questions about the radio spectrum in Canada.

### ◆ Further Down the Line

March is the big month for Ontario's Town of Caledon, it seems. In addition to the annual invasion of radio enthusiasts at Ham-Ex, *Scanning Canada's* rail journey along the Orangeville Brampton Railway line also takes us into Caledon this month.

The town proudly proclaims its fame as the greenest town in Ontario. The main topographical feature of the town is the Niagara Escarpment which separates the southern portion bordering on Brampton (where we will visit next month) from the northern portion at the top of the escarpment. The Niagara Escarpment runs 725 kilometers from Niagara Falls in the south to Tobermory at the tip of Ontario's Bruce Peninsula in the north. The escarpment cuts through the middle of Caledon, pushing the northern section up about 1000 feet higher above sea level than the City of Toronto some 80 kilometers to the southeast.

This is great antenna country. There is only one tower in southern Ontario that can see up and over the edge of the escarpment and that is Toronto's CN Tower. Radio enthusiasts in Caledon have a natural thousand-foot height advantage over city dwellers, and that really makes a difference for DX reception.

But, back to the rail line. The tracks have to make their way down the steep escarpment on their way to their junction with the main CN tracks in the city. At a picturesque point near the hill called the Devil's Pulpit, the tracks cross a traditional wooden trestle bridge traversing the confluence of the two arms of the Credit River. There is a hairpin bend in the road beside the rail line at the point called "Forks of the Credit."

The scenery here is very typical of most

people's mental image of Canada – steep slopes, a swiftly flowing river and a traditional railroad trestle bridge. Perhaps for this reason the location has been used for filming scenes from the popular Canadian TV show "Due South."

The railroad frequencies used by the Orangeville Brampton Railway company were listed in last month's column. These frequencies are quite active on Tuesdays and Thursdays when freight trains use the line. This month's frequency list is for the Town of Caledon.

Hydro One Networks Inc  
72.420  
Brampton Flying Club (Caledon) – Canada's largest private flying club  
123.300, 123.450  
CIDC FM Tower  
(CIDC FM broadcasts on 103.5 MHz)  
151.250 411.7375 Province of Ontario (GMCO)  
159.660 164.820 167.100 931.4375  
931.6125 931.6875 931.9375 Rogers Paging  
Canadian Pacific Railroad  
159.885 160.935 161.115 161.175  
161.415 161.535 896.9375 935.9375  
School Buses  
162.435 Parkview Transit  
167.265 408.1625 Laidlaw Transit  
Town of Caledon  
72.100 Town Hall  
169.155 169.755 Roads Dept  
Respond Emergency Communications Search & Rescue  
172.470 172.980  
Caledon Ski Club  
172.500 172.590  
Clublink - Bolton Golf Club  
(good for knowing when the course marshalls are coming)  
451.1875 451.6625 458.6625  
462.5625 469.2625  
Peel District School Board  
458.6625 469.2625  
Region of Peel, Victoria Yard  
821.0875 821.1875 821.2125  
821.3375 821.4375 821.6875  
821.7125 821.8375 821.9375  
821.9625 822.0875 822.1875  
822.2125 822.3375 822.5875  
822.6875 822.8375 822.9375  
Region of Peel  
440.2875 445.2875 928.84375  
952.84375  
Province of Ontario (GMCO)  
152.000 (very active)  
419.4125 Caledon Fire Tower  
149.440 Bolton MTC Tower

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## AFRTS/AFN Confusion Continues

**S**everal months after the American Forces Radio/TV Service (AFRTS) announced new frequencies for the Navy's shortwave rebroadcast of AFRTS and the American Forces Network (AFN), things are still pretty confused.



The AFN web site shows the following new frequencies, which are all upper sideband (USB) and in kilohertz (kHz):

Diego Garcia (Indian Ocean): 12579 day, 4319 night (all nights are local time at the transmitter)

Guam (West Pacific): 13362 day, 5765 night  
Pearl Harbor, Hawaii: 10320 day, 6350 night

Key West, FL: 5446.5 and 12133.5, 24 hours

Roosevelt Roads, Puerto Rico: 7507, 24 hours

Keflavik, Iceland (North Atlantic): 13855, 24 hour

Immediate confusion was caused by Diego Garcia's listing for 12579, which is an international MSI (Maritime Safety Information) frequency using narrowband direct printing in SITOR-B (Simplex Telex Over Radio, mode B). This particular frequency is used every day by the US Coast Guard, among other agencies worldwide, to comply with treaties regarding the safety of life at sea. They're still sorting this one out.

Keflavik, a military base in Iceland, was not heard right away, but Klaus Betke was able to confirm it from Scandinavia on New Year's Eve. 13855 is indeed the right frequency.

For the longest time, there was some dispute over whether the US transmitter was at the Key West communication site, or the big Rosey Roads base in Puerto Rico. In this band plan, though, all three frequencies have been reported as up simultaneously.

All the confusion is probably due to the fact that AFRTS has always been pretty much out of the loop on this particular broadcast. At the very beginning, in fact, they thought someone had pirated their downlink. This is why it's never a good idea to try and get a verifica-

tion ("QSL") from AFRTS itself. AFN lists an e-mail address of [QSL@mediacen.navy.mil](mailto:QSL@mediacen.navy.mil).

The content of this broadcast is a pickup of the AFRTS/AFN "interruptible voice channel." It's a dump from the satellite downlink to HF (high frequency, nominally 3-30 megahertz). This was originally done in order to fill gaps in the Navy's DTS (Direct To Sailor) entertainment system. Years later, though, the rebroadcast continues. It has proven simple and effective, as HF usually does.

The "interruptible" part refers to the fact that the "voice channel" can be broken into for special programs such as ball games. There are actually several program channels going out at once, and so the content on HF can be kind of unpredictable. Sure is nice to miss all the commercials, though.



### ◆ New Beacon Oddities

It appears as if the Russian single-letter beacons are no longer alone. A number of other such devices have been discovered on high frequency (HF, 3-30 kilohertz). They are unlicensed, and using frequencies that probably make them pirates under the letter of FCC Part 15 regulations. Their purpose is a total mystery.

One group has posted a list of its frequencies to a pirate radio group on the Internet. They claim to have operated many very low-powered radio beacons in the more remote desert regions of California and Arizona "for a few years now." All are said to be solar powered, with most going to a battery at night. Typical power output is said to be 100-200 milliwatts, rather low for HF. Emission is CW (continuous wave or A1A), and the frequencies are crystal controlled.

A closely-spaced group of five beacons, reminiscent of the Russian "clusters" believed to be used for propagation sounding or direction finding, are between 4095 and 4096 kHz. Three of these have been found here, in Los Angeles. The loudest one, on 4095.54, sends Morse code dits (dots) of varying numbers and speeds, plus the Morse letter "W" every 11 seconds. 4096.27 kHz sends long dashes, actually a carrier switched one second on, one second off. Finally 4096.6 sends long dashes of varying lengths.

Also loud here is the single-letter "S" bea-

con (same identifier used by Marconi's first transatlantic test). Frequency is given as 8000.55 kHz, but it measures at 8000.63. It only transmits in day time, when the sun is shining.

Finally, there's one on or near 6700 kHz. It's only heard sporadically here, sending odd strings of dits.

It's probably worth some listening to determine whether these interesting transmissions could be some kind of telemetry, changing in proportion to anything such as temperature or battery charge. If nothing else, their ultra-low power certainly makes for good propagation soundings.

Just so people outside the southwestern US won't feel left out, there have been reports of a pirate beacon in the British Isles. This one appeared on 499.25 kHz in December, repeating the Morse code loop, "CQ CQ CQ DE BDN BDN BDN HAPPY NEW YEAR."

"CQ" is of course the Morse code callup for "hello all stations," and "DE" is the procedural signal for "from." The callsign "BDN" sure sounds like the reverse of "NDB," the official generic designator for a "Non-Directional Beacon." Real navigation beacons don't call "CQ," though, and needless to say they never, ever, wish us any kind of holiday greetings. Increasingly, they send Differential Global Positioning System data streams, and don't say anything intelligible to humans at all.

Other pirate beacons have been reported on 6925 (letter "C") and 6135 kHz.

### ◆ Coastal Station List

There are a few additions and corrections to the list of maritime public coastal stations published in the January column.

Change the status of KLC, Galveston Radio in Texas, from uncertain to closed, sometime in the '80s. Some of its frequencies were taken over by other stations and the letters are currently used as an identifier name by KLCR, a low-power station at Lewis & Clark College in Oregon.

Add RLK7, another callsign used by Arkhangelsk Radio in Russia. Add UFA, Batumi Radio, Georgia, Russia. Tentatively add UTM, Feodosia Radio, in the Ukraine. It's still being reported, but not often.

Finally, add A4M, Muscat Radio, in Oman. With these changes, we have a pretty good accounting of what's up in maritime coastal radio.

## ABBREVIATIONS USED IN THIS COLUMN

AFB	Air Force Base
ALE	Automatic Link Establishment
ARINC	Aeronautical Radio, Incorporated
ARQ	Automatic Repeat Request teleprinting system
CAMSLANT	Communication Area Master Station, Atlantic
CAMSPAC	Communication Area Master Station, Pacific
Coq-8	Coquelet-8, French teleprinting system
CW	Morse code telegraphy ("Continuous Wave")
DEA	US Drug Enforcement Administration
DSC	Digital Selective Calling
EAM	Emergency Action Message
FAX	Radiofacsimile
FEC	Forward Error Correction teleprinting system
HF-GCS	High-Frequency Global Communications System
JSTARS	Joint Surveillance Target Attack Radar System
LDOC	Long-Distance Operational Control
MARS	Military Affiliate Radio System
Meteo	Meteorological
MFA	Ministry of Foreign Affairs
MWARA	Major World Air Route Area
MX	Russian single-letter beacons/channel markers
PACKTOR	Packet Teleprinting Over Radio
PR	Puerto Rico
RSA	Republic of South Africa
RTTY	Radio Teletype
SAM	Special Air Mission (Distinguished Visitors)
SHARES	Shared Resources, US federal net
SITOR-A	Simplex Teleprinting Over Radio, ARQ mode
SITOR-B	Simplex Teleprinting Over Radio, FEC mode
UK	United Kingdom
Unid	Unidentified
US	United States

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 (encrypted, usually unidentified, broadcasts thought to be intelligence-related) are identified in ( ) with their ENIGMA station designators, as issued by the European Numbers Intelligence Gathering and Monitoring Association.

- 490.0 C-Portpatrick, UK, SITOR-B wind warnings at 2020. G-Monsanto, SITOR-B weather and navigation warnings in Portuguese, at 2100. (Day Watson-UK)
- 2182.0 VAR-Canadian Coast Guard, St John, NB, announcing upcoming broadcast on 2749, English and French, at 0139. (Rick Baker-OH)
- 2187.5 002241078-Madrid, Spain, with a DSC all-ship call, listening on 2182, at 0031. 002510100-Reykjavik, Iceland, DSC at 0202. 002371000-Olympia Radio, Greece, DSC at 0226. 232002774-GFKA, British vessel *Blackfriars*, DSC test with UK Coast Guard, Milford Haven, at 0754. (Watson-UK) 533529000-9MEA7, vessel *Alam Bitara*, calling Malaysia in DSC, at 0755. (Patrice Privat-France)
- 2250.0 OWI-Dutch Air Force, Aalborg, working OWF, Skrydstrup, also using 2531, 3291, and 4841, all in ALE, at 2249. (Watson-UK)
- 2461.5 0A-Irish Navy, Haulbowline, working ships in SITOR-A at 2338. (Watson-UK)
- 2598.0 VOK-Canadian Coast Guard, Goose Bay, Labrador, with Marine Information Broadcast at 0137. (Baker-OH)
- 2617.0 GYA-UK Royal Navy, Northwood, FAX weather charts at 2315. (Watson-UK)
- 2670.0 "Activities"-US Coast Guard, working vessel *Atlantic Queen*, at 0415. VCO-Canadian Coast Guard, Sydney, NS, Marine Information Broadcast at 0040. (Baker-OH) US Coast Guard Group Charleston (SC), information broadcast at 1108. (Mark Cleary-SC)
- 2682.4 CFH-Canadian Forces, Halifax, NS, weather in RTTY at 0350. (Ron Perron-MD)
- 2899.0 Shanwick-North Atlantic MWARA control, Ireland, position from Delta 64, at 0650. Shanwick, position from American 84, at 0659. (Allan Stern-FL)
- 3137.0 IKF-US Air Force, Keflavik, Iceland, ALE call to ICZ, Sigonella, Italy, at 2306, and HAW, Ascension Island, at 2317. (Watson-UK)
- 3155.0 OB1P-Lithuanian military, working MS2Z in ALE at 17091. (Watson-UK)
- 3476.0 Gander-North Atlantic MWARA, Canada, handing Delta 665 off to Shanwick, at 0333. (Stern-FL)
- 4364.5 3AC-Monaco Radio, PACKTOR-II traffic list at 1655. (Watson-UK)
- 4469.0 Florida Cap 1030-Civil Air Patrol, checking stations into wing net at 0130. (Stern-FL)
- 4604.0 Columbus 4-Ohio Civil Air Patrol, calling any Red Thunder (OH), Red Robin (MI), and Blue Mound (WI), no joy, at 2334. (Perron-MD)
- 4739.0 Cardfile 712-US Navy, working Fiddle (USN, Jacksonville, FL), at 0503. (Cleary-SC)
- 4755.0 RCV-Russian Navy, Moscow, working RHV42 in CW, at 1850. (Watson-UK)
- 4777.3 IMB51-Rome Meteo, Italy, FAX weather charts at 1918. (Watson-UK)
- 4996.0 RWM-Moscow, Russian, with CW standard time pips at 1814. (Watson-UK)
- 5465.8 "R"-Russian Navy, Ustinov, CW single-letter marker beacon (MX), at 2156. (Watson-UK)
- 5500.0 H6W-Moroccan police, calling AOP and L9X, also using 6922, 7635, 8942, 9285, and 10900, all ALE, starting at 0749. (Watson-UK)
- 5616.0 Gander-North Atlantic MWARA, Canada,, position from Amtran 442, at 0504. (Stern-FL)
- 5696.0 Rescue 1500-US Coast Guard, working CAMSLANT and NMN37, CG Group Ft. Macon, GA, on a rescue at 2012. (Baker-OH)
- 5732.0 Coast Guard 1712, passing position and ops-normal to CAMSPAC, CA, at 0104. (Cleary-SC)
- 5850.0 OXT-Copenhagen Meteo, with notice in frequency-shift Morse that station will discontinue FAX ice charts on 1 Jan 2004, at 0945. (Watson-UK)
- 6449.7 PWZ-Brazilian Navy, Rio de Janeiro, RTTY navigational warnings in Spanish, at 2200. (Bob Hall-RSA)
- 6491.5 LOR-Argentine Navy, Puerto Belgrano, with RTTY weather in Spanish, simulkeyed on 8303, at 0004. (Hall-RSA)
- 6637.0 Miami Radio-ARINC contract LDOC, FL, working Amerijet 710, at 1108. (Stern-FL)
- 6640.0 New York-ARINC LDOC, patching US Air 782 to company dispatch at 0345. (Stern-FL)
- 6697.0 Twilight-US military, with EAM simulcast on 8992, 11244, and 13155, at 0437. (Jeff Haverlah-TX)
- 6700.0 OCEANO-Mexican Army, ["Ocean"], calling SELVA (Forest) at 1024, and TIBURON (Shark) at 1110. (Watson-UK) [Mexican scrambled voice heard here too. -Hugh]
- 6721.0 Reach 0177-US Air Force Air Mobility Command, with ALE-initiated patch to Charleston AFB, at 1517. (Cleary-SC)
- 6761.0 Palm 91-US Air Force, arranging refueling track with Steel 72, at 2353. (Cleary-SC)
- 7527.0 Hammer-US Customs Service, working aircraft Omaha 297, at 1224. (Cleary-SC)
- 7633.5 Reach 6307-US Air Force, making a morale patch at 2300. (Cleary-SC)
- 8337.6 Shark 11-US Coast Guard, working 17C and cutter *Harriet Lane*, at 0016. Shark 13-Probably US Coast Guard, tracking Haitians near "Batcave" at 2351. (Cleary-SC)
- 8414.5 23909200-SKYV, Swedish vessel *Karoline*, DSC test with 003669995, US Coast Guard CAMSLANT, VA, at 2151. (Watson-UK)
- 8578.0 ANTARNET01-unknown station, working ASSEDNET01, in an ALE-initiated data exchange, at 1404. (Watson-UK)
- 8807.5 3AC-Monaco Radio, PACKTOR-II traffic list at 1633. (Watson-UK)
- 8912.0 Coast Guard 1717-US Coast Guard, position report for Predator 1 (PR), at 1333. (Cleary-SC)
- 8942.0 007-ARINC Ground Station, Shannon, Ireland, identifying in HFDL at 1544. KE0502-Korean flight giving HFDL position at 1545. (Watson-UK)
- 8971.0 Archer 21-Unknown US military, working Fiddle (US Navy, FL), at 2015. (Cleary-SC)
- 8977.0 SU0118-Aeroflot A320 VP-BDK, HFDL position at 1939. (Privat-France)

- 8983.0 Coast Guard 2102-US Coast Guard, being diverted by CAMSLANT to search for a drifting vessel, at 1954. (Cleary-SC) Coast Guard 2105, in a search and rescue of sinking motor vessel Dizzy; Air Force rescue helo also enroute, at 2115. (Stern-FL)
- 8992.0 Reach 9011-US Air Force, patch via Andrews HF-GCS for weather, at 1521. (Cleary-SC) Steel 71-US Air Force, probably a tanker, receiving coded messages from Offutt HF-GCS, NE, at 1535. Override-US military, calling Skymaster (US Strategic Command tactical call), followed by a "3-6-9" message simulcast on 11244, at 1954. Repudiate-US military, patch via Puerto Rico HF-GCS to "Command Center," to whom he passed a "3-6-9" message in 8 groups, at 2042. (Haverlah-TX)
- 9007.0 Canforce 2395-Canadian Forces aircraft, getting North Atlantic weather from Trenton Military, at 2333. (Cleary-SC)
- 9025.0 Coast Guard 1717-US Coast Guard, with ALE-initiated patch to Clearwater Air, FL, regarding a search, at 1254. (Cleary-SC) 291191-US Air Force C-17 89-1191, ALE sounding at 1347. (Privat-France) IKF-US Air Force, Keflavik, Iceland, working ICZ, Sigonella, Italy, in ALE at 1600. (Watson-UK)
- 9040.7 5YE-Nairobi Meteo, Kenya, coded RTTY weather observations, at 0112. (Hall-RSA)
- 9106.0 HHS-SHARES station WWD58, US Department of Health and Human Services, sounding in ALE, at 1551. (Perron-MD)
- 9226.7 Unid-Egyptian Embassy, Berlin, Germany, with encrypted message in SITOR-A, at 1624. (Watson-UK)
- 9982.5 KVM70-Honolulu Meteo, FAX weather charts at 1525. (Watson-UK)
- 9996.0 RWM-Moscow, standard time pips in CW, at 1545. (Watson-UK)
- 10033.0 Houston Radio-ARINC contract LDOC, TX, working West Indian 79, at 1520. (Stern-FL)
- 10075.0 Houston Radio-ARINC contract LDOC, working United 883, at 2034. (Perron-MD)
- 10242.0 Omaha 3SA-US Customs Service, tracking a target with Hammer, at 2008. (Cleary-SC)
- 10536.0 CFH-Canadian Forces Meteo, Halifax, NS, weather in RTTY, at 1500. (Privat-France)
- 10780.0 Cape Radio-US Air Force Eastern Test Range/HF-GCS, patching Razor 22 (E-8C JSTARS) to Peachtree Ops, Warner-Robins AFB, GA, at 1803. (Stern-FL) Razor 22, patch to Peachtree Ops at 1828. (Haverlah-TX)
- 10993.6 Herk 20-US Coast Guard, setting radio guard with Key West, at 2058. (Cleary-SC)
- 11175.0 Cacti 61-US Air Force, probably a tanker, came from erroneous 11176 frequency, this time raised Keflavik for a signal check, at 0015. Puerto Rico-US Air Force HF-GCS, came from 8992 with SAM 6717, at 0752. (Haverlah-TX) Puerto Rico working AMC 237 at 2351. (Stern-FL)
- 11176.0 Cacti 61-US Air Force, calling Mainsail (group call: any ground station this net) on the old frequency (which he called 11175), no joy, at 0013. (Haverlah-TX)
- 11220.0 Fish Pond-US military, troubleshooting data mode with Andrews HF-GCS, at 2105. (Cleary-SC)
- 11232.0 Canforce 4478-Canadian Forces, patching Wing Ops via Trenton, at 2255. (Cleary-SC)
- 11244.0 McClellan-US Air Force, CA, with a 110-character EAM simulcast on the HF-GCS frequencies, at 1909. Offutt-US Air Force, NE, same 110-character EAM at 2020. (Haverlah-TX)
- 11309.0 New York-North Atlantic MWARA, position from Air Portugal 1437, at 2047. (Stern-FL)
- 11330.0 New York-North Atlantic MWARA, working Gofer 07 (MN Air National Guard C-130E), at 1710. (Stern-FL)
- 11396.0 New York-North Atlantic MWARA, handing US Air 1745 off to San Juan, PR, on 134.3, at 1718. New York, position from American 679 at 1723. (Stern-FL)
- 11494.0 17C-US drug interdiction, working Panther (DEA, Bahamas), at 1843. (Cleary-SC)
- 12560.0 UCON-Russian vessel Pioner Moldavi, Russian SITOR-A traffic for Arkhangelsk, at 1400. (Privat-France)
- 12577.0 636006270-D5FQ, Liberian bulk carrier African Azalea, DSC at 0815. (Hall-RSA)
- 12669.0 LOR-Argentina Navy, Puerto Belgrano, with RTTY world news in Spanish, at 1800. (Hall-RSA)
- 13110.0 WLO-Mobile Radio, AL, traffic list and schedule, at 2200. (Stern-FL)
- 13155.0 Mill Pond-US military, with two 28-character EAMs, simulcast on 6697 and 11244, at 1536. (Haverlah-TX)
- 13200.0 Bolt 21-US Air Force tanker, patch via Puerto Rico HF-GCS to Lightning Ops (MacDill AFB, FL), at 2248. (Cleary-SC)
- 13306.0 New York-North Atlantic MWARA, working Virgin 167 at 1845. (Stern-FL)
- 13354.0 New York-North Atlantic MWARA, position from Virgin 31, at 8832. (Stern-FL)
- 13357.0 Recife/Atlantico-South Atlantic MWARA control, Brazil, working Varig 1167 in English and Portuguese, at 2007. (Perron-MD)
- 13510.0 CFH-Canadian Forces Meteo, Halifax, NS, with RTTY Terminal Aerodrome Forecasts, at 1730. (Privat-France)
- 13927.0 AFA1EN-US Air Force MARS, IN, medical patch with Air Evac 950, at 1730. (Stern-FL) Teal 40-US Air Force Reserve weather observation WC-130, morale patch via MARS AFA3HS, at 2054. (Cleary-SC) [This unit works some winter storms as well as the better-known summer hurricanes. -Hugh]
- 13993.0 AFA1BV-US Air Force MARS, checking into transcontinental net at 1800. (Stern-FL)
- 14408.0 Reach 883Y-US Air Force, morale patches via MARS AFA1EN, at 1917. (Cleary-SC)
- 15010.0 Halifax Military-Canadian Forces, calling NE4V at 1237. (Cleary-SC)
- 15025.0 SU0584-Aeroflot A320 VP-BWE, HFDL position at 1436. (Privat-France)
- 16745.2 Unid-SITOR-B news broadcast, probably Philippines, at 1601. (Perron-MD)
- 16799.0 Unid-SITOR-B news broadcast, probably Philippines, at 1345. (Perron-MD)
- 16821.0 VRX-Hong Kong Radio, working vessels in SITOR-A at 0904. (Watson-UK)
- 16822.5 UDK2-Murmansk Radio, Russia, working ships in SITOR-A at 0914. (Watson-UK)
- 16829.5 UCE-Arkhangelsk Radio, Russia, working a ship at 0932. (Watson-UK)
- 16840.5 RRR34-Moscow Radio, Russia, working a ship in SITOR-A, then traffic list in SITOR-B, at 0952. (Watson-UK)
- 17147.0 URL-Sevastopol Radio, with CW messages in very fast machine-ent Russian, at 1607. (Hall-RSA)
- 17206.0 IAR-Rome Radio, Italy, CW bulletins in English and Italian, at 1308. (Perron-MD)
- 17487.0 HHS-US Department of Health and Human Services SHARES station, sounding in ALE, at 1251. (Privat-France)
- 17982.0 Aircraft 511-Brazilian Air Force, calling Navy submarine Tamoio in Portuguese, no joy, at 2034. (Perron-MD)
- 18183.4 7RQ20-Algerian MFA, Algiers, with a Coq-8 New Year's greeting to all-stations, at 1600. (Hall-RSA)
- 18571.7 Unid-Tunisian diplomatic messages in 5-letter code groups, usual powerful FEC signal, at 0949. (Hall-RSA)
- 18666.0 OC1-US Federal Bureau of Investigation, Oklahoma City, calling EP1 (El Paso, TX), in ALE at 2211. (Perron-MD)
- 19320.0 OLZ88-Czech MFA, Prague, weird ALE-initiated CW and data exchange with OLZ78, at 1234. (Watson-UK)
- 19323.0 OLZ-Czech MFA, Prague, hourly ALE calls to OLZ78, starting at 1142. (Watson-UK)
- 19709.0 ERMSAL-Brazilian Navy, Salvador de Bahia, calling several ships in ALE at 1156. (Privat-France)
- 19814.0 022NHQCAP-US Civil Air Patrol National Operations Center, AL, ALE sounding at 2327. (Perron-MD)
- 20945.5 8BY-French Forces, Paris, weird CW markers at 1450. (Perron-MD) [ENIGMA code M16 was withdrawn - 8BY isn't really "numbers." -Hugh]
- 20948.0 8BY-French Forces, Paris, CW marker at 1255. (Perron-MD)
- 20992.5 Tahoe 81-US Air Force, patches via MARS AFA1RE (ME) and AFA2MH (GA), at 2039. (Cleary-SC)
- 22401.0 UIW-Kaliningrad Radio, Russia, Marine Information Bulletins and holiday traffic in transliterated Russian SITOR-B, at 1409. (Perron-MD)
- 22542.0 JJC-Tokyo Radio, Japan, with very clear Japanese newspaper FAX from Kyodo News, simulcast on 8457.5, 12745.5, 16971.0, and 17069.5, at 1600. (Hall-RSA)
- 23337.0 538032-US Air Force KC-135 63-8032, ALE sounding at 1506. (Privat-France)

## Listening Tips, CAP, and Brazilian ALE

**A**s promised last month, we thought we'd start this month's column with some tips for finding utility stations. We also provide an update on the US Civil Air Patrol and Brazilian Navy and their use of Automatic Link Establishment (ALE).

### ◆ Listening Tips

Rarely does a month go by without an e-mail from a new listener asking us how we "hear" digital utility stations. If we leave aside the obvious need for a good radio (which we covered in last month's column) and a decoder, we are blessed with the same basic equipment that any other listener has, namely two ears and a brain!

As part of answering this question, we've also urged listeners, new and old, to check into Leif Dehio's excellent *Digital Signals* website and listen to the audio clips of practically any digital signal on the air today. Being able to recognize various systems from their characteristic sounds is a vital skill also.

But what else can we do to increase our chances of hearing some good digital DX?

### ◆ Tuning Ranges

Before we turn to some techniques to increase the likelihood of catching those elusive signals, let's review the most fruitful regions of the dial for digital utility stations. For years, we've searched the following basic frequency ranges in order to find the bulk of interesting diplomatic, military and commercial digital traffic:

Daytime	Nighttime
13300 to 13600	4000 to 4100
13850 to 14000	4400 to 5850
14350 to 15000	6600 to 7000
15700 to 16400	7500 to 8200
17400 to 17550	8800 to 9350
17900 to 21000	9900 to 11450
21500 to 26000	12000 to 12400

As you will probably notice, these ranges – wherever you may be in the world – will basically keep you in the so-called "Fixed" station allocation. In other words, we are keeping away from broadcast, maritime and aeronautical traffic.

Why? Well, most of the stations that we are searching for have relatively low transmit power and modest antenna systems. They simply can't compete with the many kilowatts and huge antenna farms of these permanent stations and so will keep away. However, some stations also use this very fact to *decrease* the chances of being heard by the likes of us!

### ◆ Tuning Techniques

So, now we know roughly where on the dial we need to be to hear our stations of choice. How do we continue to refine our search techniques to maximize our chances of hearing some interesting stations?

First, if our receiver is capable of searching, why not use the receiver to do the hard work? We often set our radio here to start searching from 20000 kHz and simply stop the search when the radio sweeps past something of interest. For this technique to work well, however, requires the radio to be set at a relatively slow sweep rate of a few hundred Hertz per second and, of course, it must be able to search with the squelch control open (if it has one), remembering that the majority of our stations won't be big signals capable of breaking even a modestly set squelch.

Our second technique, a variation of the simple sweep or search above, is to nominate a couple of 100 kHz ranges on which to concentrate each day or each hour. The range can be searched repeatedly manually, or if your receiver has a frequency-to-frequency repeating search (often called something like "Programmable Band Scan"), we can again let the radio do the work.

This technique works well because of two main reasons. First, it increases the chances that you will find brief transmissions, since you cover the same ground in relatively short intervals. Remember that digital signals come in two main varieties – continuous signals (like RTTY, SITOR-B, ARQ-E3, etc) and burst signals (SITOR-A, PacTOR, MIL-188-110A, etc). A burst station with long gaps between bursts may not be heard during the first sweep-through of your chosen chunk of spectrum, but subsequent sweeps may catch it. Continuous signals will always be caught, of course.

Secondly, you will quickly become familiar with the usual occupants of your chosen piece of spectrum. This latter point is extremely important, as learning the habits and regular occupants of a certain section of spectrum is a vital part of knowing where to focus your listening time.

Try these techniques next time you listen and see what more they can tell you about who is on, at what time, and where.

### ◆ US Civil Air Patrol (CAP)

Most *MT* readers will be familiar with CAP, which has been covered extensively in many other columns over the years. Like most US agencies, CAP also makes of MIL-188-141A ALE in order to provide interoperability, frequency selection, and interoperability with other government agencies. Ron Perron recently

checked into their network and we weighed in with a few more frequencies that appear to be new to the system (all frequencies kHz USB).

3068 5006 6800 6806 7602 7739 8012  
9047 11402 13415 19814 20107 23006

ALE Identifiers:  
RIC

004MERCAP  
034MERCAP

022NHQCAP

033NHQCAP  
043NHQCAP  
046NHQCAP  
047NHQCAP

062NHQCAP

CAP National Technology Center, Richmond VA  
UNID  
Middle East Region, NC Region Chief of Staff (unconfirmed)  
National Operations Center (NOC), Maxwell AFB AL  
UNID  
UNID  
UNID  
Director of Communications (DOK), Maxwell AFB AL (unconfirmed)  
Director of Operations (DOO), Maxwell AFB AL (unconfirmed)

Any help in piecing together the unidentified parts of the network would be appreciated.

### ◆ Brazilian Navy Update

Space prevented us from printing this update a few months ago, also provided by Ron Perron, regarding the recent upturn in Brazilian Navy ALE activity which shows that more of their ships appear to have joined the network:

ERMBEL	Brazilian Navy Radio Station, Belem
ERMNAT	Brazilian Navy Radio Station, Natal
ERMRIO	Brazilian Navy Radio Station, Rio de Janeiro
FCONST	Brazilian Navy Frigate F-42 "Constitucao" (Classe Niteroi)
FDEFEN	Brazilian Navy Frigate F-41 "Defensora"
FUNIAO	Brazilian Navy Frigate F-45 "Uniao" (Classe Niteroi)
NDDCEA	Brazilian Navy G-30 "Ceara" (Navios de Desembarque-Doca)
NEBRSL	Brazilian Navy U-27 "Brasil" (Navio-Escola)

Ron also reports activity on the following frequencies:

8031 9117 11010 11452 11455 11486  
12132 12370 14705 14780 15932 kHz USB

Until next month, enjoy your digital listening.

### Resources

Civil Air Patrol <http://www.cap.gov>  
Brazilian Navy <http://www.mar.mil.br>

## Precision Frequency Measurement

A few DX listeners dare to report kHz frequencies to three decimal places. Some old-fashioned editors don't even want frequencies with any decimal places, rounding off any that they get, but precision frequency measurement is one more tool to help identify stations, if you know what you're doing. One thing *not* to do: don't rely on your digital readout, especially if you tune to one side to avoid interference. Only true carrier frequencies should be reported; this may require measuring them with the BFO on.

We asked one practitioner of PFM, Stig Adolfsson in Sweden, via Thomas Nilsson, *Shortwave Bulletin*, how he does it?

Glenn, Thanks for your interest in the way I am carrying out frequency measurements. I am using a Rohde & Schwarz frequency standard with an accompanying receiver which is phase-locked to the DCF 77 Mainflingen LF transmitter. This set has an accuracy of 0.00001

Hertz at 10 MHz. The measured frequency is given directly digitally with four decimals, e.g. 21600.0001 kHz. The received carrier is shown on a CRT as a Lissajous figure or rotating marker so you know for sure when you are tuned correctly.

Very often you see people give two decimals on the monitored frequency when presenting their loggings. These stated frequencies are not always correct. Without visual aids, it is almost impossible to tune in exactly on the AM carrier. Then you have other factors influencing the reception, like filter symmetry, strong interfering signals, accuracy of the receiver internal frequency reference. Another factor of importance is the fact that most modern receivers are designed for SSB reception, which mean they suppress the AM carrier, so a LF response below 100 Hz is rarely found. So telling the true received frequency is a tricky matter.

**ALASKA** You will find no US HFBC stations in 40/41 meters below 7300 kHz. It is only in ITU Region 2 (the Americas) that hams have 7100-7300 kHz portion of the spectrum (Dan Ferguson, IBB, swl at qth.net) A station is operating in violation of this long-standing policy. KNLS, in Chinese at 1000 on 7160 ex 7365 (Robin VK7RH Harwood, Tasmania) Perhaps they decided, "close enough" to Asian region, and not many Alaskan 40m hams would be wanting to use 7160 in the middle of the night at 1 a.m.! But the hams would surely be justified in "jamming it to hell" as they have "exclusive" right to it!

Original version of the January schedule had the 1000 Mandarin on 5955, ever used? But soon changed to show 7160. One might guess they had again hired airtime in the DVR, where this is legal, but no mention of that, and this fits right into the rest of the KNLS schedule before 1000 and after 1100. Not for long, tho; the February schedule moved this to 9615. KNLS must expect to have loyal listeners to keep up with frequency changes every month (Glenn Hauser, *DX Listening Digest*)

**ANDAMAN & NICOBAR ISLANDS** AIR Port Blair had been reduced to 4 kW, but resumed 10 kW in mid-Jan. Schedule is: 4760 kHz 2355-0300 UTC, 1030-1630/1700/1730; 7115 0315-0346 (Sat 0415, Sun 0505), 0700-0930. Note: 4760 is also used by AIR Leh, both in the mornings and evenings!

Port Blair reports go to Mr. K. S. Venkateswarlu, Station Engineer at ks\_venkateswarlu@hotmail.com While sending reports to any AIR station, please write the date and time in Indian Standard Time (UT +5.5). Instead of SINPO reports in numbers, briefly explain reception quality in words. The Spectrum Management & Synergy Division of All India Radio HQ in New Delhi have created a separate account to receive reception reports from listeners. It is: spectrum-manager@air.org.in (Jose Jacob, VU2JOS, dx\_india)

**ARGENTINA** RAE (Radio Argentina al Exterior) is very hospitable to visitors: on the radioescutas list, Antônio Schuler from Recife told of his visit to Buenos Aires, where he was warmly received by RAE manager Marcela Campos, a day he will never forget. Rudolf Grimm from Porto Alegre agreed that his own visit was unforgettable (gh)

**BOLIVIA** In mid-December, a new Bolivian was heard by Björn Malm, Ecuador, SWB América Latina on 4722.86 at 0000-0200\*, not on the air every day. Henrik Klemetz, Sweden, identified it from a recording as Radio Uncia in the town of the same name, 105.3 and testing SW on "4700". Then it was heard by Dave Valko, PA, Cumbre DX at 2312-0100+ with romantic LAm pop music, very low distorted modulation. Klemetz found out more about it: owned by the Municipality of Uncia, 15 minutes away from Llallagua, the place where the tin tycoon Simón I. Patiño used to live. In his day he was one of the wealthiest men on earth. His mansion has now become a museum. But by January 1, R. Uncia was no longer being heard, says Bob Wilkner, FL, Cumbre DX.

**CANADA** Beware of mixing products between any two RCI Sackville frequen-

cies, many of which relay other stations. The formula is 2B minus A, where you will hear the audio of one or both. These keep popping up above 6.2 MHz, for example. If you hear one, scan inside the band for matching audios, and do the math. But there's another formula, B minus A (gh) Sackville transmitter mixing product found on 3530 at 1100-1200: Radio Korea relay on 9650 minus Radio Japan on 6120 (Steve Lare, MI, swl at qth.net)

**CHINA** CRI Plans Expansion On Radio And Internet. Replying to a Bangladesh listener, the "Listeners' Garden" program said CRI is adding more English broadcasts so listeners in different target areas can hear it both in morning and evening, and will soon run continuously on the internet. CRI is already advertising for a news editor for the 24-hour service - see <http://www.crienglish.com/job.htm> And is recruiting monitors for 2004-2005. They are expected to report not only on technical quality but on programming and even to organize CRI events in their locality.

I think CRI has deliberately set out to rival the big Western stations in both quantity and quality. Journalistically it has a long way to go. News is frequently many hours behind reporting on other stations, due in part, to being pre-recorded, a cardinal sin for news. If China can find an effective journalistic voice to convey its policies and concerns to an international audience, then that is to be welcomed. CRI is becoming increasingly adept at communicating with the world (Roger Tidy, UK, DXLD)

Domestic network CNR-1 has been renamed Zhongguo zhi Sheng (=Voice of China), heard at 0800 on 17615, 15370, 11750, 11720 (Olle Alm, Sweden, DXLD)

New 2004 schedule of China Huayi Broadcasting Company: 2230-0000 and 1300-1700 4830; 0000-1300 6185, except 0400-0830 ceases broadcasting for transmitter checking every Wednesday. (Qiao Xiaoli, Cumbre DX)

**COSTA RICA** RFPI served as a defacto American public radio station broadcasting on shortwave to the United States. It didn't perform that mission very well. Existing American shortwave stations could have carried it out much better, where the going rate is often \$30 for an hour of airtime on a 50 kW transmitter. With an Internet stream of its programs, it could be on shortwave now, instead of a year from now. This makes a lot more sense than setting up shop again in Costa Rica (Hans Johnson, radiointel.com)

Potential advantages in this approach: better reception, larger audience, improved diversity of programming on US stations, more cost effective, greater listener support (John Figliozzi, NY, swprograms)

I am sure that several NASB members would be more than happy to sell RFPI airtime at very reasonable prices. I'm sure there are some that would not accept certain types of programs that were on RFPI (just as they don't accept certain right-wing programs), but that is their prerogative, and there would still be more than enough stations to accommodate RFPI's needs. In addition to lower start-up and op-

*All times UTC; All frequencies kHz; \* before hr = sign on, \* after hr = sign off; // = parallel programming; + = continuing but not monitored; 2x freq = 2nd harmonic; B-03=winter season; [non] = Broadcast to or for the listed country; but not necessarily originating there; u.o.s. = unless otherwise stated*

erating costs, it's a lot less hassle and administrative work, and it provides the time-buyer with the greatest amount of flexibility (Jeff White, WRML, NASB) Except being in full control of your own station (gh)

**TIUCR**, R. Universidad de Costa Rica, presumed the one on 6105.01, at midday, 1630-1730+ UT with continuous classical/chamber music, rather low modulation (David E. Crawford, Titusville, FL, Cumbredx) 0035 blues, 0056 ID, 0102 chamber/opera vocals (Terry Krueger, FL, Tocobaga DX) Also at 0445-0532 Latin music (Rich D'Angelo, PA, NASWA Flashsheet) And 1115 light romantic vocals, 1200 no ID, not much left by 1230 (Jerry Berg, MA, *ibid.*) Web site <http://cariari.ucr.ac.cr/~radioucr/radioucr/> has little detail, no mention of SW but tho cultural they do have a rate card (gh)

**CUBA** Ms. Dora Guillén, creator and one of the presenters of the Guaraní language section of Radio Havana Cuba passed away suddenly December 9, 2003 in Asunción, Paraguay. Funeral took place at the Paraguayan Communist Party headquarters. Guillén was a member of the PCP's Central Committee. Guillén lived her last 41 years in Havana. In 1962 she went to RHC, launching the program in Guaraní, the native language spoken in Paraguay. There is a sense of emptiness in Radio Havana. The upset voice of her inseparable comrade, María Céspedes, sent to the ether the last farewell (Miguel H. López, *Última Hora*, Paraguay, via Horacio Nigro, DXLD)

[non] During VOA's Ventana a Cuba program at 0100-0200, some R. Martí frequencies such as 11775 and 13820 temporarily lose their bubbles, as the Cuban jammers shift to the VOA frequencies (Adán González, Venezuela, DXLD)

**GERMANY** The VOA/Radio Liberty/Radio Free Iraq relay site at Holzkirchen closed December 31, after a long campaign by local residents in Valley the Oberlandern to get rid of all the RF. Station grounds will be sold for 7 million Euro to the municipality. It is intended to establish a golf course there. The federal government of Germany will pay the expenses of 600,000 Euro for the demolition of the station. All transmission equipment will be dismantled by the end of June 2004; three of the four shortwave transmitters will be moved to the Philippines, but what about the other one? Almost all the transmissions were moved to other sites: Lampertheim and Biblis, Germany; Kavala, Greece; Briech, Morocco (Kai Ludwig, DXLD)

**GUAM** KSDA Chief Engineer Dan Weston agreed to my visiting the station. I witnessed three or four new 100 kW ABB transmitters in operation, and another one was being serviced, soon to come on line. They still have a studio room, but due to RF feedback, programming now comes from CDs or from studios somewhere else. Transmitters are cooled with special non-conductive water. An engineer vacuums dust away from the transformers. I saw an exciter tube about two feet in length and a foot wide. There were special boxes between cabinets to cut back on RF between the units. Just being there was like a QSL card in itself (Larry Fields, N6HPX/DU1, swl at qth.net) see SAIPAN

**IRAN** V. of Justice, in English at 0130-0227 confirmed on 6120 and 9580, also scheduled on 6135, 9835; at 1130-1157 heard on 15550, 21470, 21730, but irregular (Observer, Bulgaria)

**IRELAND** Glenn, it is with great sadness and anger I learn of the termination of RTE's shortwave transmissions as of Jan. 1 2004. I smelt a rat when the "consultation exercise" occurred shortly before Christmas when many exiles were returning to Ireland to spend Christmas with their families and the response announced within a couple of days including free World Space Radios for African listeners - how could that have been decided in such a short period? When was Merlin informed? For a country of 4 million with 70 million people of Irish heritage around the world short wave radio was ideal. For those like me that have returned to Ireland but travel regularly it is easier to bring a shortwave radio with me rather than a satellite system to keep in touch with home! I did not come across any reports of these developments in the Irish written media.

Those of you who wish to register your protest, please send them to Lennie.Kaye@rte.ie or Lennie Kaye, RTE Radio, Donnybrook, Dublin 4, Ireland. As RTE is 100% [state] owned, perhaps letters of protest to your local Irish Embassy or Consulate would also be helpful! It is a very sad day for the many Irish and friends of Ireland that listened to RTE on shortwave! (Paul Guckian, Ireland, DXLD)

**IRELAND** [and **NORTHERN?**] Irish church stations heard on CB: With the help of Roger [Caird, Ireland], a compilation of the transmissions from Irish churches heard during the past 2 years. [26805-27981.25 kHz]: <http://www.wunclub.com/wunstr/wunstr0309.html> (via Jem Cullen, Australia, ripple)

**ISRAEL** Contrary to expectations, Israel Radio did not cancel most of its SW languages at yearend, tho schedule somewhat modified. Still in Hungarian, Romanian, Spanish, Ladino, Yiddish, Persian, Russian, French, Arabic, Hebrew. And English, to NAM/WEu u.o.s.: 0500-0515 7545 6280, CAM/Au 17600; 1110-1120 15640 17535; 1800-1815 15640 11585; 2000-2025 6280 11585, SAF 15640. Per sked from Moshe Oren, Bezeq, via Doni Rosenzweig. Observer, Bulgaria had different info for 1800-1815: 9435 and 17535.

The Hillel transmitter site closed down two MW transmitters and the old 100 kW SW used on 11585, retaining only a 500 kW Telefunken (Daniel Rosenzweig, DXLD)

**LIBERIA** The High Adventure transmitter moved here from Southern Lebanon is up at half power of 5 kW. An engineering crew was going there in late January to tune the transmitter, on 11515 (Morgan Freeman, WJIE, DXLD) Last reported off the air in July, 2003, ID as V. of Liberty (gh)

**MYANMAR** I have been hearing a station on 5770 in Burmese at 1330-1630 and again from 0130. Victor Goonetilleke of Sri Lanka says it is the Burmese Defense Ministry which was on 6570 earlier and was off the air for some time (Jose Jacob, India, *World of Radio*)

**NIGERIA** Fun stuff on V. of Nigeria, Tuesday at 2140 on 17800: a quiz contest with questions about various political, historical, landmark factoids across the continent, and the question numbering was also curious - not in consecutive order, and changing with each round. In between rounds, VON solicited donations to support the contest, giving its own mailing address. Questions ran the gamut along the lines of: what year did some African country get its independence; what is the correct form of the title of the head of state of some country; #19 in the "second" round was - who was the first woman to drive a car in Nigeria; what is the tallest building in Nigeria; what does a given set of initials stand for and when was it founded under what leader; etc. The winner was declared at 2156, the emcee said "bye for now" and said his name was Oliver something, then was followed by a delightful piece on the fingerpiano. A YL gave an ID and launched into news. And a good time was had by all including this listener (Clara Listensprechen, shortwave basics yahooogroup)

**NORWAY** R. Norway and R. Denmark are gone from SW after Dec. 31. Now the transmitters are closed but still powered in a mode dubbed "black heating". This way they can be kept operational without further maintenance for some time (contrary to a complete shut-down that would result in the transmitters becoming unusable) in case somebody should be interested in leasing a sufficient amount of airtime or if somebody should be interested in obtaining the transmitters for use at other sites - The staff at Kvitøy and Sveio will be reduced from 13 to 5 until February (Bernt Erfjord, Norway, via Kai Ludwig)

**PAKISTAN** On 5080.3, R. Pakistan, Islamabad, at 1635-1650, English current affairs program with reports on Afghanistan and Taliban (Vaclav Korinek, RSA, DSWCI DX Window) WRTH 2004 says the News & Current Affairs program on SW is scheduled: 0200-0400 on 6205, 1300-1800 on 5080, both 100 kW Islamabad, in Urdu and English. Specific times for English not specified; can anyone find out? (gh)

**POLAND** [non] Announcements on Radio Maryja said it would leave shortwave as of January 1 (Wojtek Zaremba, Legionowo, Poland, *World of Radio*) Was via Russia. Final SW broadcast did not inform listeners how to continue listening on internet, domestic radio (Kai Ludwig, Germany)

**ROMANIA** RRI program quality is variable. Some of their announcers read in a rushed and mechanical manner as if they were not concentrating on what they are saying, and often it's difficult to determine where one sentence ends and the next begins! But there are others who are much better, and overall I get the impression that this station, for all its faults, is trying hard to provide a decent service for its listeners. Probably the best show is Sunday Studio aired every week during the 56-minute periods, one of three shows in which RRI answers listeners' mail. The other two are Listeners' Letterbox (Thursdays) and DX Mailbag on Saturdays. English schedule:

WEu: 0700-0726 on 11775 and 15105; 1300-1356 on 15105 and 17745; 1730-1756 on 9570 and 11940; 2030-2100 on 6110 and 7105; and 2200-2256 on 9575 and 7250.

ENAm: 2200-2256 on 9550 and 11830 and 0100-0156 on 9510 and 11740.

WNAm: 0100-0156 on 6040 and 9530 and 0300-0356 on 6040 and 9515.

Au: 2300-2356 on 11840, 11940, 15145 and 15370 (Roger Tidy, UK, DXLD)

**RUSSIA** [non] Voice of Russia is relayed by SW transmitters abroad in Armenia, Moldova, Tajikistan, Ukraine, China, Germany, and Vatican. Vatican City State: 7350 0300-0500 250 kW, 9765 0200-0300 250 kW (Nikolai Rudnev, Belgorodskaya oblast, RUS-DX) Most or all in English to NAM, providing some of the best VOR reception here (gh)

**SAIPAN** Having visited KSDA Guam on Christmas, I went ashore here on New Year's, to visit FEBC (KFBS) for the second time. It's about 20 minutes from the main part of town, and found it quite fast, as the antenna towers were visible from the main part of town. I could also see 'em at night as they have a fancy way of lighting 'em up at night; they form a glow across the lines and reflect like a giant Christmas light.

It's about 6 minutes off the highway down an old rock path. The antennas are like those of AWR, and KTWR, but shorter and four towers instead of six. An engineer took me into one building where they had about five studios and audio room where they still have at least a thousand cassette tapes from years of programs. The tapes are no longer being used and they are starting to go the same format as AWR and KTWR with audio CD. They have a few students in the process of changing the audio cassettes to CD or digital. The rooms where they did the programs are all still there but some are being used for storage. The engineer took me into the transmitter room; they now

have three transmitters instead of four. The fourth transmitter is now in their FEBC station in the Philippines and they might be getting a new one.

We went out into the yard where the antennas were and actually walked over between the towers. We talked about the damages they get and the way they repair the antennas. They just lower the curtains to work on damaged cables or wires. They also do this when the typhoons come through. These are multiband dipoles. It takes all day to put 'em back into the air. They start at 5 am and work till 6 or 8 in the evening.

Then I was planning to visit Radio Free Asia [IBB, ex-KYOI] which is about ten minutes from the other side of the town area. I found the antenna farm. A lot different in design and shape as compared to FEBC and the others at Guam. They were still curtains but the towers were not the same make. They also had two big satellite dishes outside and some smaller microwave types to talk to another station only a few miles away. I took a number of pictures outside. And drove up the gate where they had a security guard standing by. I asked if there was a chance to see the station. The reply was a big disappointment. Since they just raised the terrorists level in the states, it came here as well.

The answer was a flat out NO! I found out also that right across the water within range is the Voice of America transmitter station on Tinian island and I could see it pretty clear but I think it too would have been out of bounds. I ended up getting stuck out in town over night and really enjoyed myself on this neat little island (Larry Fields, N6HPX/DU1, swl at qth.net)

**SUDAN** [non] Sudan Radio Service (heard via Javoradio Oz) at 1501 on 15530 announced schedule as 1500-1700 on 15530, and new 0300-0500 on 9625 (Hans Johnson, FL, Cumbredx) Bad news for CBC North-ern; site is UK

**UGANDA** Radio Uganda Loses Part Of [Shortwave] Transmission Site In Property Deal. The department of information has lost another prime piece of land in Bugolobi to a private developer in a mysterious deal reportedly sanctioned by the former state minister for information, the late Basoga Nsadh.

The land on Plot 4 and 5 Faraday Road was meant to be left open as a security measure for the Radio Uganda Short Wave transmitters in the Middle East [sic], but has been given to an unidentified developer who is already erecting a perimeter fence.

The land originally measuring 23 acres also had huge swathes fenced off from the southern end approachable from Bazarabusa Drive. At some spots, the fences are as close as 20 metres from the transmitters.

Information minister Nsaba Buturo said his predecessor erred by giving out the ministry's land in Bugolobi. Buturo warned that the area was dangerous for human habitation because of the radiation from the installations. "I am writing a letter warning those people about the risks. It has never been done anywhere in the world that people settle close to such installations. The radiation from the equipment poses a big health risk," he said.

The Bugolobi mast hosts antennae for short wave transmitters to the east, west and northern parts as well as for Kenya, Tanzania, Rwanda, Burundi, Zambia and Zimbabwe, a ministry official said. [4976, 5026?]

"The installations on Naguru hill are very sensitive and need good aeration. But the area is now surrounded by high wall fenced buildings and our equipment are not getting good ventilation which is likely to affect its lifespan," an official said [The New Vision, Kampala via AllAfrica.com via Kim Elliott, Artie Bigley, Jilly Dybka]

**UK** A sad but inspiring story - Jonathan Marks came across a story from last August in *The Times* which most of us seem to have missed. Apparently former BBC World Service announcer John Stone suffered a massive stroke three years ago. The story is about how John has coped with the situation. And, like all of us, he never imagined such a thing could happen to him (Andy Sennitt, Media Network blog) Stroke: 'I Can Think, But I Can't Bloody Say It' - Health features August 27, 2003, By Susan Shepherd <http://www.timesonline.co.uk/article/0,,8123-892676,00.html> (via Andy Sennitt)

**USA** You might think VOA is entirely tax-supported, as is only appropriate for the US government broadcaster. But, perhaps due to budget cuts, VOA is now heard with commercial underwriting credits, just like public radio! Catching our ear at 0529 UT Mon on 6035, and when rechecked 24 and 48 hours later, during a 2-minute break when affiliates may sell real commercials, VOA has a brief sesquiminate feature *Our Ocean World*, apparently an in-house production (if it's worth producing and broadcasting, why isn't it on the program schedules??) concluding with: "made possible by Royal Caribbean International and Explorer of the Seas, <http://www.royalcaribbean.com>" No doubt this also occurs at many other times now on VOA. Other listeners please note and report times and details (Glenn Hauser, OK, *World of Radio*)

Veronique Rodman, a public relations specialist and former television producer, has been appointed to the Broadcasting Board of Governors (BBG), the bipartisan, nine-member board which super-

vises all U.S. nonmilitary international broadcasting. President Bush nominated Rodman to the BBG on October 24, 2003, and gave her a recess appointment on Dec. 26, 2003. Rodman is director of public affairs at the American Enterprise Institute for Public Policy Research, a Washington-based think-tank. Before joining AEI in 1999, Rodman worked for many years in broadcasting. From 1982 to 1995, she served as a producer of ABC-TV's *This Week With David Brinkley*. As a television news consultant, she later helped launch *Fox News Sunday*. Rodman also worked as vice president for the Cosmetic, Toiletries and Fragrance Association Foundation (BBG press release)

[non] Dave Barasoain is no longer the *Wavescan* host. He has left AWR due to budget cuts (Jeff White, WRMI) Tsk; he lent it some class. I listened to parts of the Jan 4 AWR *Wavescan* 470 online, and heard that the "all-new" *Wavescan* is hosted by Piper Anna Shields, or something like that, and by Ray Allen (sp?); another announcer reading a segment was Ariel McCleghan (sp?). As John Norfolk notes, some links to the scripts lead nowhere, but the scripts don't usually mention the names of the announcers, anyway. In the 28th minute of the previous edition 469, Dave Barasoain briefly said his goodbye, "leaving WS and the AWR family for different horizons in the new year," after 12 years of employment there (Glenn Hauser, DXLD)

On 1 January 2004, Adventist World Radio sharply reduced its international output, mostly by canceling morning transmissions and second frequencies. While the overall output of AWR's own short wave station KSDA was cut by some three and a half transmitter hours by reducing transmissions to single frequencies, Merlin Communications and T-Systems lost more than 20 hours of leased airtime daily: Al Dhabbaya eight hours, Meyerton four hours daily, Moosbrunn five hours daily, Jülich three hours, Taiwan one hour. Broadcasts in Malagasy via the Radio Netherlands station on Madagascar and in Spanish via Radio Netherlands in Bonaire remained unchanged (Dr. Hansjörg Biener, Nürnberg, Germany, <http://www.biener-media.de> via dx\_india)

[non] On Xmas Eve heard Brother Stair himself announcing a huge frequency list - 'unprecedented' as he calls it. He also asks for \$100,000. Some unpaid bills? The Overcomer Ministry's website shows a remarkable amount of output via Jülich, including nine frequencies at 1000-1100: 11950, 17482 [sic], 15235, 17735, 6100, 9610, 13820, 9485, 21720; and no less than eleven for 2200-2300! - 6175, 9695, 9490, 5985, 9730, 9480, 7105, 5905, 6055, 6045, 7145, in addition to some other broadcasts (Silvain Domen, Belgium, *World of Radio*) He's probably getting a discount deal like on some US stations, occupying otherwise unsold time until they can sell it to somebody else for full price. Says this schedule is for five months only; then the apocalypse?? (gh)

*Religion for Adults*: A program called *The Secular Bible Study* airs weekly on WBCQ. The host presents a balanced and insightful discussion of the interpretation of biblical works from a scholarly viewpoint. He examines biblical stories from the historical and cultural perspective and cites many sources. The show is consistently well produced and always very interesting. The host makes it a point to state that it's not a "religious" show and that no requests for donations will be made. *The Secular Bible Study* runs on WBCQ 7415 from 9 to 10 ET (Tuesday 0200-0300 UT). (Larry Will, Maryland, DXLD)

The guy running this show is not afraid to say that certain books of the bible are just outright fiction. It's an hour long program with the first half devoted to the old testament and second part to the new testament. He reads the bible verse by verse, word by word, using at least twenty sources. He reads a verse from the King James, then explains how the other versions differ on a word or phrase and then pronounces sentence as to whether or not there's any truth to it. In the short time I've listened to it I've heard him proclaim that the Book of Exodus is total fiction, the story of Abraham is total fiction, the gospels weren't written by the apostles and a few other gems (John H. Carver Jr., IN, DXLD)

WBCQ is very interested in trying out DRM, probably on 9330, once all the equipment can be installed, but we have no intention of giving up analog (Allan Weiner, WBCQ, DXLD) Came across this website <http://www.rfma.net/> - a forum discussing things like what's on WBCQ's internet stream and what's not - like Hal Turner; rants, kooks, KIPM, etc. (gh)

Additional times for *World of Radio*: WBCQ, UT Sun 0130 on 9330-CLSB; WWRB, Sat 2130 on 12160; all one hour earlier from first Sunday in April (gh)

WWRB is adding a 3 MHz frequency, 3200, 3220, or 3225. Our fiberglass radome is ready we will begin construction of our VOR on 108.00 MHz, experimenting with new antenna designs. We have a complete avionics repair station right here at the WWRB transmitter site, totally enclosed in an RF tight screen room allowing us to be able to repair avionics while WWRB is transmitting. Our Aircraft Enroute Communications Business is much more profitable than broadcasting, with much less headaches! Getting paid in the broadcasting business is always a challenge (Dave Frantz, WWRB, *World of Radio*)

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

## 0000 UTC on 4775

PERU: Radio Tarma. Spanish. Complete ID with frequency quote and city. SINPO 24332. Peruvians audible: **Radio Sicuani** 4826.4, 2322-2335; **Radio Cultural** 4955, 2304+; **Radio Santa Monica** 4965, 2327+; **Radio Quillabamba** 5025, 2255+; **Radio Los Andes** 5030, 2336+; **Radio Cusco** 6193.25, 0000+. (Arnaldo Slaen, Buenos Aires, ARG) **Radio Nor Andina** 4460-7, 1041-1058. (Scott Barbour, Intervale, NH)

## 0000 UTC on 7270

ALBANIA: Radio Tirana. Poor signal quality during station ID, frequency quote and national news. (William McGuire, Cheverly, MD)

## 0027 UTC on 6150

SINGAPORE: Radio Singapore Intl. News coverage on the Philippines to "RSI" identification. 7235, 1137-1150. // 9665 poor copy; 6150, 1154-1202. (Barbour, NH) **BBC Singapore** relay 9740, 0027. (Stewart MacKenzie, Huntington Beach, CA)

## 0122 UTC on 6120

IRAN: Voice of Justice. Anti British commentary on Iraq, to "this is the Voice of Justice from the Islamic Republic of Iran," SIO 332. (Harold Frodge, Midland, MI)

## 0200 UTC on 9870

RWANDA: Deutsche Welle relay. German service's interval signal, identification and report on Iraq. (McGuire, MD) 9655, 0034 // 13780. English 9545, 0413; 17860 //13780, 11955 at 2316. (MacKenzie, CA) **Radio Rwanda** 6055, 1917-2007 Vernacular/French with Afro pops, to two solid Ids. (Barbour, NH)

## 0300 UTC on 9400

BULGARIA: Radio. Sign-on interval signal, ID and national news report on European Union. (McGuire, MD).

## 0320 UTC on 4830

VENEZUELA: Radio Tachira. Spanish chat to two English IDs including call letters "YVOB." Two anthems to 0357\*. (Rich D'Angelo, PA/NASWA Flash Sheet) **Radio Amazonas** 4939.7, 0308-0314. (Frodge, MI)

## 0345 UTC on 4775

SWAZILAND: TWR. Religious text to closing ID and music box interval signal at 0355. Opening ID at 0400 into German sermon. (D'Angelo, PA)

## 0355 UTC on 9885

BOTSWANA: VOA relay. Interviews to ID and VOA News promo, // 9775, 7415. **VOA Sao Tome** relay 11975, 2158. (MacKenzie, CA)

## 0405 UTC on 6200

CZECH REP: Segment on national Jewish landmarks. (David Weronka, Benson, NC) 11615, 1636-1645+ on various national concerns of drug abuse and child slavery. (Frodge, MI)

## 0419 UTC on 11765

SOUTH AFRICA: BBC Meyerton relay. Discussion on Czech and Slovak republics. **BBC Seychelles** relay 9630 at 2030 with Newshour segment. (David Ross, Hamilton, Ontario, Canada) 9630, 1936-1945+. (Frodge, MI)

## 0857 UTC on 4990

SURINAM: Radio Apintie. Dutch. Reactivated station with ID at 0858. Talk segment into religious text and music at 0900. A treat to hear Dutch from South America again! (Jerry Berg, MA/NASWA) Audible 2230-0445. (George Maroti, NY/NASWA)

## 1027 UTC on 3976

INDONESIA (Kalimantan) RRI Pontianak. Indonesian with clean QRM free signal for two minutes. **RRI Kendari** 4000, 1053-1104; **Voice of Indonesia** 15150, 1958-2018; **RRI Ternate** (Moluccas) presumed 3345, 2156 with choral music (anthem?) to 2159\*. Poor copy. (Barbour, NH)

## 1110 UTC on 3355

PAPUA NEW GUINEA (Papua) Radio Simbu. Ballads and talk to C&W tunes. Possible national anthem at 1159\*. Observed later 1135-1140; PNG's audible; **NBC** (Papua) 4890, 1119-1133; **Radio Manus** (Admiralty Island) 3315, 1140-1151. (Barbour, NH)

## 1345 UTC on 9570

CUBA: China Radio Intl relay. News story covering research and treatment of AIDS in China. (Weronka, NC) **Radio Havana** 9820, 0021. (MacKenzie, CA) 6000, 0331. (Frodge, MI)

## 1404 UTC on 5995

AUSTRALIA: Radio. Station ID to newscast from male announcer // 9590. Fair-good quality. (Ross, CAN) 21740, 2305 //17795, 9660.

(MacKenzie, CA) 6020, 1042-1103+; 9710, 1946-1959\* (Frodge, MI) **ABC** 2310, 1016-1030. (Barbour, NH)

## 1424 UTC on 12080

MADAGASCAR: Radio Netherlands relay. Good signal quality for program preview of coming week. (Ross, CAN) Spanish 9895, 0010 // 15315 via **Bonaire**; 11655, 2135 // 17810, 9590, 0410 via **Bonaire**. (MacKenzie, CA) Fair quality on // 15595. 9845, 0019 via **Bonaire**. (MacKenzie, CA)

## 1801 UTC on 13605

INDIA: All India Radio. News to identification at 1805. (Frodge, MI; Weronka, NC) 9475, 2337; 10330, 1655. (Jerry Brookman, Kenai, AK) Additional **AIR** freqs monitored as; 7170, 1048-1106; 4990, 1111-1122; 4970, 1139-1149; 4760, 1123-1137; 4895, 1200; 5010, 1212-1226. Tentative log on AIR 4940 via Guwahati at 1200. (Barbour, NH)

## 2002 UTC on 13855

ICELAND: AFRTS. *World Focus Public Radio News* to 2005. (Frodge, MI) AFRTS **Iceland** 6320, 1644. (Brookman, AK) **AFRTS Key West** site 12133, 1733-1738. (Frodge, MI)

## 2009 UTC on 11335

NORTH KOREA: Voice of Korea. French news to ID at 2015. English 11335, 2106-2116+ & 2147-2153+. No parallels observed. North Korea's **KCBS** 11679.85, 2315-2323+, SIO 232; Spanish ID at "Voice of Corea" 11735, 0201-0206+. (Frodge, MI)

## 2020 UTC on 4976

UGANDA: Radio. Vernacular text to Afro pops and talk segments. National news with breaks for clear identification. (Gayle Van Horn, NC)

## 2031 UTC on 5050

TANZANIA: Radio. Presumed Swahili at tune-in. Fair signal for talks and music. Lady's mention of Radio Tanzania at 2144 with noticeable signal fading amid music bits. Very pleased with this log. (Barbour, NH)

## 2031 UTC on 11905

UZBEKISTAN: Radio Tashkent. Discussion on the music of Uzbekistan. (Frodge, MI). **Radio Netherlands Uzbekistan** relay 12070 at 1425. (Ross, CAN)

## 2218 UTC on 4800

CHINA: CPBS, Geermu. Mandarin service with alternating talks over music to fade-out by 2230. (Barbour, NH) **China Radio Intl** 11980, 1243-1249+. (Frodge, MI)

## 2246 UTC on 4959.9

DOMINICAN REP: Radio Cima. Spanish tropicales to three IDs. SIO 322; **Radio Cristal/Radio Puebla** 5009.8, 2312-2330+. (Frodge, MI)

## 2312 UTC on 4650.3

BOLIVIA: Radio Santa Ana de Yacuma. Spanish ID "en la Radio Santa Ana" to football coverage. Bolivia's **Radio Paititi** 4682.1, 2317+ **Radio Cruz del Sur** 4876.75, 0050-0058 (Slaen, ARG). **Radio Illimani** 4944.9, 2259-2303+. (Frodge, MI)

## 2321 UTC on 6950 USB

PIRATE: Radio Free Speech. Holiday parody ads to ID, followed by QSL maildrop address. Reception hampered by poor propagation and medium wave signal spurs. (Joe Wood, Gray, TN) **Under Cover Radio** 6925 USB, 0134-0153; **WHYP** 6925, \*2306-2349+; **WSDW-Shadow Radio** 6950.05 USB, 0051-0109. (Frodge, MI) Argentine pirate **Radio Bosques** 6153.17, 0316-0330, best in LSB. (Slaen, ARG). South American pirate **Radio Cochiguaz** 6950 LSB, 0149-0203+. (Frodge, MI)

## 2337 UTC on 4835

MALI: RTV Malienne. French service playing old Spanish tropicales! "Mali" identification at 2248. Poor signal best to monitor in LSB, // 5995 covered by VOA (Morocco relay) in English. (Frodge, MI)

## 2345 UTC on 13680

CANADA: China Radio Intl relay. Segment on retirement in China, including an interview with a 105 year old man. (MacKenzie, CA) Canada's **CFRX** 6070, 1808-1816+. (Frodge, MI)

*Thanks to our contributors – Have you sent in YOUR logs?  
Send to Gayle Van Horn, c/o Monitoring Times (or e-mail  
gaylevanhorn@monitoringtimes.com) Please note: paper strips and  
cassette recordings will no longer be accepted.  
English broadcast unless otherwise noted.*

## Merci, Danke, Grazie, Obrigado, Thanks... for the QSL !

Did yesterday's mail bring that sought-after reply from a Chinese domestic station? Did RTBF International's French verification letter leave you baffled? If translating Chinese and French have left you stupefied, as well as a bevy of other languages, I have a solution.

*Systran Standard*, a leading computer software, offers a proven and cost-effective way to translate emails, letters and web pages. Your own terminology can be added to translate any text. For more product information, go to: <http://www.systransoft.com/Products/Standard.html>.



Is *free* your favorite word? Alta Vista's *Bable Fish Translation* website offers free on-line translations for words, a block of text or a

web page. Common languages include English, French, German, Spanish, Italian, Portuguese, Russian, Korean, Chinese and Japanese at: <http://world.altavista.com/>.

The *Free Translation* website offers the same languages as Alta Vista, plus Dutch and Norwegian. Both free sites are a tremendous boost for DXers translating or composing their letters at: <http://www.freetranslation.com/>.

One additional language aid is a multilingual dictionary. Bookstores as well as online sources can provide this great addition to your reference library.

On-line translations plus software and dictionaries can solve those language problems and could improve your return. Now you can thank the station in almost any language!

### DOMINICAN REPUBLIC

Radio Amanecer Intl 6025 kHz. Full data verification letter signed by Lic. German Lorenzo-General Manager. Received in six months for a Spanish report. Station address: Apartado 1500, Santo Domingo, Dominican Republic. (Arnaldo Eranmo, Buenos Aires, ARG)

### MEDIUM WAVE

KMMZ, 1640 kHz AM. Partial data verification letter signed by Hiram Champlin-Owner. Letter confirms directional antenna pattern aimed 160 degrees and 340 degrees. Received in nine days for an AM report. Station address: 316 E. Willow, Enid, OK 73702. (Patrick Griffith, NONNK, Westminster, CO)

KPOJ, 620 kHz AM. Prepared verification card signed by Michael Birby. Received in four days after an AM follow-up report. Station address: 4949 SW Macadam Avenue, Portland, OR 97201-3912. (Patrick Martin, Seaside, OR) <http://www.super62.com>.



KSPN, 710 kHz AM. Full data verification letter signed by Mike Worrall-Assst. Chief Engineer, plus a color coverage map. Received in 30 days for a taped report. The CE was amazed at the excellent signal quality on the tape. Station address: ESPN Radio 710, 3321 S. La Cienega Blvd., Los Angeles, CA 90016. (Martin, OR)

New Zealand, Radio Rhema, 1251 kHz AM. Full data card with illegible signature, with mention of station as 5 KW. Also received a fantastic packet of goodies, which cost \$17 New Zealand dollars to mail, including a large color New Zealand scenic calendar, booklets and more. Received in 31 days for a taped report. Station address: Rhema Broadcasting Group, Inc., Private Bag 92-636, Auckland, New Zealand. (Martin, OR) *this is Pat's 110th QSL from New Zealand...he's definitely a pro!* - GVH

WDSU, 980 kHz AM. Station returned my reception report with "confirmation" written on it and signed by Al Decker-Owner. Received in nine days for an AM report. Sta-

tion address: 745 Main, Deadwood, SD 57732. (Griffith, CO)

### MONGOLIA

Voice of Mongolia, 12085 kHz. Full data waterfall scenery card unsigned. Two mint Mongolian stamps and a 50 note piece, Chinese form letter and an English program schedule enclosed. Received in 62 days for a taped report, sent to the Chinese section. Station address: C.P.O. 365, Ulaanbaatar 13, Mongolia. (Martin, OR)

### PARAGUAY

Radiodifusion America, 7737.1 kHz. Full data email verification from Adan Mur-Technical Advisor. Received in one day for reception from a DXpedition in Chamberlain, Maine. Station noted as 300 watts with plans to increase their output to 2.4 kW. Email address: [ramerica@rieder.net.py](mailto:ramerica@rieder.net.py). (George Maroti, Cumbre DX)

### PIRATE

South America, Radio Cochiguaz 6950 kHz USB. Email verification received in three hours for an email pirate report. Email: [radiocochiguaz@yahoo.com](mailto:radiocochiguaz@yahoo.com) (Harold Frodge, Midland, MI)

### PUERTO RICO

AFRTS/Armed Forces Radio via Roosevelt Roads, Isabella., 6458.5 kHz. Full data verification letter signed by Brooke Armato JO3 (SW)-Broadcast Operations Specialist. Received in 38 days for an English report sent via email. Station address: Naval Media Center, NDW Anacostia Annex, 2713 Mitscher Road SW, Washington, DC 20373-5819. <http://www.afrts.osd.mil/> (Frank Hillton, Charleston, SC)

### SIERRA LEONE

Radio UNAMSIL, 6137.8 kHz. Frequency only verification letter, signed by Shelia Dallas-Station Manager/Executive Producer. Program schedule and souvenir T-shirt enclosed. Received in 89 days for an English report. Very pleased with this package. Station address: Mammy Yoko Hotel, P.O. Box 5, Freetown Sierra Leone. (Rich D'Angelo, PA/DXLD)

### SOUTH AFRICA

South African Radio League, 21560 kHz. Full

data station card signed by Kathy Otto. Received in ten months for an English report. Station address: Private Bag X06, Honeydew 2040, South Africa. (Arnaldo Slaen, Buenos Aires, ARG)

### SOUTH KOREA

Radio Korea Intl 13670 kHz. Full data Koryo Dynasty art card unsigned. Received in 85 days for an English report. Station address: Overseas Service, Korean Broadcasting System, Yoido-dong 18, Youngdeungpo-ku, Seoul, Rep. Of Korea. (Tom Banks, Dallas, TX) <http://rki.kbs.co.kr/>

### SWEDEN

Radio Sweden, 17525 kHz. Full data color station card unsigned, plus station brochures. Received in 25 days for an English report and one US dollar. Station address: SE-105 10 Stockholm, Sweden. (Duane Hadley, Bristol, TN) <http://www.se/rs/>

### USA

AFRTS/Armed Forces Radio via Pearl Harbor, HI 10320 kHz. Full data verification letter signed by Braoke Armato JO3 (SW)-Broadcast Operations Specialist. Received in 32 days for an English report. Station address: (see Puerto Rico) (Hilton, SC)

WRMI, 9955 kHz. Full data card signed by Jeff White. Verification for a special Mexican DX Convention. Received in 58 days for an English report. Station address: 175 Fontainebleau Blvd. Suite 1N4, Miami, FL 33172. (Slaen, ARG)

### MARCH HOLIDAY QSLING

Guam Discovery Day, 1 March  
Bulgaria Liberation Day, 3 March  
Ghana Independence Day, 6 March  
Lithuania Independence Day (from Soviet Russia), 11 March  
Gabon Founding of Democratic Party, 12 March  
Mauritius Independence Day, 12 March  
Ireland St. Patrick's Day, 17 March  
Aruba Flag Day, 18 March  
Tunisia Independence Day, 20 March  
Iran Noruz (New Year's Day) 21 March  
Namibia Independence Day, 21 March  
Pakistan Republic Day, 23 March  
Greece Independence Day, 25 March

## Strong Signals

**W**here are they? While shortwave continues to be an important medium for international broadcasting around the world, several international broadcasters have either de-emphasized or entirely discontinued its use to audiences in North America. Even program listeners are finding that they need, under certain circumstances, to adopt some of the mindset of a DXer to be able to hear some big stations that they heard almost effortlessly in the past.

This is certainly true of **Deutsche Welle's** English Service. With broadcasts on shortwave now targeted only to Africa, Asia and – to a lesser extent – Europe, there's some heavy lifting to do to locate a broadcast that comes in reliably at listenable levels in North America. (The 2100 broadcast to western Africa originating from **DW's** Kigali, Rwanda, 250kW relay site on 15410 kHz in winter and 15205 and 11865 kHz in summer has been the best bet by far in at least the eastern half of North America.) This is even more the case for those seeking to tune in **Radio France Internationale**, whether in English or in French!

After the unsuccessful campaign to convince the **BBC World Service** that dropping shortwave to North America (and other regions) was unwise, we found that a few frequencies to adjacent areas still worked for us. But, while the signal (primarily on 15190 mornings and 5975 evenings) is better than we thought it might be, it's nowhere near as reliably or robustly heard as it once was. Listening to *Sportsworld* on Saturdays – which incidentally is still not available via the internet due to copyright issues – can be a supremely frustrating experience, for example.

So, where are those signals, strong and true, on the order in which we used to hear them?

### ◆ Expatriate Services

In the main, they are to be found in the home language services intended principally for expatriates. Where international services in English and other foreign languages have been a demonstrably harder sell for international broadcasters when seeking funding from their sponsors (ie: their parent corporations and, ultimately, their home governments or their agencies), relays of home services and services designed specifically for countrymen and women abroad have been easier to justify – (though not in all cases, as we have found recently with **Radio Denmark**, **Radio Norway** and **RTE Ireland**).

For those who crave a strong and steady shortwave signal with corresponding superior audio fidelity, this is one route to nirvana which

remains. Of course, it helps more if the listener is something of a linguist. But even if language is an initial barrier to enjoyment of every aspect of these broadcasts, the music programs remain largely accessible and there's always the chance that one might be inspired to take the effort to learn a new language.

Two stations that still put powerful signals into North America for much of the day are **Deutsche Welle (DW)** in German and **Radio Exterior de España (REE)** in Spanish. Tune these in and you'll experience shortwave at its best technically. They broadcast as follows:

#### DW Deutsches Programm

1800-0000	17860
2000-2200	17810
2200-0000	11690, 11955
0000-0600	6075, 6100
0000-0200	9655
0200-0400	9870
0200-0600	6145

<http://www.dw-world.de/german/0,3367,705-184676,00.html> for further info. Some navigating is required; the DW site is somewhat unsuitably arranged for this purpose.

#### REE en español

0800-1000	21570 (M-F)
1000-1500	17595 (M-F)
1100-1400	15170 (M-F)
1500-1600	17850 (S)
1600-1800	17850 (S/A)
1800-2000	17850
1900-2300	15110
2000-0000	17850 (S/A)
2300-0500	9540
0200-0600	6055, 11880

<http://www.rne.es/ree/OndaCorta/p-h-f1.htm#am> for program schedule.  
[www.rne.es/ree/programas.htm](http://www.rne.es/ree/programas.htm) for program descriptions.

### ◆ Religion on Radio Redux

You'll recall that a couple of months back, I lamented the lack of intelligent programs about religion on domestic North American radio. Thanks to Glenn Hauser, who took up the cudgel by reprinting that segment of my January column in his always excellent *DX Listening Digest*, we have these rejoinders and my thanks for the input.

Sergei Sosedkin (IL) points out **CBC Radio's Tapestry**, broadcast domestically on Sunday afternoons and which also used to be broadcast on **RCI** to the U.S. It still goes out on **RCI** to Southeast Asia and China (M 0000) and is available a number of ways via the internet. Its brief is to examine faith as a force in the world. (I should have recalled this one; it's a very good program.)

Sergei also cites a program from **Minnesota**

**Public Radio** entitled *Speaking of Faith*. It's fairly new (**PRI** began national distribution in July) and is hosted by journalist and theologian Krista Tippett. <http://www.speakingoffaith.org> says the program "will grapple with common and larger themes of American life – asking how perspectives of faith might offer illumination." At deadline, 53 public radio stations had signed on to carry this weekly program.

Don Moore (IA) recommends *Sound and Spirit*, produced by **WGBH** Boston and broadcast by 110 U.S. public radio stations. <http://www.wgbh.org/wgbh/pages/pri/spirit/> says the program "explores the human spirit through music and ideas...history, myth and spiritual traditions." On the air since 1996, *Sound and Spirit* is produced by anthropologist, writer and broadcaster Ellen Kushner. Bill Moyers calls it "the best program on public radio bar none." (So why haven't I heard it? My local public radio affiliate has never carried it.)

Getting back to shortwave, Larry Will (MD) suggests *The Secular Bible Study* which airs on **WBCQ** (T 0200 on 7415 kHz.) He says this program examines biblical stories from an historical and cultural viewpoint and seeks to interpret biblical works from a scholarly viewpoint.

The hour is split between the Old and New Testaments and, from one listen, it appears to me that the host (whose name I did not get) is not afraid of expressing an opinion. Nonetheless, he does seek to back up his assertions with numerous sources and perspectives which makes for an interesting listen even if your opinions or convictions might differ.

### ◆ The Comfort Zone Redux

This Australian program also was highlighted in January's column, whereupon **Radio Australia** promptly dropped it from its schedule! It still can be heard via the internet <http://www.abc.net.au/rn/ezone/> on-demand and on the **ABC Radio National** stream. (It's nice to have alternatives when that happens.)

Until April, good listening!

## Video Piracy

by David Lawson

The volume carries information about current security technology used by cable and satellite providers. This information is not available elsewhere.

### Video Piracy

has everything you need to know about video piracy. Satellite, Cable, Videotape, DVD, etc. ISBN 0-9703092-4-4 Only \$18.95. Free info 954-432-7943

[ScramblingNews.com](http://ScramblingNews.com)

## 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 Standard Time) 5, 6, 7 or 8 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, 7:30 pm Eastern, 6:30 pm Central, etc.).

### Find the station you want to hear.

Look at the page which corresponds to the time you will be listening. On the top half of the page 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:

#### Day Codes

s/S	Sunday
m/M	Monday
t/T	Tuesday
w/W	Wednesday
h/H	Thursday
f/F	Friday
a/A	Saturday
D	Daily
mon/MON	monthly
occ:	occasional
DRM:	Digital Radio Mondiale

In the same column ⑤, irregular broadcasts are indicated "tent" and programming which includes languages besides English are coded "vl" (various languages).

### 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
au:	Australia
ca:	Central America
do:	domestic broadcast
eu:	Europe
irr:	irregular (Costa Rica RFPI)
me:	Middle East
na:	North America
om:	omnidirectional
pa:	Pacific
sa:	South America
va:	various

### Choose a program or station you want to hear.

Selected programs for prime listening hours appear following the frequencies – space does not permit 24 hour listings nor can every station be listed. However, listings for the most popular stations and selected lesser-known stations illustrate the variety available on shortwave. The format of the listings alternates among three different styles – by station, by genre and by day – month by month. Times listed are approximate and programs are subject to change.

The program listings emphasize broadcasts targeted to North America. In most cases, the stations and programs listed should be readily receivable in North America using a portable radio. Most broadcasters produce one broadcast in English per day that is repeated over a 24 hour period to all areas. If you are able to listen to transmissions to other areas of the world during "non-prime time" hours, referring to the prime time listings for those stations will likely be helpful in determining what programs will be broadcast.

Occasionally, a program or station listing may be followed by a reference to another listing for the same program or station at a different time. This is done to conserve space and make it possible to provide more listings.

#### MT MONITORING TEAM

Gayle Van Horn    John Figliozzi  
 Frequency Manager    Program Manager  
 gaylevanhorn@monitoringtimes.com    johnfigliozzi@monitoringtimes.com

Mark Fine, VA  
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#### Program Highlights

John Figliozzi

#### ❖ Realtime Beijing

Last month in this space we clued you into this new and unannounced hour-long transmission from China Radio International at 1100 on 5960 kHz. Here's a more detailed rundown of what you can expect to hear within this magazine program on weekdays:

- 1100 Top Stories (also on S/A)
- 1108 City Reports
- 1115 Business & Markets
- 1124 Sports News
- 1130 Top News Headlines & Press Clippings
- 1135 Feature Highlights
- 1142 Sci-Tech
- 1148 Culture & Showbiz (incl. Song of the Day)

#### Music in Other Languages

Tying in with this month's *Programming Spotlight* column, here are some music programs from the home language services of broadcasters putting strong signals into North America:

#### Deutsche Welle (DW)

*Bunte Noten* — S 1805, 2205; M 0205.  
*Klassik und Mehr* — S 1830, 2230; M 0230.

*Musik-Thema* — M 1940, 2340; T 0340.

*Schlager* — T 2135; W 0135, 0535.

*Weltmusik* — H 1940, 2340; F 0340.

#### Radio Exterior de España (REE)

*Así Sueño* — M-F 2030.

*La Bañera de Ulises* — S 0005, 1005, 2205; T 1405, 2205.

*Nuestro Sello* — M-F 1005.

#### Radio France Internationale (RFI)

*Afro Pop* — S 2105 (9790, 11955)

*Couleurs Tropicales* — M-F 2110 (9790, 11955)

*La Bande Passante* — M-F 1430 (15300, 21685); 2030 (9790, 11955)

*Musiques de Monde* — T/W 1410; S 1510 (15300, 21685)

*Tu Connais la Chanson* — S 1430; H 1410 (15300, 21685)

**0000 UTC - 7PM EST / 6PM CST / 4PM PST**

0000	0007		Sierra Leone, SLBS	3316do		
0000	0015	vl	Cambodia, National Radio Of	11940as		
0000	0015		Japan, Radio	13650as	17810as	
0000	0030		Egypt, Radio Cairo	11725na		
0000	0030		Thailand, Radio	9680af		
0000	0030		UK, BBC World Service	3915as	11945as	
			17615as			
0000	0030		USA, Voice of America	7215va	9890va	
			11760va	15185va	15290va	
			17820va			
0000	0045		India, All India Radio	9705as	9950as	
			11620as	11645as	13605as	
0000	0055		Netherlands, Radio	9845na		
0000	0057		Canada, Radio Canada Intl	5960na	9590na	
			9755as	11895as		
0000	0059	DRM	UK, BBC World Service	6015na		
0000	0100		Anguilla, Caribbean Beacon	6090am		
0000	0100		Australia, ABC NT Alice Springs	2310irr	4835co	
0000	0100		Australia, ABC NT Katherine	5025do		
0000	0100		Australia, ABC NT Tennant Creek	4910do		
0000	0100		Australia, Radio	9660pa	12080va	13630pa
			15240pa	15415as	17750as	17775va
			17795va	21725as		
0000	0100		Bulgaria, Radio	7400na	9400na	
0000	0100		Canada, CBC Northern Service	9625do		
0000	0100		Canada, CFRX Toronto ON	6070do		
0000	0100		Canada, CFVP Calgary AB	6030do		
0000	0100		Canada, CKZN St John's NF	6160do		
0000	0100		Canada, CKZU Vancouver BC	6160do		
0000	0100		Costa Rica, University Network	5030am	6150am	
			7375am	9725sa	11870am	13750na
0000	0100	1st a	Finland, Scandinavian Weekend	Radio	5990eu	
			11690eu			
0000	0100		Germany, Deutsche Welle	7290as	9880as	
0000	0100		Guyana, Voice of	3291do	5950do	
0000	0100		Japan, Radio	6145na		
0000	0100		Malaysia, RTM Radio 4	7295do		
0000	0100		Namibia, Namibian BC Corp	6060af	3270af	3290af
0000	0100		New Zealand, Radio NZ Intl	17675pa		
0000	0100		Sierra Leone, Radio UNAMSIL	6139af		
0000	0100		Singapore, Mediacorp Radio	6150do		
0000	0100	vl	Solomon Islands, SIBC	5020do	9545do	
0000	0100		Spain, Radio Exterior Espana	6055am		
0000	0100		UK, BBC World Service	5970as	5975ca	
			6195as	9410as	9740as	11955as
			12095as	15280as	15310as	15360as
			17790as			
0000	0100		USA, Armed Forces Radio	4319usb	5446usb	
			5765usb	6350usb	7507usb	10320usb
			12133usb	12579usb	13362usb	13855usb
0000	0100		USA, KAIJ Dallas TX	13815va		
0000	0100		USA, KTBN Salt Lake City UT	7505na		
0000	0100		USA, KWHR Naalehu HI	17510as		
0000	0100	twhfa	USA, Voice of America	5995am	6130am	
			7405am	9455am	9775am	11695am
			13790am			
0000	0100		USA, WBCQ Kennebunk ME	7415na	9330na	
0000	0100	mtwhfa	USA, WBCQ Kennebunk ME	5105na		
0000	0100		USA, WBOH Newport NC	5920am		
0000	0100		USA, WEWN Birmingham AL	5825va		
0000	0100		USA, WHRA Greenbush ME	7580va		
0000	0100		USA, WHRI Noblesville IN	5745va	7315am	
0000	0100		USA, WINB Red Lion PA	9320am		
0000	0100		USA, WJIE Louisville KY	7490am	11515va	
			13595am			
0000	0100	sm	USA, WRMI Miami FL	9955am		
0000	0100	twhfa	USA, WRMI Miami FL	7385na		
0000	0100	mwfas	USA, WSHB Cypress Creek SC	7535na		
0000	0100	mwf	USA, WSHB Cypress Creek SC	9430am		
0000	0100		USA, WTJC Newport NC	9370na		
0000	0100	sm	USA, WWBS Macon GA	11900na		
0000	0100		USA, WWCR Nashville TN	3210na	5070na	
			5935na	7465na		
0000	0100		USA, WWRB Manchester TN	5050na	5085na	
			6890na			
0000	0100		USA, WYFR Okeechobee FL	6085na	9505na	
			11720sa			
0000	0100	vl	Vanuatu, Radio	3945al	7260do	
0000	0100		Zambia, Christian Voice	4965do		
0015	0030	twhfa	Austria, Radio Austria Intl	13730sa		
0030	0100	mtwhf	Germany, Bible Voice Broadcasting		7105as	
0030	0100		Iran, Voice of the Islamic Rep	6120na	9580na	
0030	0100		Lithuania, Radio Vilnius	6120al	7325na	
0030	0100		Sri Lanka, SLBC	6005as	9770as	15745as
0030	0100		Thailand, Radio	13695na		
0030	0100		UK, BBC World Service	9580as		
0045	0100	twhfa	Austria, Radio Austria Intl	13730sa		
0055	0100		Italy, RAI Intl	9675na	11800na	

**0100 UTC - 8PM EST / 7PM CST / 5PM PST**

0100	0115		Italy, RAI Intl	9675na	11800na	
0100	0127		Czech Rep, Radio Prague Intl		6200na	7345na
0100	0127		Slovakia, Radio Slovakia Intl		5930na	7230ca
			9440sa			
0100	0127		Vietnam, Voice of	6175na		
0100	0130	s	Germany, Universal Life		9435as	
0100	0130	mtwhfa	Serbia & Montenegro, Intl Radio		7115na	
0100	0130	twhfa	USA, Voice of America	7405am	9455am	6130am
					9775am	13790am
0100	0130		Uzbekistan, Radio Tashkent Intl	5975as	6165as	
			7160as			
0100	0155		Netherlands, Radio	6165na		
0100	0156		China, China Radio Intl		6140va	9580na
			9790na			
0100	0156		North Korea, Voice of		3560as	6195as
			7140am	9345as	11735cm	
0100	0156		Romania, Radio Romania Intl	9530na	6040na	9510na
				11740na		
0100	0159		China, China Radio Intl		6140na	
0100	0200		Anguilla, Caribbean Beacon		6090am	
0100	0200		Australia, ABC NT Katherine		5025do	
0100	0200		Australia, ABC NT Tennant Creek		4910do	
0100	0200		Australia, HCJB	15560pa		
0100	0200		Australia, Radio	9660pa	12080va	13630pa
			15240pa	15415as	17750as	17775va
			17795vc	21725as		
0100	0200		Canada, CBC Northern Service	9625do		
0100	0200		Canada, CFRX Toronto ON	6070do		
0100	0200		Canada, CFVP Calgary AB	6030do		
0100	0200		Canada, CKZN St John's NF	6160do		
0100	0200		Canada, CKZU Vancouver BC	6160do		
0100	0200		Costa Rica, University Network	5030am	6150am	
			7375am	9725sa	11870am	13750na
0100	0200		Cuba, Radio Havana		6000na	9820na
0100	0200	1st o	Finland, Scandinavian Weekend	Radio	5990eu	
			11690eu			
0100	0200		Guyana, Voice of	3291do	5950do	
0100	0200		Iran, Voice of the Islamic Rep		6120na	9580na
0100	0200		Japan, Radio	11860as	11880va	15325as
			17560va	17685pa	17810as	17835as
			17845as			
0100	0200		Malaysia, RTM Radio 4	7295do		
0100	0200		Namibia, Namibian BC Corp	6060af	3270af	3290af
0100	0200		New Zealand, Radio NZ Intl	17675pa		
0100	0200		Sierra Leone, Radio UNAMSIL	6139af		
0100	0200		Singapore, Mediacorp Radio	6150do		
0100	0200	vl	Solomon Islands, SIBC	5020do	9545do	
0100	0200		Sri Lanka, SLBC	6005as	9770as	15745as
0100	0200		UK, BBC World Service	5975ca	6195as	
			9410as	9525ca	9825sa	11955as
			15280as	15310as	15360as	17790as
0100	0200		Ukraine, Radio Ukraine Intl	5905na		
0100	0200		USA, Armed Forces Radio	4319usb	5446usb	
			5765usb	6350usb	7507usb	10320usb
			12133usb	12579usb	13362usb	13855usb
0100	0200		USA, KAIJ Dallas TX	13815va		
0100	0200		USA, KTBN Salt Lake City UT	7505na		
0100	0200		USA, KWHR Naalehu HI	17510as		
0100	0200		USA, Voice of America	9850va	11705va	11820va
				15290va	17740va	17820vc
0100	0200		USA, WBCQ Kennebunk ME	5105na	7415na	
			9330na			
0100	0200		USA, WBOH Newport NC	5920am		
0100	0200		USA, WEWN Birmingham AL	5825va		
0100	0200		USA, WHRA Greenbush ME	7580va		
0100	0200		USA, WHRI Noblesville IN	5745va	7315am	
0100	0200		USA, WINB Red Lion PA	9320am		
0100	0200		USA, WJIE Louisville KY	7490am	11515va	
			13595am			
0100	0200	sm	USA, WRMI Miami FL	9955am		
0100	0200	twhfa	USA, WRMI Miami FL	7385na		
0100	0200		USA, WSHB Cypress Creek SC	7535na		
0100	0200	m	USA, WSHB Cypress Creek SC	9430am		
0100	0200		USA, WTJC Newport NC	9370na		
0100	0200	sm	USA, WWBS Macon GA	11900na		
0100	0200		USA, WWCR Nashville TN	3210na	5070na	
			5935na	7465na		
0100	0200		USA, WWRB Manchester TN	5050na	5085na	
			6890na			
0100	0200		USA, WYFR Okeechobee FL	6065na	9505na	
			15060as			
0100	0200	vl	Vanuatu, Radio	3945al	7260do	
0100	0200		Zambia, Christian Voice	4965do		
0105	0115	sm	Austria, Radio Austria Intl		7325am	9870am
0115	0120	mtwhf	Kyrgyzstan, Radio Kyrgyz		4010irr	4795irr
0115	0130		Austria, Radio Austria Intl		7325am	9870am
0130	0200		Sweden, Radio	9435va		
0130	0200	twhfa	USA, Voice of America	9455va	5995am	6130am
					13740am	
0135	0145	sm	Austria, Radio Austria Intl		7325am	9870am
0140	0200		Vatican City, Vatican Radio		7335as	9865as
0145	0200		Austria, Radio Austria Intl		7325am	9870am

SELECTED PROGRAMMING BEGINS ON PAGE 55

# Shortwave Guide



## 0200 UTC - 9PM EST / 8PM CST / 6PM PST

0200	0227	Czech Rep, Radio Prague Intl	6200na	7345na
0200	0228	Hungary, Radio Budapest	9835na	
0200	0230	Austria, AWR Europe	7230as	
0200	0230	Iran, Voice of the Islamic Rep	6120na	9580na
0200	0230	Serbia & Montenegro, Intl Radio	7130na	
0200	0230	USA, KJES Vado NM	7555na	
0200	0256	North Korea, Voice of 11335as	4405as	9325as
0200	0256	South Korea, Radio Korea Intl 15575na	9560na	11810sa
0200	0259	Canada, Radio Canada Intl 11725am 15150as	6040am 17860am	9755am
0200	0300	Anguilla, Caribbean Beacon	6090am	
0200	0300	Argentina, RAE	11710am	
0200	0300	Australia, ABC NT Alice Springs	2310irr	4835da
0200	0300	Australia, ABC NT Katherine	5025da	
0200	0300	Australia, ABC NT Tennant Creek	4910da	
0200	0300	Australia, HCJB	15560pa	
0200	0300	Australia, Radio	9660pa 12080va	13630pa
0200	0300	15240pa 15415as 21725as	15515va	17750as
0200	0300	Canada, CBC Northern Service	9625da	
0200	0300	Canada, CFRX Toronto ON	6070da	
0200	0300	Canada, CFVP Calgary AB	6030da	
0200	0300	Canada, CKZN St John's NF	6160da	
0200	0300	Canada, CKZU Vancouver BC	6160da	
0200	0300	Costa Rica, University Network	5030am 6150am	
0200	0300	7375am 9725sa	11870am	13750na
0200	0300	Cuba, Radio Havana	6000na	9820na
0200	0300	Egypt, Radio Cairo	11780na	
0200	0300	1st a Finland, Scandinavian Weekend 11720eu	Radio	5980eu
0200	0300	as Germany, Bible Voice Broadcasting		17540as
0200	0300	Guyana, Voice of	3291da	5950da
0200	0300	Indonesia, Voice of	9525as	11785as
0200	0300	Malaysia, RTM Radio 4	7295da	
0200	0300	Myanmar, Radio	7185da	
0200	0300	Namibia, Namibian BC Corp	3270af	3290af
0200	0300	6090af		
0200	0300	New Zealand, Radio NZ Intl	17675pa	
0200	0300	as Philippines, Radio Pilipinas 15270me	12015me	15120me
0200	0300	Russia, Voice of	5995me 6155na	7180na
0200	0300	9765na 15445na	15595na	
0200	0300	Sierra Leone, Radio UNAMSIL	6139af	
0200	0300	Singapore, Mediacorp Radio	6150da	
0200	0300	vi Salaman Islands, SIBC	5020da	9545da
0200	0300	Sri Lanka, SLBC	6005as	9770as
0200	0300	Taiwan, Radio Taiwan Intl	5950na 15745as	9680na
0200	0300	11875as 15320as	15465as	
0200	0300	UK, BBC World Service	5975ca 6195eu	
0200	0300	9410me 9525ca	9750af	9825sa
0200	0300	11955as 12095sa	15280as	15310as
0200	0300	15360as 17790as		
0200	0300	USA, Armed Forces Radio	4319usb 5446usb	
0200	0300	5765usb 6350usb	7507usb	10320usb
0200	0300	12133usb 12579usb	13362usb	13855usb
0200	0300	USA, KAIJ Dallas TX	5755va	
0200	0300	USA, KTBN Salt Lake City UT	7505na	
0200	0300	USA, KWHR Naalehu HI	17510as	
0200	0300	USA, Voice of America	7200va 7255va	
0200	0300	9850va 11705va	11705va	11820va
0200	0300	15250va 15290va	17740va	17820va
0200	0300	mtwhfa USA, WBCQ Kennebunk ME	5105na	
0200	0300	USA, WBOH Newport NC	5920am	
0200	0300	USA, WEWN Birmingham AL	5825va	
0200	0300	USA, WHRA Greenbush ME	7580va	
0200	0300	USA, WHRI Noblesville IN	5745va	7315am
0200	0300	USA, WINB Red Lion PA	9320am	
0200	0300	USA, WJIE Louisville KY	7490am	11515va
0200	0300	13595am		
0200	0300	1whfa USA, WRMI Miami FL	7385na	
0200	0300	sm USA, WSHB Cypress Creek SC	7535na	
0200	0300	mh USA, WSHB Cypress Creek SC	9430ca	
0200	0300	USA, WTJC Newport NC	9370na	
0200	0300	USA, WWCR Nashville TN	3210na	5070na
0200	0300	5935na 7465na		
0200	0300	USA, WWRB Manchester TN	5050na	5085na
0200	0300	6890na		
0200	0300	USA, WYFR Okeechobee FL	5985na 6065na	
0200	0300	9505na 9985sa	11855ca	
0200	0300	vi Vanuatu, Radio	3945af	7260da
0200	0300	Zambia, Christian Voice	4965da	
0215	0220	Nepal, Radio	3230as 5005as	6100as
0230	0257	Vietnam, Voice of	6175na	
0230	0300	Sweden, Radio	9495na	
0245	0300	1whfas Albania, Radio Tirana Intl	6115na	7160na
0245	0300	UK, BBC World Service	9610af	
0250	0300	Vatican City, Vatican Radio	7305am	9605am
0250	0300	Zambia, Radio	4910da	

## 0300 UTC - 10PM EST / 9PM CST / 7PM PST

0300	0310	Vatican City, Vatican Radio	7305am	9605am
		9660af 17665as		
0300	0315	Croatia, Voice of	7285na	
0300	0330	Australia, HCJB	15560pa	
0300	0330	sm w ia Belarus, Radio Belarus Intl		5970eu 7210eu
0300	0330	as Egypt, Radio Cairo	11780na	
0300	0330	Philippines, Radio Pilipinas	12015me	15120me
		15270me		
0300	0330	Thailand, Radio	15460na	
0300	0330	a UK, Wales Radio Intl	9735na	
0300	0330	USA, KJES Vado NM	7555na	
0300	0355	South Africa, Channel Africa	3345af	9770af
0300	0356	China, China Radio Intl	9690na	9790na
0300	0356	North Korea, Voice of	3560as	6195as
		7140as 9345as		
0300	0356	Romania, Radio Romania Intl	6040na	9515na
0300	0400	Anguilla, Caribbean Beacon	6090am	
0300	0400	Australia, ABC NT Alice Springs	2310irr	4835da
0300	0400	Australia, ABC NT Katherine	5025da	
0300	0400	Australia, ABC NT Tennant Creek	4910da	
0300	0400	Australia, Radio	9660pa 12080va	13630pa
0300	0400	15240pa 15415as 21725as	15515va	17750as
0300	0400	vi Botswana, Radio	4820da	4830af
0300	0400	Bulgaria, Radio	7400na	9400na
0300	0400	Canada, CBC Northern Service	9625da	
0300	0400	Canada, CFRX Toronto ON	6070da	
0300	0400	Canada, CFVP Calgary AB	6030da	
0300	0400	Canada, CKZN St John's NF	6160da	
0300	0400	Canada, CKZU Vancouver BC	6160da	
0300	0400	Costa Rica, University Network	5030am 6150am	
0300	0400	7375am 9725sa	11870am	13750na
0300	0400	17645as		
0300	0400	Cuba, Radio Havana	6000na	9820na
0300	0400	1st a Finland, Scandinavian Weekend 11720eu	Radio	5980eu
0300	0400	Guyana, Voice of	3291da	5950da
0300	0400	Japan, Radio	21610pa	
0300	0400	Malaysia, RTM Radio 4	7295da	
0300	0400	Namibia, Namibian BC Corp	3270af	3290af
		6090af		
0300	0400	New Zealand, Radio NZ Intl	17675pa	
0300	0400	Oman, Radio	15355af	
0300	0400	Russia, Voice of	6155na 7180na	7350na
		15445na 15595na		
0300	0400	Sierra Leone, Radio UNAMSIL	6139af	
0300	0400	Singapore, Mediacorp Radio	6150da	
0300	0400	vi Salaman Islands, SIBC	5020da	9545da
0300	0400	Sri Lanka, SLBC	6005as	9770as
0300	0400	Sudan, Sudan Radio Service	9625af	
0300	0400	mtwhf Taiwan, Radio Taiwan Intl	5950na 9680na	
		11875as 15125as	15320as	
0300	0400	Uganda, Radio	4976da	5026da
0300	0400	UK, BBC World Service	3255af 5975ca	7196da
		6005af 6190af 6195eu	7160af	9410eu
		9525am 9750af	11760me	11765af
		12035af 15280as	15310as	15360as
		15410af 15575me	17760as	17790as
		21660as		
0300	0400	USA, Armed Forces Radio	4319usb 5446usb	
		5765usb 6350usb	7507usb	10320usb
		12133usb 12579usb	13362usb	13855usb
0300	0400	USA, KAIJ Dallas TX	5755va	
0300	0400	USA, KTBN Salt Lake City UT	7505na	
0300	0400	USA, KWHR Naalehu HI	17510as	
0300	0400	USA, Voice of America	7200va 7255va	
		9850va 11705va	11705va	11820va
		15250va 15290va	17740va	17820va
0300	0400	USA, WBCQ Kennebunk ME	5105na	
0300	0400	USA, WBOH Newport NC	5920am	
0300	0400	USA, WEWN Birmingham AL	5825va	
0300	0400	USA, WHRA Greenbush ME	7580va	
0300	0400	USA, WHRI Noblesville IN	5745va	7315am
0300	0400	USA, WINB Red Lion PA	9320am	
0300	0400	USA, WJIE Louisville KY	7490am	11515va
0300	0400	13595am		
0300	0400	m USA, WRMI Miami FL	7385na	
0300	0400	USA, WSHB Cypress Creek SC	7535na	
0300	0400	USA, WTJC Newport NC	9370na	
0300	0400	USA, WWCR Nashville TN	3210na	5070na
0300	0400	5935na 7465na		
0300	0400	USA, WWRB Manchester TN	5050na	5085na
0300	0400	6890na		
0300	0400	USA, WYFR Okeechobee FL	5985na 6065na	
		9505na 9985sa	11855ca	
0300	0400	vi Vanuatu, Radio	3945af	7260da
0300	0400	Zambia, Radio Christian Voice	6065da	
0300	0400	vi Zimbabwe, ZBC Corp	5975da	
0310	0330	Vatican City, Vatican Radio	9660af	17665as
0330	0357	Vietnam, Voice of	6175na	
0330	0358	Hungary, Radio Budapest	9835na	
0330	0400	1whfas Albania, Radio Tirana Intl	6165eu	7160eu
0330	0400	Malaysia, Radio Malaysia Kata	Kinabalu	5979do
0330	0400	Sweden, Radio	9495na	
0330	0400	UAE, Radio Dubai	12005na	15400na

# Shortwave Guide



0330	0400	17890na UK, BBC World Service 9670eu	7130eu	7265eu
0345	0400	Tajikistan, Radio	7245irr	

## 0400 UTC - 11PM EST / 10PM CST / 8PM PST

0400	0427	Czech Rep, Radio Prague Intl	6200na	7345na
0400	0430	France, Radio France Intl	9805af	11995af
0400	0430	South Africa, Channel Africa	3345af	
0400	0430	Sri Lanka, SLBC	6005as	15745as
0400	0450	Turkey, Voice of	6020va	7240eu
0400	0455	Netherlands, Radio	6165ra	9590na
0400	0456	China, China Radio Intl	6190na	9560na
		9755na		
0400	0500	Anguilla, Caribbean Beacon	6090am	
0400	0500	Australia, ABC NT Alice Springs	2310irr	4835do
0400	0500	Australia, ABC NT Katherine	5025do	
0400	0500	Australia, ABC NT Tennant Creek	4910do	
0400	0500	Australia, Radio	9660pa	13630pa
		15240pa	15415as	15515va
		21725as		
0400	0500	Botswana, Radio	4820do	4830af
0400	0500	Canada, CBC Northern Service	9625do	7255do
0400	0500	Canada, CFRX Toronto ON	6070do	
0400	0500	Canada, CKZN St John's NF	6160do	
0400	0500	Canada, CKZU Vancouver BC	6160do	
0400	0500	Costa Rica, University Network	5030am	6150am
		7375am	9725sa	11870am
		17645as		
0400	0500	Cuba, Radio Havana	6000na	9820ra
0400	0500	Finland, Scandinavian Weekend Radio	5980eu	
		11720eu		
0400	0500	Germany, Deutsche Welle	6180af	9545af
		9710af		
0400	0500	Germany, Overcamer Ministries	9770au	
0400	0500	Guyana, Voice of	3291do	5950do
0400	0500	Malaysia, Radio Malaysia Kota	Kinabalu	5979co
0400	0500	Malaysia, RTM Radio 4	7295da	
0400	0500	Namibia, Namibian BC Corp	3270af	3290af
		6090af		
0400	0500	New Zealand, Radio NZ Intl	15340pa	
0400	0500	Russia, Voice of	7125na	7240ra
		7350na	12010na	15595na
		12010na		
0400	0500	Sierra Leone, Radio UNAMSIL	6139af	
0400	0500	Singapore, Mediacorp Radio	6150do	
0400	0500	Salomon Islands, SIBC	5020do	9545do
0400	0500	Sudan, Sudan Radio Service	9625af	
0400	0500	Uganda, Radio	5026do	7196do
0400	0500	UK, BBC World Service	3255af	5975am
		6005af	6135ca	6190af
		9410eu	11760me	12035af
		15280as	15310as	15420af
		15575me	17760as	21660as
0400	0500	UK, BBC World Service	6010na	
0400	0500	Ukraine, Radio Ukraine Intl	5905na	
0400	0500	USA, Armed Forces Radio	4319usb	5446usb
		5765usb	6350usb	10320usb
		12133usb	12579usb	13855usb
0400	0500	USA, KAIJ Dallas TX	5755va	
0400	0500	USA, KTNB Salt Lake City UT	7505na	
0400	0500	USA, KWHR Naalehu HI	17780as	
0400	0500	USA, Voice of America	4960af	6080af
		7170va	7290af	9475ra
		9575af	9885af	15205va
0400	0500	USA, WBCQ Kennebunk ME	5105na	7415na
0400	0500	USA, WBCQ Kennebunk ME	9330na	
0400	0500	USA, WBOH Newport NC	5920am	
0400	0500	USA, WEWN Birmingham AL	5825na	
0400	0500	USA, WHRA Greenbush ME	7580va	
0400	0500	USA, WHRI Noblesville IN	5745va	7315am
0400	0500	USA, WINB Red Lion PA	9320am	
0400	0500	USA, WJIE Louisville KY	7490am	11515va
		13595am		
0400	0500	USA, WMLK Bethel PA	9465eu	
0400	0500	USA, WRMI Miami FL	7385na	
0400	0500	USA, WSHB Cypress Creek SC	12020va	
0400	0500	USA, WTJC Newport NC	9370na	
0400	0500	USA, WWCR Nashville TN	3210na	5070na
		5770na	5935na	
		6890na		
0400	0500	USA, WYFR Okeechobee FL	7355va	6065na
		9505na		6855va
0400	0500	Vanuatu, Radio	3945af	7260do
0400	0500	Zambia, Radio	4910do	
0400	0500	Zambia, Radio Christian Voice	6065do	
0400	0500	Zimbabwe, ZBC Corp	5975do	
0415	0420	Kyrgystan, Radio Kyrgyz	4010irr	4795irr
0430	0457	Czech Rep, Radio Prague Intl	9865va	11600va
0430	0500	Nigeria, Radio/Enugu	6025do	
0430	0500	Nigeria, Radio/Ibadan	6050do	
0430	0500	Nigeria, Radio/Kaduna	4770do	6090dc
0430	0500	Nigeria, Radio/Lagos	3326do	4990do
0430	0500	Swaziland, TWR	4775af	6120af
0445	0500	Italy, RAI Intl	5965af	6100af
				7230af

## 0500 UTC - 12AM EST / 11PM CST / 9PM PST

0500	0515	Israel, Kol Israel	6280va	7545va	17600va
0500	0529	Belgium, Radio Vlaanderen Intl		9590na	
0500	0530	France, Radio France Intl		11850af	13610af
0500	0530	Netherlands, Radio	15255va		
0500	0530	UK, BBC World Service		15280as	17885af
0500	0530	UK, BBC World Service		7295eu	9670eu
		11845eu			
0500	0530	Vatican City, Vatican Radio		7360af	9660af
		11625af			
0500	0556	China, China Radio Intl		6190na	9560na
0500	0600	Anguilla, Caribbean Beacon		6090am	
0500	0600	Australia, ABC NT Alice Springs		2310irr	4835do
0500	0600	Australia, ABC NT Katherine		5025do	
0500	0600	Australia, ABC NT Tennant Creek		4910do	
0500	0600	Australia, Radio	9660pa	12080va	13630pa
		15160as	15240pa	15515vc	17750as
0500	0600	Bhutan, Bhutan BC Service		5030af	6035do
0500	0600	Botswana, Radio	4820do	4830af	7255do
0500	0600	Canada, CBC Northern Service		9625do	
0500	0600	Canada, CFRX Toronto ON		6070do	
0500	0600	Canada, CKZN St John's NF		6160do	
0500	0600	Canada, CKZU Vancouver BC		6160do	
0500	0600	Costa Rica, University Network		5030am	6150am
		7375am	9725sa	11870am	13750na
		17645as			
0500	0600	Cuba, Radio Havana		9550am	9820na
		11760na			
0500	0600	Finland, Scandinavian Weekend Radio		6170eu	
		11690eu		11720eu	
0500	0600	Germany, Deutsche Welle		9565af	11805af
		12045af		15410af	
0500	0600	Greece, Voice of	9420eu	12105eu	
0500	0600	Guyana, Voice of	3291do	5950do	
0500	0600	Japan, Radio	5975eu	6110na	7230eu
		11715eu	11760as	15195as	17810as
		21755pa			
0500	0600	Kuwait, Radio	15110as		
0500	0600	Malaysia, Radio Malaysia Kota	Kinabalu	5979do	
0500	0600	Malaysia, RTM Radio 4		7295do	
0500	0600	Namibia, Namibian BC Corp		6060af	6175af
0500	0600	New Zealand, Radio NZ Intl		15340pa	
0500	0600	Nigeria, Radio/Enugu		6025do	
0500	0600	Nigeria, Radio/Ibadan		6050do	
0500	0600	Nigeria, Radio/Kaduna		4770do	6090do
0500	0600	Nigeria, Radio/Lagos		3326do	4990do
0500	0600	Nigeria, Voice of	17800af		
0500	0600	Russia, Voice of	7125na	7180na	7240na
		12010na	15445na	15595na	
0500	0600	Sierra Leone, Radio UNAMSIL		6139af	
0500	0600	Singapore, Mediacorp Radio		6150do	
0500	0600	Salomon Islands, SIBC		5020do	9545do
0500	0600	South Africa, Channel Africa		9525af	11710af
0500	0600	Swaziland, TWR	6120af	7205af	9500af
0500	0600	Uganda, Radio	4976do	5026do	7196do
0500	0600	UK, BBC World Service		6005af	6135ca
		6190af	6195eu	7160af	9410eu
		11765af	11940af	11955as	15310as
		15360as	15420af	15565eu	15575me
		17640af	17760as	17790as	21660as
0500	0600	USA, Armed Forces Radio		4319usb	5446usb
		5765usb	6350usb	7507usb	10320usb
		12133usb	12579usb	13362usb	13855usb
0500	0600	USA, KAIJ Dallas TX	5755va		
0500	0600	USA, KTNB Salt Lake City UT	7505na		
0500	0600	USA, KWHR Naalehu HI	17780as		
0500	0600	USA, Voice of America	6035af	6080af	
		6105af	7170va	7295af	9700va
		11835af	13710af	15205va	11825va
0500	0600	USA, WBCQ Kennebunk ME		7415na	
0500	0600	USA, WBCQ Kennebunk ME		9330na	
0500	0600	USA, WBCQ Kennebunk ME		5105na	
0500	0600	USA, WBOH Newport NC		5920am	
0500	0600	USA, WEWN Birmingham AL		5825na	7570va
0500	0600	USA, WHRA Greenbush ME		7580af	
0500	0600	USA, WHRI Noblesville IN		5745va	7315am
0500	0600	USA, WINB Red Lion PA		9320am	
0500	0600	USA, WJIE Louisville KY		7490am	11515va
		13595am			
0500	0600	USA, WMLK Bethel PA		9465eu	
0500	0600	USA, WRMI Miami FL		7385na	
0500	0600	USA, WSHB Cypress Creek SC		7535eu	
0500	0600	USA, WSHB Cypress Creek SC		12020af	
0500	0600	USA, WTJC Newport NC		9370na	
0500	0600	USA, WWCR Nashville TN		3210na	5070na
		5770na	5935na		
		6890na			
0500	0600	USA, WYFR Okeechobee FL		6855eu	7520eu
0500	0600	Vanuatu, Radio	3945af	7260do	
0500	0600	Zambia, Radio Christian Voice		6065do	
0500	0600	Zimbabwe, ZBC Corp		5975do	
0515	0525	Rwanda, Radio	6005do		
0525	0600	Ghana, Ghana BC Corp		3366do	4915do
0530	0545	UK, BBC World Service		6010eu	9865eu
0530	0550	UAE, Radio Dubai	13675ou	15435ou	17830ou
		21700ou			

# Shortwave Guide



0530 0600 Thailand, Radio 13780eu  
 0530 0600 mtwhf UK, BBC World Service 17885af

## 0600 UTC - 1AM EST / 12AM CST / 10PM PST

0600	0615	South Africa, TWR	11640af		
0600	0620	Vatican City, Vatican Radio	7250eu	4005eu	5890eu
0600	0630	France, Radio France Intl	17800af	11725af	15155af
0600	0630	Swaziland, TWR	6120af	7205af	9500af
0600	0700	Anguilla, Caribbean Beacon		6090am	
0600	0700	Australia, ABC NT Alice Springs		2310irr	4835do
0600	0700	Australia, ABC NT Katherine		5025do	
0600	0700	Australia, ABC NT Tennant Creek		4910do	
0600	0700	Australia, Radio	9660pa	11880pa	12080va
			15160s	15240pa	17750as
0600	0700	Botswana, Radio	4820do	4830al	7255do
0600	0700	Canada, CFRX Toronto ON		6070do	
0600	0700	Canada, CFVP Calgary AB		6030do	
0600	0700	Canada, CKZN St John's NF		6160do	
0600	0700	Canada, CKZU Vancouver BC		6160do	
0600	0700	Costa Rica, University Network	7375am	5030am	6150am
			17645as	9725sa	13750na
0600	0700	Cuba, Radio Havana		9550am	9820na
			11760na		
0600	0700	Finland, Scandinavian Weekend Radio			6170eu
			11690eu		
0600	0700	Georgia, Radio Georgia		11805eu	
0600	0700	Germany, Deutsche Welle		6140eu	7225af
			11785af	15410af	
0600	0700	Ghana, Ghana BC Corp		3366do	4915do
0600	0700	Guyana, Voice of	3291da	5950do	
0600	0700	Japan, Radio	7230eu	11690am	11740as
			15195as	17870pa	21755pa
0600	0700	Kuwait, Radio	15110as		
0600	0700	Liberia, ELWA		4760do	
0600	0700	Malaysia, RTM Radio 4		7295do	
0600	0700	Malaysia, Voice of	6175as	9665as	9750as
			15295ou		
0600	0700	Namibia, Namibian BC Corp		6060af	6175al
0600	0700	New Zealand, Radio NZ Intl		15340pa	
0600	0700	Nigeria, Radio/Enugu		6025da	
0600	0700	Nigeria, Radio/Ibadan		6050do	
0600	0700	Nigeria, Radio/Kaduna		4770do	6090do
0600	0700	Nigeria, Radio/Lagos		3326do	4990do
0600	0700	Nigeria, Voice of	17800af		
0600	0700	Papua New Guinea, NBC		4890do	9675irr
0600	0700	Russia, Voice of	21790pa		
0600	0700	Sierra Leone, Radio UNAMSIL		6139af	
0600	0700	Singapore, Mediacoop Radio		6150do	
0600	0700	Solomon Islands, SIBC		5020do	9545do
0600	0700	South Africa, Channel Africa		9525af	15215af
0600	0700	Swaziland, TWR	7205af	9500af	
0600	0700	UK, BBC World Service		17885af	
0600	0700	UK, BBC World Service		6055af	6190af
			6195eu	7160af	9410eu
			11940af	11955as	12095eu
			15360as	15400af	15575me
			17640af	17760as	21660as
0600	0700	USA, Armed Forces Radio		4319usb	5446usb
				5765usb	6350usb
				12133usb	12579usb
				12133usb	13362usb
				12133usb	13855usb
0600	0700	USA, KAIL Dallas TX		5755va	
0600	0700	USA, KATN Salt Lake City UT		7505na	
0600	0700	USA, KWHR Naalehu HI		17780as	
0600	0700	USA, Voice of America		5995va	6035af
				6080af	6105af
				7170va	11825va
				11835af	11995af
0600	0700	USA, WBCQ Kennebunk ME		5105na	
0600	0700	USA, WBCQ Kennebunk ME		9330na	
0600	0700	USA, WBOH Newport NC		5920am	
0600	0700	USA, WEWN Birmingham AL		5825na	7570va
0600	0700	USA, WHRA Greenbush ME		7580af	
0600	0700	USA, WHRI Nablesville IN		5745va	7315om
0600	0700	USA, WJIE Louisville KY		7490om	11515va
				13595om	
0600	0700	USA, WRMI Miami FL		7385na	
0600	0700	USA, WSHB Cypress Creek SC		7535af	
0600	0700	USA, WTJC Newport NC		9370na	
0600	0700	USA, WWCR Nashville TN		3210na	5070na
				5770na	5935na
0600	0700	USA, WWRB Manchester TN		5050na	5085na
				6890na	
0600	0700	USA, WYFR Okeechobee FL		7355eu	11530eu
				11580eu	
0600	0700	Vanuatu, Radio	3945al	4960do	7260irr
0600	0700	Yemen, Rep of Yemen Radio		9780me	
0600	0700	Zambia, Radio Christian Voice		9865do	
0600	0700	Zimbabwe, ZBC Corp		5975do	
0605	0630	Austria, Radio Austria Intl		17870me	
0630	0645	UK, BBC World Service		9875eu	
0630	0700	Vatican City, Vatican Radio		9660af	11625af
				13765af	
0635	0700	Austria, Radio Austria Intl		17870me	

## 0700 UTC - 2AM EST / 1AM CST / 11PM PST

0700	0715	Croatia, Voice of	13820pa		
0700	0726	Romania, Radio Romania Intl		11775na	15105na
0700	0727	Slovakia, Radio Slovakia Intl		13715au	15460au
			17550au		
0700	0730	Tibet, Xizang PBS	9490as	9580as	
0700	0730	UK, BBC World Service		17885af	
0700	0745	USA, WYFR Okeechobee FL		7355eu	9985af
0700	0800	Anguilla, Caribbean Beacon		6090am	
0700	0800	Australia, ABC NT Alice Springs		2310irr	4835do
0700	0800	Australia, ABC NT Katherine		5025do	
0700	0800	Australia, ABC NT Tennant Creek		4910do	
0700	0800	Australia, Radio	9660pa	11880pa	12080va
			13630pa	15160as	15240va
0700	0800	Botswana, Radio	4820do	4830al	7255do
0700	0800	Canada, CFRX Toronto ON		6070do	
0700	0800	Canada, CFVP Calgary AB		6030do	
0700	0800	Canada, CKZN St John's NF		6160do	
0700	0800	Canada, CKZU Vancouver BC		6160do	
0700	0800	Costa Rica, University Network	7375am	5030am	6150am
			17645as	9725sa	11870am
0700	0800	Egt Guinea, Radio Africa		15184af	
0700	0800	Finland, Scandinavian Weekend Radio			6170eu
				11690eu	
0700	0800	France, Radio France Intl		15605of	
0700	0800	Germany, Deutsche Welle		6140eu	
0700	0800	Ghana, Ghana BC Corp		3366do	4915do
0700	0800	Guyana, Voice of	3291da	5950do	
0700	0800	Kuwait, Radio	15110as		
0700	0800	Liberia, ELWA		4760do	
0700	0800	Malaysia, Radio Malaysia Kota		7295do	9750as
0700	0800	Malaysia, RTM Radio 4		7295do	
0700	0800	Malaysia, Voice of	6175as	9665as	9750as
			15295au		
0700	0800	Myanmar, Radio	9730do		
0700	0800	New Zealand, Radio NZ Intl		15340pa	
0700	0800	Nigeria, Radio Enugu		6025do	
0700	0800	Nigeria, Radio/Ibadan		6050do	
0700	0800	Nigeria, Radio/Kaduna		4770do	6090do
0700	0800	Nigeria, Radio/Lagos		3326do	4990do
0700	0800	Nigeria, Voice of	17800af		
0700	0800	Papua New Guinea, NBC		4890do	9675irr
0700	0800	Russia, Voice of	21790pa		
0700	0800	Sierra Leone, Radio UNAMSIL		6139af	
0700	0800	Singapore, Mediacoop Radio		6150do	
0700	0800	Solomon Islands, SIBC		5020do	9545do
0700	0800	South Africa, Channel Africa		9525af	15215af
0700	0800	Swaziland, TWR	7205af	9500af	
0700	0800	Taiwan, Radio Taiwan Intl		5950na	
0700	0800	UK, BBC World Service		6190af	6195eu
				9410eu	11760me
				11955as	12095eu
				15400af	15485eu
				17760as	17790as
0700	0800	USA, Armed Forces Radio		4319usb	5446usb
				5765usb	6350usb
				12133usb	12579usb
				12133usb	13362usb
				12133usb	13855usb
0700	0800	USA, KTBN Salt Lake City UT		7505na	
0700	0800	USA, KWHR Naalehu HI		11565pa	17780as
0700	0800	USA, WBCQ Kennebunk ME		5105na	
0700	0800	USA, WBCQ Kennebunk ME		7415na	
0700	0800	USA, WBOH Newport NC		5920am	
0700	0800	USA, WEWN Birmingham AL		5825na	7570va
0700	0800	USA, WHRA Greenbush ME		7580af	
0700	0800	USA, WHRI Nablesville IN		5745va	7315am
0700	0800	USA, WJIE Louisville KY		7490om	11515va
				13595om	
0700	0800	USA, WRMI Miami FL		7385na	
0700	0800	USA, WSHB Cypress Creek SC		7535af	
0700	0800	USA, WTJC Newport NC		9370na	
0700	0800	USA, WWCR Nashville TN		3210na	5070na
				5770na	5935na
0700	0800	USA, WWRB Manchester TN		5050na	5085na
				6890na	
0700	0800	USA, WYFR Okeechobee FL		7355eu	11530eu
				11580eu	
0700	0800	Vanuatu, Radio	3945al	4960do	7260irr
0700	0800	Yemen, Rep of Yemen Radio		9780me	
0700	0800	Zambia, Radio Christian Voice		9865do	
0700	0800	Zimbabwe, ZBC Corp		5975do	
0700	0800	Austria, Radio Austria Intl		17870me	
0700	0800	UK, BBC World Service		9875eu	
0700	0800	Vatican City, Vatican Radio		9660af	11625af
				13765af	
0700	0800	Austria, Radio Austria Intl		17870me	

## 0800 UTC - 3AM EST / 2AM CST / 12AM PST

0800	0804	Pakistan, Radio	17835eu	21465eu	
0800	0825	Malaysia, Voice of	6175as	9665as	9750as

# Shortwave Guide



0800	0827		15295au	Czech Rep, Radio Prague Intl	7345eu	9880eu
0800	0829			Belgium, Radio Vlaanderen Intl	5965eu	
0800	0830			Australia, ABC NT Katherine	5025do	
0800	0830			Australia, ABC NT Tennant Creek	4910do	
0800	0830			Malaysia, Radio Malaysia Kota Kinabalu		5979do
0800	0830			Myanmar, Radio	9730do	
0800	0850	a		Monaco, TWR	9870eu	
0800	0900	smtwhf		Albania, TWR	12070eu	
0800	0900			Anguilla, Caribbean Beacon	6090am	
0800	0900			Australia, ABC NT Alice Springs	2310irr	4835dc
0800	0900			Australia, HCJB	11750pa	
0800	0900			Australia, Radio	5995na	9590as
0800	0900				9710pa	12080va
0800	0900				15415as	
0800	0900	mtwhf		Bhutan, Bhutan BC Service	5030al	6035do
0800	0900	vi		Botswana, Radio	4820do	7255do
0800	0900			Canada, CFRX Toronto ON	6070do	
0800	0900			Canada, CFPV Calgary AB	6030do	
0800	0900			Canada, CKZN St John's NF	6160do	
0800	0900			Canada, CKZU Vancouver BC	6160do	
0800	0900			Costa Rica, University Network	5030am	6150am
0800	0900				7375am	9725sa
0800	0900				17645as	
0800	0900	1st a		Eqt Guinea, Radio Africa	15184af	
0800	0900			Finland, Scandinavian Weekend Radio		6170eu
0800	0900				11690eu	
0800	0900			Germany, Bible Voice Broadcasting		5975eu
0800	0900			Germany, Deutsche Welle	6140eu	
0800	0900	DRM		Germany, Deutsche Welle	15440af	21675af
0800	0900	vi		Ghana, Ghana BC Corp	3366do	4915do
0800	0900	as		Guam, TWR/KTWR	15205as	
0800	0900	mtwhf		Guam, TWR/KTWR	15205as	15330as
0800	0900			Guyana, Voice of	3291do	5950do
0800	0900			Indonesia, Voice of	9525pa	15150as
0800	0900			Liberia, ELWA	4760do	
0800	0900			Malaysia, RTM Radio 4		7295do
0800	0900	mtwhfs		Monaco, TWR	9870eu	
0800	0900			New Zealand, Radio NZ Intl		9885pa
0800	0900			Nigeria, Radio Enugu	6025do	
0800	0900			Nigeria, Radio/Ibadan	6050do	
0800	0900			Nigeria, Radio/Kaduna	4770do	6090do
0800	0900			Nigeria, Radio/Lagos	3326do	4990do
0800	0900			Nigeria, Voice of	17800af	
0800	0900			Papua New Guinea, NBC	4890do	9675 rr
0800	0900			Russia, Voice of	17495pa	17525pa
0800	0900				21790pa	
0800	0900			Sierra Leone, Radio UNAMSIL	6139af	
0800	0900			Singapore, Mediacorp Radio	6150do	
0800	0900	vi		Solomon Islands, SIBC	5020do	9545do
0800	0900	s		South Africa, Amateur Radio League		9750af
0800	0900				17780af	
0800	0900	a		South Africa, Radio League	9750af	17780af
0800	0900			South Korea, Radio Korea Intl	9570as	13670eu
0800	0900			Swaziland, TWR	7205af	9500af
0800	0900			Taiwan, Radio Taiwan Intl	9610au	
0800	0900			UK, BBC World Service	6190af	9410eu
0800	0900				11760me	11940af
0800	0900				15310as	15360as
0800	0900				15565eu	17640eu
0800	0900				17830af	17885af
0800	0900	as		UK, BBC World Service	15575me	
0800	0900			USA, Armed Forces Radio	4319usb	5446usb
0800	0900				5765usb	6350usb
0800	0900				12133usb	12579usb
0800	0900				12133usb	13362usb
0800	0900				12579usb	13855usb
0800	0900			USA, KNLS Anchor Point AK	11765as	
0800	0900			USA, KTBN Salt Lake City UT	7505na	
0800	0900			USA, KWHR Naalehu HI	9930as	11565pa
0800	0900			USA, WBOH Newport NC	5920am	
0800	0900			USA, WEWN Birmingham AL	5825na	
0800	0900			USA, WHRI Noblesville IN	5745va	7315am
0800	0900			USA, WJIE Louisville KY	7490am	11515vc
0800	0900				13595am	
0800	0900	mtwhf		USA, WMLK Bethel PA	9465eu	
0800	0900			USA, WRMI Miami FL	7385na	
0800	0900	as		USA, WSHB Cypress Creek SC	7535eu	9845pa
0800	0900			USA, WTJC Newport NC	9370na	
0800	0900			USA, WWCR Nashville TN	3210na	5070na
0800	0900				5770na	5935na
0800	0900			USA, WYFR Okeechobee FL	9985eu	
0800	0900	vi		Vanuatu, Radio	3945al	4960do
0800	0900			Zambia, Radio Christian Voice	9865do	7260irr
0815	0900	as		Guam, TWR/KTWR	15330as	
0830	0900			Australia, ABC NT Katherine	2485do	
0830	0900			Australia, ABC NT Tennant Creek	2325do	
0830	0900			Austria, AWR Europe	9660af	
0830	0900			Georgia, Radio Georgia	11910eu	
0830	0900			Switzerland, Swiss Radio Intl	21770af	

## 0900 UTC - 4AM EST / 3AM CST / 1AM PST

0900	0915	as	Germany, Bible Voice Broadcasting	5975eu
0900	0915	vi	Ghana, Ghana BC Corp	3366do
0900	0920	sm-whf	Albania, TWR	12070eu
0900	0920	s	Monaco, TWR	9870eu
0900	0930	mtwhf	Guam, TWR/KTWR	15330as
0900	0930	as/vl	Italy, IRRS	13840va
0900	0956		China, China Radio Intl	15210pa

0900	1000		Anguilla, Caribbean Beacon	6090am
0900	1000		Australia, ABC NT Alice Springs	2310do
0900	1000		Australia, ABC NT Katherine	2485do
0900	1000		Australia, ABC NT Tennant Creek	2325do
0900	1000		Australia, HCJB	11750pa
0900	1000		Australia, Radio	9580va
0900	1000			15240va
0900	1000			15415as
0900	1000		Australia, Voice Intl	11955as
0900	1000	vi	Botswana, Radio	4820do
0900	1000		Canada, CFRX Toronto ON	6070do
0900	1000		Canada, CFPV Calgary AB	6030do
0900	1000		Canada, CKZN St John's NF	6160do
0900	1000		Canada, CKZU Vancouver BC	6160do
0900	1000		Costa Rica, University Network	5030am
0900	1000			7375am
0900	1000			9725sa
0900	1000			17645as
0900	1000		Eqt Guinea, Radio Africa	15184cf
0900	1000	1st a	Finland, Scandinavian Weekend Radio	
0900	1000			11690eu
0900	1000	DRM/ m-f	Germany, Deutsche Welle	15440af
0900	1000			21675af
0900	1000		Germany, Deutsche Welle	6140eu
0900	1000		Guyana, Voice of	3291do
0900	1000		Malaysia, RTM Radio 4	7295do
0900	1000		New Zealand, Radio NZ Intl	9885pa
0900	1000		Nigeria, Radio Enugu	6025do
0900	1000		Nigeria, Radio/Ibadan	6050do
0900	1000		Nigeria, Radio/Kaduna	4770do
0900	1000		Nigeria, Radio/Lagos	3326do
0900	1000		Nigeria, Voice of	17800af
0900	1000		Palau, KHBN	15725as
0900	1000		Papua New Guinea, NBC	4890do
0900	1000		Russia, Voice of	17495pa
0900	1000		Singapore, Mediacorp Radio	6150do
0900	1000	vi	Solomon Islands, SIBC	5020do
0900	1000	s	UAE, Radio UNMEE	21460af
0900	1000		UK, BBC World Service	6190af
0900	1000			9605as
0900	1000			9740as
0900	1000			11760me
0900	1000			15190as
0900	1000			15310as
0900	1000			15485eu
0900	1000			15565eu
0900	1000			17760as
0900	1000			17790as
0900	1000			21470af
0900	1000			21660as
0900	1000		USA, Armed Forces Radio	4319usb
0900	1000			5765usb
0900	1000			6350usb
0900	1000			12133usb
0900	1000			12579usb
0900	1000		USA, KTBN Salt Lake City UT	7505na
0900	1000		USA, KWHR Naalehu HI	9930as
0900	1000		USA, WBOH Newport NC	5920am
0900	1000		USA, WEWN Birmingham AL	5825na
0900	1000		USA, WHRA Greenbush ME	7580af
0900	1000		USA, WHRI Noblesville IN	5745va
0900	1000		USA, WJIE Louisville KY	7490am
0900	1000			13595am
0900	1000		USA, WRMI Miami FL	7385na
0900	1000		USA, WTJC Newport NC	9370na
0900	1000		USA, WWCF Nashville TN	3210na
0900	1000			5770na
0900	1000			5935na
0900	1000	vi	Vanuatu, Radio	3945al
0900	1000		Zambia, Radio Christian Voice	9865do
0910	0930	s	Armenia, Voice of	4810eu
0930	1000		Georgia, Radio Georgia	11910me
0930	1000		Greece, Voice of	9420eu
0930	1000		Lithuania, Radio Vilnius	9710eu
0945	0959	DRM	Netherlands, FEBA	9850eu
0945	1000		Serbia & Montenegro, Intl Radio	9850eu

## 1000 UTC - 5AM EST / 4AM CST / 2AM PST

1000	1027		Vietnam, Voice of	9840as
1000	1029		Czech Rep, Radio Prague Intl	12020as
1000	1030		Germany, Deutsche Welle	21745va
1000	1030			6205as
1000	1030			17820as
1000	1030		Guam, AWR/KSDA	11705as
1000	1030		Mongolia, Voice of	12085as
1000	1030		UK, BBC World Service	9605as
1000	1030	as	UK, BBC World Service	15190sa
1000	1030			15400af
1000	1045			17830af
1000	1045		USA, KWHR Naalehu HI	9930as
1000	1055		Netherlands, Radio	7315as
1000	1055			12070pa
1000	1055	DRM	Netherlands, Radio	9850pa
1000	1056		China, China Radio Intl	15210pa
1000	1056		North Korea, Voice of	3560as
1000	1100			9850as
1000	1100			11709am
1000	1100			11735as
1000	1100			11775am
1000	1100		Anguilla, Caribbean Beacon	2310do
1000	1100		Australia, ABC NT Alice Springs	2310do
1000	1100		Australia, ABC NT Katherine	2485do
1000	1100		Australia, ABC NT Tennant Creek	2325do
1000	1100		Australia, HCJB	11750pa
1000	1100		Australia, Radio	9580va
1000	1100			15240va
1000	1100			15415as
1000	1100		Australia, Voice Intl	11955as

# Shortwave Guide



			7375am	9725sa	11870am	13750na
			17645as			
1000	1100		Eq't Guinea, Radio Africa		15184af	
1000	1100	1st a	Finland, Scandinavian Weekend Radio		6170eu	
			11720eu			
1000	1100	mtwhf	Germany, Deutsche Welle		17700va	
1000	1100	DRM/ m-f	Germany, Deutsche Welle		15440eu	17700eu
1000	1100	DRM	Germany, Deutsche Welle		6140eu	
1000	1100		Guyana, Voice of		3291do	
1000	1100		India, All India Radio		7270as	13710as
			15020as		15235as	17510au
			17800as		1789Sou	
1000	1100	as/vl	Italy, IRRS		13840vo	
1000	1100		Japan, Radio		6120na	9695as
			17585eu		21755pa	
1000	1100		Malaysia, RTM Radio 4		7295do	
1000	1100		New Zealand, Radio NZ Intl		9885pa	
1000	1100		Palau, KHBN		15725as	
1000	1100		Papua New Guinea, NBC		4890do	9675irr
1000	1100		Singapore, Mediocorp Radio		6150do	
1000	1100	vl	Solomon Islands, SIBC		5020do	9545do
1000	1100		South Africa, Radio Veritas		7240af	
1000	1100		UK, BBC World Service		6190af	6195vo
			9740as		11760me	12095eu
			15485eu		15565eu	15310as
			17760as		17790as	21470af
1000	1100	DRM	UK, BBC World Service		7320eu	
1000	1100	DRM/ m	UK, Christian Voice		9760eu	
1000	1100		USA, Armed Forces Radio		4319usb	5446usb
			5765usb		6350usb	7507usb
			12133usb		12579usb	13362usb
1000	1100		USA, KTBN Salt Lake City UT		7505na	
1000	1100		USA, WBOH Newport NC		5920am	
1000	1100		USA, WEWN Birmingham AL		5825na	
1000	1100		USA, WHRI Noblesville IN		9495am	9840na
1000	1100		USA, WJIE Louisville KY		7490am	11515va
			13595am			
1000	1100	a	USA, WRMI Miami FL		9955am	
1000	1100		USA, WSHB Cypress Creek SC		9455am	
1000	1100		USA, WTJC Newport NC		9370na	
1000	1100		USA, WWCR Nashville TN		5070na	5770na
			5935na		9435na	
1000	1100	mtwhfo.vl	USA, WYFR Okeechobee FL		5950na	
1000	1100		Vanuatu, Radio		3945af	7260irr
1000	1100		Zambia, Radio Christian Voice		4960do	
1030	1045	mtwhf	Ethiopia, Radio		5990do	9704do
1030	1100	mt hfa	Germany, Deutsche Welle		15440vo	
1030	1100		Guam, AWR/KSDA		11900as	
			Iran, Voice of the Islamic Rep		21470as	15480as
			21605eu		21730as	15550as
1030	1100	t	UAE, Radio Dubai		13675eu	15435eu
1030	1100		121605eu			17865eu
			UAE, Radio UNMEE		21550af	
			UK, BBC World Service		15285as	21660as
1030	1100	as	UK, BBC World Service		15400af	17830af
1030	1100	mt hfa	Vatican City, Vatican Radio		5890eu	
1045	1100		USA, KWHR Naalehu HI		9930as	
1045	1100	as	USA, KWHR Naalehu HI		11565pa	

## 1100 UTC - 6AM EST / 5AM CST / 3AM PST

1100	1104	mtwhfa.vl	Pakistan, Radio	17835eu	21465eu	
1100	1115		Vanuatu, Radio	3945af	4960do	7260irr
1100	1127		Vietnam, Voice of	7285as		
1100	1130	as	Australia, HCJB	11750pa		
1100	1130		Bhutan, Bhutan BC Service		5030al	6035do
1100	1130	t	Tibet, Xizang PBS	4920as	6110as	9490as
1100	1130		UAE, Radio UNMEE	21550af		
1100	1130	mtwhf	UK, BBC World Service		15400af	
1100	1130	DRM	UK, BBC World Service		6195ca	15190ca
1100	1155	DRM/ m-f	Netherlands, Radio	9850eu		
1100	1155		Netherlands, Radio	9850va		
1100	1200		UK, BBC World Service		17710eu	
1100	1200		Anguilla, Caribbean Beacon		11775am	
1100	1200		Australia, ABC NT Alice Springs		2310do	4835irr
1100	1200		Australia, ABC NT Katherine		2485do	
1100	1200		Australia, ABC NT Tennant Creek		2325do	
1100	1200		Australia, Radio	5995po	6020pa	6035va
			9475as	9580va	9590as	11880as
1100	1200		Australia, Voice Intl	13685as		15240va
1100	1200		Canada, CFRX Toronto ON		6070do	
1100	1200		Canada, CFVP Calgary AB		6030do	
1100	1200		Canada, CKZN St John's NF		6160do	
1100	1200		Canada, CKZU Vancouver BC		6160do	
1100	1200		Costa Rica, University Network		5030am	6150am
			7375am	9725so	11870am	13750na
			17645as			
1100	1200	1st o	Ecuador, HCJB	21455va		
1100	1200		Finland, Scandinavian Weekend Radio		6170eu	
			11720eu			
1100	1200	DRM	Germany, Deutsche Welle		17670as	21650as
1100	1200		Germany, Deutsche Welle		15440eu	
1100	1200		Germany, Overcomer Ministries		6110eu	9485eu
			9610eu	11950eu	13820eu	15235me
			17485af	17735as	21720af	
1100	1200		Iran, Voice of the Islamic Rep		21470as	15550as
			21470as	21730as		
1100	1200	as/vl	Italy, IRRS		13840va	

1100	1200		Japan, Radio	6120na	9695as	11730as
1100	1200		Malaysia, RTM Radio 4		7295do	
1100	1200		New Zealand, Radio NZ Intl		15530pa	
1100	1200		Papua New Guinea, NBC		4890do	9675irr
1100	1200		Singapore, Radio Singapore Intl		6150as	9600as
1100	1200		South Africa, Channel Africa		9525af	
1100	1200		South Africa, Radio Veritas		7240af	
1100	1200		Taiwan, Radio Taiwan Intl		7445as	
1100	1200	DRM/as	UK, BBC World Service		9410eu	
1100	1200	DRM	UK, BBC World Service		7320eu	21780eu
			UK, BBC World Service		6190af	6195va
			9740as	11760me	11940af	12095eu
			15310as	15485eu	15565eu	15575me
			17640eu	17760as	17790as	17830af
			17885af	21470of		
1100	1200		USA, Armed Forces Radio		4319usb	5446usb
			5765usb	6350usb	7507usb	10320usb
			12133usb	12579usb	13362usb	13855usb
1100	1200		USA, KTBN Salt Lake City UT		7505na	
1100	1200	as	USA, KWHR Naalehu HI		11565pa	
1100	1200	mtwhf	USA, KWHR Naalehu HI		9930as	
1100	1200		USA, WBOH Newport NC		5920am	
1100	1200		USA, WEWN Birmingham AL		5825na	
1100	1200		USA, WHRI Noblesville IN		9495am	9840na
1100	1200		USA, WINB Red Lion PA		9320am	
1100	1200		USA, WJIE Louisville KY		7490am	11515va
			13595am			
1100	1200		USA, WRMI Miami FL		9955am	
1100	1200	fas	USA, WSHB Cypress Creek SC		6095am	
1100	1200		USA, WTJC Newport NC		9370na	
1100	1200		USA, WWCR Nashville TN		5070na	5770na
			5935na	15825na		
1100	1200		USA, WYFR Okeechobee FL		5950na	7355na
			9555as	11725sa	11830na	
1100	1200		Zambia, Radio Christian Voice		9865do	
1110	1120		Israel, Kol Israel		15640va	17535va
1115	1145		Nepal, Radio		3230as	5005as
			7164as			6100as
1130	1145		Germany, Bible Voice Broadcasting			13590as
1130	1145		UK, BBC World Service		7135os	11920os
1130	1157		Czech Rep, Radio Prague Intl		11640eu	21745va
1130	1159		Belgium, Radio Vlaanderen Intl		9945as	
1130	1200		South Korea, Radio Korea Intl		9650na	
1130	1200	a	UK, Wales Radio Intl		17625au	
1130	1200	f	Vatican City, Vatican Radio		15595va	17515va
1145	1155		Rwanda, Radio		6055do	
1145	1200		Germany, Bible Voice Broadcasting			13590as

## 1200 UTC - 7AM EST / 6AM CST / 4AM PST

1200	1215	vl	Cambodia, National Radio Of		11940as	
1200	1230		France, Radio France Intl		17815af	25820af
1200	1230		Iran, Voice of the Islamic Rep		15480as	15550as
			21470as	21730as		
1200	1230		South Korea, Radio Korea Intl		9650na	
1200	1230	as	UAE, AWR Africa		15135as	
1200	1230		UK, BBC World Service		6195ca	15190am
1200	1230		Uzbekistan, Radio Tashkent Intl		5060os	5975as
			6025as	9715as		
1200	1255	DRM	Netherlands, Radio		5965na	
1200	1255		Netherlands, Radio		21780eu	
1200	1256		China, China Radio Intl		9730as	9760pa
			11760pa	11980as	15415pa	
1200	1259		Canada, Radio Canada Intl		9795as	11730as
1200	1300		Anguilla, Caribbean Beacon		11775am	
1200	1300		Australia, ABC NT Alice Springs		2310do	4835irr
1200	1300		Australia, ABC NT Katherine		2485do	
1200	1300		Australia, ABC NT Tennant Creek		2325do	
1200	1300		Australia, Radio		5995pa	6020pa
			9475as	9580va	9590as	11880as
1200	1300		Australia, Voice Intl		13685as	
1200	1300		Canada, CBC Northern Service		9625do	
1200	1300		Canada, CFRX Toronto ON		6070do	
1200	1300		Canada, CFVP Calgary AB		6030do	
1200	1300		Canada, CKZN St John's NF		6160do	
1200	1300		Canada, CKZU Vancouver BC		6160do	
1200	1300		Costa Rica, University Network		5030am	6150am
			7375am	9725sa	11870am	13750na
			17645as			
1200	1300	1st a	Ecuador, HCJB		21455va	
1200	1300		Finland, Scandinavian Weekend Radio		6170eu	
			11720eu			
1200	1300	DRM	Germany, Deutsche Welle		9655eu	15440eu
1200	1300	as/vl	Italy, IRRS		13840vo	
1200	1300		Malaysia, RTM Radio 4		7295do	
1200	1300		New Zealand, Radio NZ Intl		15530pa	
1200	1300		Papua New Guinea, NBC		4890do	9675irr
1200	1300		Singapore, Radio Singapore Intl		6150as	9600as
1200	1300		South Africa, Channel Africa		9525af	
1200	1300		South Africa, Radio Veritas		7240af	
1200	1300	</				

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1200	1300	Ukraine, Radio Ukraine Intl	15520eu		
1200	1300	USA, Armed Forces Radio	4319usb	5446usb	
		5765usb	6350usb	7507usb	10320usb
		12133usb	12579usb	13362usb	13855usb
1200	1300	USA, KTBN Salt Lake City UT	7505na		
1200	1300	USA, KWHR Naalehu HI	9930as		
1200	1300	USA, KWHR Naalehu HI	11565pa		
1200	1300	USA, Voice of America	6110va	9645va	
		9760va	11715va	15250va	
		15425va			
1200	1300	USA, WBOH Newport NC	5920am		
1200	1300	USA, WEWN Birmingham AL	5825na		
1200	1300	USA, WHRI Noblesville IN	9495am	9840na	
1200	1300	USA, WINB Red Lion PA	9320am		
1200	1300	USA, WJIE Louisville KY	7490am	11515va	
		13595am			
1200	1300	USA, WRMI Miami FL	15725na		
1200	1300	USA, WSHB Cypress Creek SC	9455am		
1200	1300	USA, WTJC Newport NC	9370na		
1200	1300	USA, WWCR Nashville TN	5070na	5770na	
		5935na	15825na		
1200	1300	USA, WYFR Okeechobee FL	5950na	7355na	
		11830na	11970na		
1200	1300	Zambia, Radio Christian Voice	9865do		
1215	1245	Germany, Bible Voice Broadcasting		13590cs	
1215	1300	Egypt, Radio Cairo	15445af	17670os	
1230	1245	UK, BBC World Service	21640af	15425af	17780af
		9840as	12020as		
1230	1300	Australia, HCJB	15405pa		
1230	1300	Bangladesh, Bangla Betar	7185as	9550as	
1230	1300	Bulgaria, Radio	11700eu	15700eu	
1230	1300	Sri Lanka, SLBC	6005as	9770as	15745cs
1230	1300	Thailand, Radio	9810as		

## 1300 UTC - 8AM EST / 7AM CST / 5AM PST

1300	1330	Ecuador, HCJB	21455va		
1300	1330	Egypt, Radio Cairo	15445af	17670as	
1300	1355	Poland, Radio Polonia	9525eu	11820eu	
1300	1356	China, China Radio Intl	9570na	9755pa	
		11760pa	11900as	11980as	15180as
1300	1356	North Korea, Voice of	4405as	7505eu	
		9335na	11335eu	11710am	
1300	1356	Romania, Radio Romania Intl	15105eu	17745eu	
1300	1400	Anguilla, Caribbean Beacon	11775am		
1300	1400	Australia, Radio	5995oo	6020po	6035va
		9580va	9590as		
1300	1400	Australia, Voice Intl	13685as		
1300	1400	Canada, CBC Northern Service	9625do		
1300	1400	Canada, CFRX Toronto ON	6070do		
1300	1400	Canada, CFVP Calgary AB	6030do		
1300	1400	Canada, CKZN St John's NF	6160do		
1300	1400	Canada, CKZU Vancouver BC	6160do		
1300	1400	Canada, Radio Canada Intl	9515am	13655am	
		17820am			
1300	1400	Costa Rica, University Network	5030am	6150am	
		7375am	9725sa	11870am	13750na
		17645as			
1300	1400	Finland, Scandinavian Weekend Radio	6170eu		
		11720eu			
1300	1400	Germany, Deutsche Welle	9655eu	15440eu	
1300	1400	Germany, Deutsche Welle	15440va	9655va	
1300	1400	Germany, Overcomer Ministries	6110eu	13810me	
1300	1400	Italy, IRRS	13840va		
1300	1400	Jordan, Radio	11690eu		
1300	1400	Malaysia, RTM Radio 4	7295do		
1300	1400	New Zealand, Radio NZ Intl	9870pa		
1300	1400	Papua New Guinea, NBC	4890do	9675irr	
1300	1400	Singapore, Radio Singapore Intl	6150as	9600as	
1300	1400	South Africa, Radio Veritas	7240af		
1300	1400	South Korea, Radio Korea Intl	9570as	13670as	
1300	1400	Sri Lanka, SLBC	6005as	9770as	15745as
1300	1400	UK, BBC World Service	7320eu		
1300	1400	UK, BBC World Service	9410eu		
1300	1400	UK, BBC World Service	6190af	6195va	
		9740as	11760me	11940af	12095eu
		15310as	15420af	15485eu	15565eu
		15575me	17640eu	17760os	17790as
		17830af	17885af	21470af	
1300	1400	USA, Armed Forces Radio	4319usb	5446usb	
		5765usb	6350usb	7507usb	10320usb
		12133usb	12579usb	13362usb	13855usb
1300	1400	USA, KNLS Anchor Point AK	9780as		
1300	1400	USA, KTBN Salt Lake City UT	7505na		
1300	1400	USA, KWHR Naalehu HI	9930as		
1300	1400	USA, Voice of America	6110va	9760va	
		11705va	15425va		
1300	1400	USA, WBCQ Kennebunk ME	17495na		
1300	1400	USA, WBOH Newport NC	5920am		
1300	1400	USA, WEWN Birmingham AL	9955na		
1300	1400	USA, WHRA Greenbush ME	17560af		
1300	1400	USA, WHRI Noblesville IN	9840na	15105am	
1300	1400	USA, WINB Red Lion PA	9930am		
1300	1400	USA, WJIE Louisville KY	7490am	11515va	
		13595am			
1300	1400	USA, WRMI Miami FL	15725na		
1300	1400	USA, WSHB Cypress Creek SC	9430na		

1300	1400	f	USA, WSHB Cypress Creek SC	9455ca	
1300	1400		USA, WTJC Newport NC	9370na	
1300	1400		USA, WWCR Nashville TN	5935na	9475na
			12160na	15825na	
1300	1400		USA, WYFR Okeechobee FL	7355na	11560as
			11740na	11830na	13695na
1300	1400		Zambia, Radio Christian Voice	9865do	
1305	1315	mtwhfa	Turkmenistan, Turkmen Radio	5015as	
1305	1330	as	Austria, Radio Austria Intl	6155eu	13730eu
1315	1320	mtwhf	Austria, Radio Austria Intl	17855as	
1330	1345		UK, BBC World Service	15105af	21640af
1330	1350		UAE, Radio Dubai	13630eu	13675eu
			17865eu	21605eu	
1330	1357		Vietnam, Voice of	9730eu	
1330	1400		Australia, HCJB	15405pa	
1330	1400		Guam, AWR/KSDA	11980as	
1330	1400	mt hfa	Guam, AWR/KSDA	15660as	
1330	1400		India, All India Radio	9690as	11620as
			13710as		
1330	1400		Laos, National Radio	7145as	
1330	1400		Serbia & Montenegro, Intl Radio	11835au	
1330	1400		Sweden, Radio	9430va	17505va
1330	1400	DRM	Sweden, Radio	9815eu	18960vo
1330	1400		Turkey, Voice of	15155va	15195eu
1330	1400		Uzbekistan, Radio Tashkent Intl	6025as	9715as
1335	1345	as	Austria, Radio Austria Intl	6155eu	13730eu
1345	1400		Austria, Radio Austria Intl	6155eu	13730eu
1345	1400	mtwhf	Austria, Radio Austria Intl	17855as	

## 1400 UTC - 9AM EST / 8AM CST / 6AM PST

1400	1415	fa	Germany, Bible Voice Broadcasting		7485as
1400	1415		Serbia & Montenegro, Intl Radio	9445as	
1400	1415	mtw	UK, BBC World Service	11860af	15420af
			21490af		
1400	1420		Turkey, Voice of	15155as	15195eu
1400	1429		Czech Rep, Radio Prague Intl	21745va	
1400	1430	DRM	Canada, Radio Canada Intl	9815eu	
1400	1430		Netherlands, Radio	12070as	12080as
1400	1430		Thailand, Radio	9560as	15595as
1400	1456		China, China Radio Intl	9755na	11675as
			11765af	13685af	15125na
1400	1500		Anguilla, Caribbean Beacon	11775am	
1400	1500		Australia, HCJB	15405pa	
1400	1500		Australia, Radio	5995va	6080pa
			9475as	9590va	11750as
1400	1500		Australia, Voice Intl	13635as	
1400	1500		Canada, CBC Northern Service	9625do	
1400	1500		Canada, CFRX Toronto ON	6070do	
1400	1500		Canada, CFVP Calgary AB	6030do	
1400	1500		Canada, CKZN St John's NF	6160do	
1400	1500		Canada, CFZU Vancouver BC	6160do	
1400	1500		Canada, Radio Canada Intl	9515am	13655am
			17820am		
1400	1500		Costa Rica, University Network	5030am	6150am
			7375am	9725sa	11870am
			17645as		
1400	1500	1st a	Finland, Scandinavian Weekend Radio	6170eu	
			11720eu		
1400	1500		France, Radio France Intl	7175as	11610as
			17515as	17620as	
1400	1500		Germany, Deutsche Welle	6140eu	
1400	1500		Germany, Overcomer Ministries	6110eu	13810me
			15620os	21590sa	
1400	1500		India, All India Radio	9690as	11620as
			13710as		
1400	1500		Japan, Radio	7200as	9845as
			17755va		11840va
1400	1500		Jordan, Radio	11690eu	
1400	1500		New Zealand, Radio NZ Intl	9870pa	
1400	1500		Oman, Radio	15140eu	
1400	1500		Singapore, Mediacorp Radio	6150do	
1400	1500	as	South Africa, Channel Africa	9525af	
1400	1500		Sri Lanka, SLBC	6005as	9770as
1400	1500		Taiwan, Radio Taiwan Intl	15265as	
1400	1500	DRM	UK, BBC World Service	7320eu	9410eu
1400	1500		UK, BBC World Service	6190af	6195as
			7160as	9740as	11940af
			15310as	15485eu	15565eu
			17640eu	17790as	17830af
			21660af		21470af
1400	1500		USA, Armed Forces Radio	4319usb	5446usb
			5765usb	6350usb	7507usb
			12133usb	12579usb	13362usb
1400	1500		USA, KJES Vado NM	11715na	
1400	1500		USA, KTBN Salt Lake City UT	7505na	
1400	1500		USA, KWHR Naalehu HI	9930as	
1400	1500		USA, Voice of America	6110va	7125va
			9645va	9760va	11705va
			15425va		15205va
1400	1500	mtwhf	USA, WBCQ Kennebunk ME	17495na	
1400	1500		USA, WBOH Newport NC	5920am	
1400	1500		USA, WEWN Birmingham AL	9955na	
1400	1500		USA, WHRA Greenbush ME	17560af	
1400	1500		USA, WHRI Noblesville IN	9840na	15105am
1400	1500		USA, WINB Red Lion PA	9930am	
1400	1500		USA, WJIE Louisville KY	7490am	11515va

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1400	1500		13595am		
1400	1500		USA, WRMI Miami FL	15725na	
1400	1500		USA, WTJC Newport NC	9370na	
1400	1500		USA, WWCR Nashville TN	9475na	12160na
1400	1500	mtwhf	13845na 15825na		
1400	1500		USA, WWRB Manchester TN	9320na	12172na
1400	1500		USA, WYFR Okeechobee FL	11560as	11740na
1400	1500		11830na 17760am		
1400	1500		Zambia, Radio Christian Voice	9865do	
1415	1420		Nepal, Radio	3230as	5005as 6100as
1415	1430	ho	7164as		
1430	1445	s ha	Germany, Bible Voice Broadcasting		7485os
1430	1500	s	Germany, Bible Voice Broadcasting		7485as
1430	1500		Germany, Pan American BC	13605me	
1430	1500		Myanmar, Radio	5040do	5985do
1430	1500	DRM	Netherlands, Radio	9815eu	
1430	1500		Netherlands, Radio	12070os	12080as 15595as
1430	1500		Sweden, Radio	17505va	18960va
1445	1500	as	Germany, Bible Voice Broadcasting		7485os
1445	1500		Guam, TWR/KTWR	15330as	
1445	1500	mtwhfa	UK, BBC World Service	6140as	7205os
			15425as		

## 1500 UTC - 10AM EST / 9AM CST / 7AM PST

1500	1530		Mongolia, Voice of	9720as	
1500	1530		UK, BBC World Service	21490af	11860af 15420af
1500	1545		Guam, TWR/KTWR	15330os	
1500	1555		Netherlands, Radio	12070as	12080as 15595as
1500	1556		China, China Radio Intl	11675as 11765as	7160as 9785as 13685af 15125af
			17720na		
1500	1556		North Korea, Voice of	4405as	7505eu
			9335am 11335eu	11710am	
1500	1559		Canada, Radio Canada Intl	9515am	9635as
			11935os 13655am	17820am	
1500	1600		Anguilla, Caribbean Beacon		11775am
1500	1600		Australia, HCJB	15405pa	
1500	1600		Australia, Radio	5995va	6080pa 7240as
			9475as 9590as	11750as	
1500	1600		Australia, Voice Intl	13635as	
1500	1600		Canada, CBC Northern Service		9625do
1500	1600		Canada, CFRX Toronto ON	6070do	
1500	1600		Canada, CFVP Calgary AB	6030do	
1500	1600		Canada, CKZN St John's NF	6160do	
1500	1600		Canada, CKZU Vancouver BC	6160do	
1500	1600		Costa Rica, University Network	5030am	6150am
			7375am 9725sa	11870am	13750na
			17645os		
1500	1600	1st o	Finland, Scandinavian Weekend Radio		5990eu
			11720eu		
1500	1600		Germany, Deutsche Welle	6140eu	
1500	1600		Germany, Overcomer Ministries	6110eu	13810eu
			21590so		
1500	1600	s	Germany, Pan American BC	12015me	
1500	1600		Japan, Radio	7200as	9505am 9750as
			9845as		
1500	1600		Jordan, Radio	11690no	
1500	1600		Myanmar, Radio	5040do	5985do
1500	1600		New Zealand, Radio NZ Intl		9870pa
1500	1600	DRM	Russia, Voice of	9490eu	
1500	1600		Russia, Voice of	6205as	7260as 7315as
			7350as 11500as		
1500	1600		Seychelles, FEBA	7340as	
1500	1600		Singapore, Mediacorp Radio		6150do
1500	1600		South Africa, Channel Africa		9525af 17770af
1500	1600		Sri Lanka, SLBC	6005as	9770as 15745as
1500	1600		Sudan, Sudan Radio Service		15290af 15530af
1500	1600	mtwhf	UK, BBC World Service		5975as 6190af
			6195as 7160as	9410eu	9740os 11940af
			12095eu	15190am	15310os 15400af
			15485eu	15565eu	17790as 17830af
			21470af	21660af	
1500	1600		USA, Armed Forces Radio	4319usb	5446usb
			5765usb	6350usb	7507usb 10320usb
			12133usb	12579usb	13362usb 13855usb
1500	1600		USA, KJES Vado NM		11715na
1500	1600		USA, KTBN Salt Lake City UT		15590na
1500	1600		USA, KWHR Naalehu HI		9930as
1500	1600		USA, Voice of America	6110va	7125va
			9575va	9645va	9760va 9765va
			9825va	15205va	15395va 15460va
1500	1600	mtwhf	USA, WBCQ Kennebunk ME		17495na
1500	1600		USA, WBOH Newport NC		5920am
1500	1600		USA, WEWN Birmingham AL		9955na
1500	1600		USA, WHRA Greenbush ME		17650af
1500	1600		USA, WHRI Noblesville IN		9840na 15105am
1500	1600		USA, WINB Red Lion PA		9930am
1500	1600		USA, WJIE Louisville KY		7490am 11515va
			13595am		
1500	1600		USA, WRMI Miami FL		15725na
1500	1600		USA, WTJC Newport NC		9370na
1500	1600		USA, WWCR Nashville TN		9475na 12160na
			13845na 15825na		
1500	1600	mtwhf	USA, WWRB Manchester TN		9320na 12172na
1500	1600		USA, WYFR Okeechobee FL		6280os 11830na
			15520os 17760na		
1500	1600		Zambia, Radio Christian Voice		4965do

1515	1530	as	Germany, Bible Voice Broadcasting		9860me
1515	1530		Vatican City, Vatican Radio	9865as	13765as
			15235as		
1530	1600		Germany, Bible Voice Broadcasting		12005me
1530	1600	m whfa	Germany, Bible Voice Broadcasting		9705as
1530	1600		Iran, Voice of the Islamic Rep	7190as	9610as
1530	1600		UAE, AWR Africo	15225as	
1530	1600		UK, BBC World Service		11685as 15540as
1530	1600	a	Vatican City, Vatican Radio	9865af	13765af
			15235of		

## 1600 UTC - 11AM EST / 10AM CST / 8AM PST

1600	1615		Pakistan, Radio	9395me	11570me 11640af
			15725af	17820af	
1600	1627		Vietnam, Voice of	7280as	9730as
1600	1628	s	Hungary, Radio Budapest		6025eu 9585eu
1600	1630		Guam, AWR/KSDA	15495as	
1600	1630		Iran, Voice of the Islamic Rep		7190as 9610as
1600	1630		Sri Lanka, SLBC	6005as	9770as 15745as
1600	1635		UAE, Radio Dubai	13630eu	13675eu 15395eu
			17865eu	21605eu	
1600	1656		China, China Radio Intl		7190af 9570af
			13685af	15125of	
1600	1656		North Korea, Voice of		3560os 9975af
			11735of		
1600	1659	as	Canada, Radio Canada Intl		9515om 13655om
			17820am		
1600	1700		Anguilla, Caribbean Beacon		11775am
1600	1700		Australia, HCJB	15405pa	
1600	1700		Australia, Radio	5995va	6080pa 7240as
			9475as		
1600	1700		Australia, Voice Intl	13635as	
1600	1700		Canada, CBC Northern Service		9625do
1600	1700		Canada, CFRX Toronto ON		6070do
1600	1700		Canada, CFVP Calgary AB		6030do
1600	1700		Canada, CKZN St John's NF		6160do
1600	1700		Canada, CKZU Vancouver BC		6160do
1600	1700		Costa Rica, University Network	5030am	6150am
			7375am 9725sa	11870am	13750na
			17645as		
1600	1700		Ethiopia, Radio	5990af	7110af 7165af
			9560af 9704af	11800af	
1600	1700	1st a	Finland, Scandinavian Weekend Radio		5990eu
			11720eu		
1600	1700		France, Radio France Intl		9730af 11615af
			15160af	15605af	17605af 17850af
1600	1700		Germany, Bible Voice Broadcasting		9860me
1600	1700	DRM	Germany, Deutsche Welle		6140eu
1600	1700		Germany, Deutsche Welle		6170as 7225as
			11695as		
1600	1700		Jordan, Radio	11690na	
1600	1700		New Zealand, Radio NZ Intl		9870pa
1600	1700		Russia, Voice of	4940va	4965va 4975va
			6005me	7260as	9830me 9830me
1600	1700		South Korea, Radio Korea Intl		5975am 7255va
			9870va		
1600	1700	mtwhf	Sudan, Sudan Radio Service		15290af 15530af
1600	1700		Taiwan, Radio Taiwan Intl		11550as
1600	1700		UK, BBC World Service		3915as 5975as
			6190af 6195as	7160as	9410eu 9510as
			11940af	12095eu	15190am 15310as
			15400af	15485eu	15565eu 17790os
			17830af	21470af	21660af
1600	1700		USA, Armed Forces Radio		4319usb 5446usb
			5765usb	6350usb	7507usb 10320usb
			12133usb	12579usb	13362usb 13855usb
1600	1700		USA, KTBN Salt Lake City UT		15590na
1600	1700		USA, KWHR Naalehu HI		9930as
1600	1700		USA, Voice of America	6035af	6110va
			7125va	9575va	9645va 9760va
			13600vo	13710af	15205va 15225af
			15395va	15240af	15445va 17640vo
			17715af	17895af	
1600	1700	mtwhf	USA, WBCQ Kennebunk ME		17495na
1600	1700		USA, WBOH Newport NC		5920om
1600	1700		USA, WEWN Birmingham AL		13615na 17840of
1600	1700		USA, WHRA Greenbush ME		17650af
1600	1700		USA, WHRI Noblesville IN		13760va 15105am
1600	1700		USA, WINB Red Lion PA		9930am
1600	1700		USA, WJIE Louisville KY		7490am 11515va
			13595am		
1600	1700	mtwhf	USA, WMLK Bethel PA		9465eu
1600	1700		USA, WRMI Miami FL		15725na
1600	1700	a	USA, WSHB Cypress Creek SC		17665af
1600	1700		USA, WTJC Newport NC		9370na
1600	1700		USA, WWCR Nashville TN		9475na 12160na
			13845na 15825na		
1600	1700	mtwhf	USA, WWRB Manchester TN		9320na 12172na
1600	1700		USA, WYFR Okeechobee FL		11830na 11865na
			15520na 17760na		17790of 18980eu
			21455eu		
1600	1700		Zambia, Radio Christian Voice		4965do
1605	1610	as	Austria, Radio Austria Intl		17865na
1610	1625		Austria, Radio Austria Intl		17865na
1625	1630	as	Austria, Radio Austria Intl		17865na
1630	1700		Egypt, Radio Cairo	9855af	
1630	1700		Georgia, Radio Georgia		6180me
1630	1700		Guam, AWR/KSDA	11980as	15495as

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1630	1700	s	Ireland, Reflections Europe 12255eu	3910eu	6295eu
1630	1700		UK, BBC World Service	15420af	
1630	1700	as	UK, BBC World Service	11860af	21490af
1635	1640	as	Austria, Radio Austria Intl	17865na	
1640	1650	mtwhfa	Turkmenistan, Turkmen Radio	4930as	
1640	1655		Austria, Radio Austria Intl	17865na	
1645	1700		Tajikistan, Radio	7245irr	
1655	1700	as	Austria, Radio Austria Intl	17865na	

## 1700 UTC - 12PM EST / 11AM CST / 9AM PST

1700	1715	vl	Somalia, Radio Galkayo	6985va	9675va
1700	1727		Czech Rep, Radio Prague Intl	5930eu	17485af
1700	1727		Vietnam, Voice of	9725eu	
1700	1730		Azerbaijan, Voice of	6110eu	9155eu
1700	1730		France, Radio France Intl	11615af	15605af
1700	1730		Jordan, Radio	11690na	
1700	1730	mtwhf	Moldova, Radio Pridnestrovye	5960eu	
1700	1745		UK, BBC World Service	6005eu	
1700	1750		New Zealand, Radio NZ Intl	9870pa	
1700	1756		China, China Radio Intl	7190af	9570af
			13685af	15125af	
1700	1800		Anguilla, Caribbean Beacon	11775am	
1700	1800		Australia, Radio	5995va	7240as
			9475as9710va	11880va	
1700	1800		Australia, Voice Intl	13635as	
1700	1800		Canada, CBC Northern Service	9625do	
1700	1800		Canada, CFRX Toronto ON	6070do	
1700	1800		Canada, CFVP Calgary AB	6030do	
1700	1800		Canada, CKZN St John's NF	6160do	
1700	1800		Canada, CKZU Vancouver BC	6160do	
1700	1800		Costa Rica, University Network	5030am	6150am
			7375am	9725sa	11870am
			17645as		
1700	1800		Egypt, Radio Cairo	9855af	
1700	1800		Eat Guinea, Radio Africa	7189af	15184af
1700	1800	1st a	Finland, Scandinavian Weekend Radio	5990eu	
			11720eu		
1700	1800	a w fa	Germany, Bible Voice Broadcasting	9860me	
1700	1800	as	Germany, Bible Voice Broadcasting	11650me	
1700	1800	DRM	Germany, Deutsche Welle	6140eu	
1700	1800		Germany, Overcomer Ministries	5870va	
1700	1800		Germany, Radio Africa Intl	11735af	13820af
1700	1800	a	Greece, Voice of	9420na	17705na
1700	1800	s	Ireland, Reflections Europe	3910eu	6295eu
			12255eu		
1700	1800		Japan, Radio	9535am	11970eu
1700	1800		Russia, Voice of	5910as	9545as
1700	1800		Swaziland, TWR	3200af	9500af
1700	1800		Taiwan, Radio Taiwan Intl	11550as	
1700	1800		UK, BBC World Service	3255af	3915as
			5975as6190af	6195eu	7160as
			9510as9630af	12095eu	15310as
			15420af	15565eu	17830af
			USA, Armed Forces Radio	4319usb	5446usb
			5765usb	6350usb	7507usb
			12133usb	12579usb	13362usb
1700	1800		USA, KTVN Salt Lake City UT	15590na	
1700	1800		USA, Voice of America	6040va	6110va
			7125va	9645va	13710af
			15205va	15240af	15395va
			17895af		15445af
1700	1800	mtwhf	USA, Voice of America	5990va	6045va
			9525va	9795va	11955va
			13600af	15255va	12005va
1700	1800	mtwhf	USA, WBCQ Kennebunk ME	9330na	17495na
1700	1800		USA, WBOH Newport NC	5920am	
1700	1800		USA, WEWN Birmingham AL	13615na	17840af
1700	1800		USA, WHRA Greenbush ME	17650af	
1700	1800		USA, WHRI Noblesville IN	13760va	15105am
1700	1800		USA, WINB Red Lion PA	9930am	
1700	1800		USA, WJIE Louisville KY	7490am	11515va
			13595am		
1700	1800	mtwhf	USA, WMLK Bethel PA	9465eu	
1700	1800		USA, WRMI Miami FL	15725na	
1700	1800	to	USA, WSHB Cypress Creek SC	17505af	
1700	1800		USA, WTJC Newport NC	9370na	
1700	1800		USA, WWCN Nashville TN	9475na	12160na
			13845na	15825na	
1700	1800	smtwhf	USA, WWRB Manchester TN	9320na	12172na
1700	1800		USA, WYFR Okeechobee FL	18980eu	21455eu
			21680af		
1700	1800		Zambia, Radio Christian Voice	4965do	
1715	1730		Vatican City, Vatican Radio	4005eu	5890eu
			7250eu	9645eu	15595va
1730	1726		Romania, Radio Romania Intl	9570eu	11940eu
1730	1740	vl	Libya, Voice of Africa	15220irr	15615irr
			15660irr	17880irr	
1730	1745	mtwhf	UK, United Nations Radio	7170af	15495me
			21535af		
1730	1800		Guam, AWR/KSDA	11560me	
1730	1800		Liberia, ELWA	4760do	
1730	1800		Philippines, Radio Pilipinas	11730me	11890me
			15190me		
1730	1800		Slovakia, Radio Slovakia Intl	5915eu	6055eu
			7345eu		
1730	1800		Switzerland, Swiss Radio Intl	9755af	11810af
			15555 skd1203		

1730	1800		UK, BBC World Service	7105eu	7230af	3390af	5875eu
			Vatican City, Vatican Radio	17515af		9530eu	9685af
1730	1800		Vatican City, Vatican Radio	17515af		13765af	15570af
1735	1745	vl/th	Paraguay, Radio Nacional			9739sa	
1745	1755	mtwhfa	Turkmenistan, Turkmen Radio			4930as	
1745	1800		Bangladesh, Bangla Betar			7185eu	15550eu
1745	1800		India, All India Radio			7410eu	9445af
			9950eu	11620eu		11935af	13605af
			15075af	15155af		17670af	
1751	1800		New Zealand, Radio NZ Intl			11980pa	

## 1800 UTC - 1PM EST / 12PM CST / 10AM PST

1800	1810		Zanzibar, Voice of Tanzania	11734do	
1800	1815		Bangladesh, Bangla Betar	7185eu	15520eu
1800	1815	a	Germany, Bible Voice Broadcasting		13845me
1800	1815		Israel, Kol Israel	9435va	11585va
1800	1827		Czech Rep, Radio Prague Intl	5930eu	9415va
1800	1827		Vietnam, Voice of	7280eu	9725eu
1800	1830		Egypt, Radio Cairo	9855af	
1800	1830	s	Germany, Universal Life	11840af	
			South Africa, AWR Africa	5960af	7265af
			11985af		
1800	1830		UK, BBC World Service	5975as	9510as
1800	1855		Poland, Radio Polonia	5995eu	7150eu
1800	1900		Anguilla, Caribbean Beacon	11775am	
1800	1900	mtwhf	Argentina, RAE	9690eu	15345eu
1800	1900		Australia, HCJB	11765pa	
1800	1900		Australia, Radio	6080pa	7240va
			9580va	9710pa	11880va
1800	1900		Australia, Voice Intl	11685as	
1800	1900		Canada, CBC Northern Service	9625do	
1800	1900		Canada, CFRX Toronto ON	6070do	
1800	1900		Canada, CFVP Calgary AB	6030do	
1800	1900		Canada, CKZN St John's NF	6160do	
1800	1900		Canada, CKZU Vancouver BC	6160do	
1800	1900		Costa Rica, University Network	5030am	6150am
			7375am	9725sa	11870am
			17645as		
1800	1900		Eat Guinea, Radio Africa	7189af	15184af
1800	1900	1st a	Finland, Scandinavian Weekend Radio	5990eu	6170eu
			11720eu		
1800	1900		Germany, Radio Africa Intl	11735af	13820af
1800	1900		India, All India Radio	7410eu	9445af
			9950eu	11620eu	11935af
			15075af	15155af	17670af
1800	1900	s	Ireland, Reflections Europe	3910eu	6295eu
			12255eu		
1800	1900		Kuwait, Radio	11990va	
1800	1900		Latvia, Laser Radio	9290eu	
1800	1900		Liberia, ELWA	4760do	
1800	1900		Netherlands, Radio	6020af	9895af
1800	1900		New Zealand, Radio NZ Intl	11980pa	11655af
1800	1900		Nigeria, Voice of	15120af	17800a
1800	1900		Philippines, Radio Pilipinas	11730me	11890me
			15190me		
1800	1900		Russia, Voice of	5910as	5945as
			9830af	11510af	7290eu
1800	1900	as	Russia, Voice of	5950eu	6175eu
1800	1900		Sierra Leone, Radio UNAMSIL	6139af	
1800	1900		South Africa, Channel Africa	15265af	
1800	1900	as	South Africa, Radio Lusafonia	3345af	
1800	1900		Swaziland, TWR	3200af	9500af
1800	1900		Taiwan, Radio Taiwan Intl	3955eu	
1800	1900		UK, BBC World Service	3255af	6055af
			6190af6195eu	9410eu	9630af
			15310me	15400af	12095af
			21470af		
1800	1900		USA, Armed Forces Radio	4319usb	5446usb
			5765usb	6350usb	7507usb
			12133usb	12579usb	13362usb
1800	1900		USA, KTVN Salt Lake City UT	15590na	
1800	1900		USA, Voice of America	6035af	6040va
			9760va	9885va	11975af
			15240af	15580af	17895af
1800	1900	mtwhfo	USA, WBCQ Kennebunk ME	9330na	17495na
1800	1900		USA, WBOH Newport NC	5920am	
1800	1900		USA, WEWN Birmingham AL	13615na	17840af
1800	1900		USA, WHRA Greenbush ME	17650af	
1800	1900		USA, WHRI Noblesville IN	13760va	15105am
1800	1900		USA, WINB Red Lion PA	9930am	
1800	1900		USA, WJIE Louisville KY	7490am	11515va
			13595am		
1800	1900	mtwhf	USA, WMLK Bethel PA	9465eu	
1800	1900		USA, WRMI Miami FL	15725na	
1800	1900	a	USA, WSHB Cypress Creek SC	15665eu	17505af
1800	1900		USA, WTJC Newport NC	9370na	
1800	1900		USA, WWCN Nashville TN	9475na	12160na
			13845na	15825na	
1800	1900	smtwhf	USA, WWRB Manchester TN	9320na	12172na
1800	1900		USA, WYFR Okeechobee FL	18980eu	21455eu
1800	1900		Yemen, Rep of Yemen Radio	9780me	
1815	1900		Zambia, Radio Christian Voice	4965do	
			Bangladesh, Bangla Betar	7185eu	9550eu
			15550eu		
1820	1830	vl	Libya, Voice of Africa	11860irr	17880irr
			15660irr		
1830	1845		Germany, BRA Radio		9520af

# Shortwave Guide

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1830	1845	m w	UK, BBC World Service 9685eu	6050eu	7105eu
1830	1859		Belgium, Radio Vlaanderen Intl	5910va	7330eu
1830	1900		Austria, AWR Europe	11865af	
1830	1900		Bulgaria, Radio 5800eu	7500eu	
1830	1900		Georgia, Radio Georgia	11910eu	
1830	1900		South Africa, AWR Africa	11985af	
1830	1900	mtwhfa	Sweden, Radio 6065va		
1845	1900		Congo, RTV Congolaise	4765af	5985af

## 1900 UTC - 2PM EST / 1PM CST / 11AM PST

1900	1915		Congo, RTV Congolaise	4765af	5985af
1900	1915	smtwhf	Germany, Bible Voice Broadcasting	6015eu	
1900	1915	a fa	Germany, Bible Voice Broadcasting	9470me	
1900	1927		Vietnam, Voice of 7280eu	9730eu	
1900	1930	s	Germany, Universal Life	7105me	
1900	1930	s	Greece, Voice of 7475eu	9420eu	15630eu
			17705na		
1900	1930		Philippines, Radio Pilipinas	11730me	11890me
			15190me		
1900	1945		India, All India Radio	7410eu	9445af
			9950eu	11620eu	11935af
			15075af	15155af	17670af
1900	1950		New Zealand, Radio NZ Intl	11980pa	
1900	1956		China, China Radio Intl	9440af	9585af
1900	1956		North Korea, Voice of	4405as	7505eu
			11335eu	11710eu	
1900	2000		Anguilla, Caribbean Beacon	11775am	
1900	2000		Australia, HCJB	11765pa	
1900	2000		Australia, Radio 6080po	7240va	9500as
			9580va	9710pa	11880va
1900	2000		Australia, Voice Intl	11685as	
1900	2000	vi	Botswana, Radio 4820do	4830af	
1900	2000		Canada, CBC Northern Service	9625do	
1900	2000		Canada, CFRX Toronto ON	6070do	
1900	2000		Canada, CFPV Calgary AB	6030do	
1900	2000		Canada, CKZN St John's NF	6160do	
1900	2000		Canada, CKZU Vancouver BC	6160do	
1900	2000		Costa Rica, University Network	5030am	6150am
			7375am	9725sa	11870am
			17645as		
1900	2000		Eqt Guinea, Radio Africa	7189af	15184af
1900	2000	1st a	Finland, Scandinavian Weekend	Radio	5990eu
			11690eu		
1900	2000		Germany, Deutsche Welle	6180af	11865af
			13590af	13780af	
1900	2000	vi	Ghana, Ghana BC Corp	3366do	4915do
1900	2000		Kuwait, Radio 11990va		
1900	2000		Latvia, Laser Radio 9290eu		
1900	2000		Liberia, ELWA 4760do		
1900	2000		Malaysia, RTM Radio 4	7295do	
1900	2000		Namibia, Namibian BC Corp	3270af	3290af
			6060af		
1900	2000		Netherlands, Radio 7120af	9895af	11655af
			17810af		
1900	2000	as	Netherlands, Radio 15315na	17725na	17875na
1900	2000		Nigeria, Radio/Enugu	6025do	
1900	2000		Nigeria, Radio/Ibadan	6050do	
1900	2000		Nigeria, Radio/Kaduna	4770do	6090do
1900	2000		Nigeria, Radio/Lagos	3326do	4990do
1900	2000		Nigeria, Voice of 15120af	17800af	
1900	2000		Russia, Voice of 6175eu	6235eu	7335af
			7360eu	7290eu	11510af
			6139af		
1900	2000		Sierra Leone, Radio UNAMSIL		
1900	2000		Sierra Leone, SLBS 3316do		
1900	2000	vi	Solomon Islands, SIBC	5020do	9545do
1900	2000	m	South Africa, Amateur Radio League	3215af	
1900	2000		South Africa, Channel Africa	3345af	
1900	2000	m	South Africa, Radio League	3215af	
1900	2000	a	South Korea, Radio Korea Intl	5975am	7275eu
1900	2000		Sri Lanka, SLBC 6010eu		
1900	2000		Swaziland, TWR 3200af		
1900	2000		Thailand, Radio 9535eu		
1900	2000		Uganda, Radio 4976do	5026do	7196do
1900	2000		UK, BBC World Service	3255af	6005af
			6190af 6195eu	9410eu	12095af
			15310me	15400af	17830af
1900	2000		USA, Armed Forces Radio	4319usb	5446usb
			5765usb	6350usb	7507usb
			12133usb	12579usb	13362usb
1900	2000		USA, KAUJ Dallas TX	13815va	
1900	2000		USA, KJES Vado NM	15385na	
1900	2000		USA, KTVN Salt Lake City UT	15590na	
1900	2000		USA, Voice of America	4950af	6035af
			7415af 9525va	9690va	9760va
			11870va	11975af	12015va
			13710af	15180va	15240af
			17895af		15580af
1900	2000	s	USA, WBCQ Kennebunk ME	7415na	
1900	2000	mtwhfa	USA, WBCQ Kennebunk ME	9330na	17495na
1900	2000		USA, WBOH Newport NC	5920am	
1900	2000		USA, WEWN Birmingham AL	13615na	17840af
1900	2000		USA, WHRA Greenbush ME	17650af	
1900	2000		USA, WHRI Nablesville IN	9495am	13760va
1900	2000		USA, WINB Red Lion PA	9930am	
1900	2000		USA, WJIE Louisville KY	7490am	11515va
			13595am		

1900	2000	mtwhf	USA, WMLK Bethel PA	9465eu	
1900	2000		USA, WRMI Miami FL	15725na	
1900	2000	a	USA, WSHB Cypress Creek SC	15665eu	
1900	2000		USA, WSHB Cypress Creek SC	17505af	
1900	2000		USA, WTJC Newport NC	9370na	
1900	2000		USA, WWCR Nashville TN	9475na	12160na
			13845na	15825na	
1900	2000	smtwhf	USA, WWRB Manchester TN	9320na	12172na
1900	2000		USA, WYFR Okeechobee FL	3230af	15115af
			15565eu	18980eu	
1900	2000	vi	Vanuatu, Radio 3945af	7260do	
1900	2000		Zambia, Radio Christian Voice	4965do	
1900	2000	vi	Zimbabwe, ZBC Corp	5975do	
1915	1925		Rwanda, Radio 6005do		
1915	1930	s t	Germany, Bible Voice Broadcasting	6015eu	
1915	1930	s fa	Germany, Bible Voice Broadcasting	7295af	
			9470me		
1915	1930		UK, BBC World Service	15105af	17885af
1923	1930	vi	Libya, Voice of Africa	15105af	15315af
1930	1945	mtwhl	Germany, Bible Voice Broadcasting	6015eu	
1930	1945		Germany, Bible Voice Broadcasting	7295af	
1930	2000		Georgia, Radio Georgia	11760eu	
1930	2000	mtwh a	Germany, AWR Europe	11845eu	
1930	2000	s fa	Germany, Bible Voice Broadcasting	9470me	
1930	2000		Greece, Voice of 5865eu		
1930	2000	s	Greece, Voice of 7475eu	9420eu	15630eu
			17705na		
1930	2000		Iran, Voice of the Islamic Rep	6110eu	7320eu
1930	2000		Papua New Guinea, NBC	4890do	9675irr
1930	2000		Serbia & Montenegro, Intl Radio	6100eu	
1930	2000		Slovakia, Radio Slovakia Intl	5915eu	6055eu
			7345eu		
1930	2000		Switzerland, Swiss Radio Intl	9820va	11920va
			13660va	17660va	
1930	2000		Turkey, Voice of 6055eu		
1935	1955		Italy, RAI Intl 5965eu	9755eu	
1945	2000	mtwh to	Albania, Radio Tirana Intl	7210eu	9510eu
1945	2000	a	Germany, Bible Voice Broadcasting	6015eu	
			7295af		
1951	2000		New Zealand, Radio NZ Intl	15265pa	

## 2000 UTC - 3PM EST / 2PM CST / 12PM PST

2000	2015	as	Germany, Bible Voice Broadcasting	9470me	
2000	2020		Turkey, Voice of 6055eu		
2000	2028		Hungary, Radio Budapest	3975eu	6025eu
2000	2030	s	Germany, Bible Voice Broadcasting	6015eu	
2000	2030		Iran, Voice of the Islamic Rep	6110eu	7320eu
2000	2030		Israel, Kol Israel 6280va	11585va	15640va
2000	2030		Mongolia, Voice of 9720as		
2000	2030		Switzerland, Swiss Radio Intl	9820af	11920af
			13660af	17660af	
2000	2030		Vatican City, Vatican Radio	7365af	9660af
			11625af		
2000	2045		Swaziland, TWR 3200af		
2000	2045	mtwhfa	USA, WBCQ Kennebunk ME	9330na	17495na
2000	2045	s	USA, WBCQ Kennebunk ME	7415na	
2000	2055		Netherlands, Radio 7120af	9895af	11655af
			17810af		
2000	2055	as	Netherlands, Radio 15315na	17725na	17875na
2000	2056		China, China Radio Intl	5965eu	9440af
			9840eu	11640af	13630af
2000	2059	mtwhf	Spain, Radio Exterior Espana	9595af	9680eu
2000	2100		Anguilla, Caribbean Beacon	11775am	
2000	2100		Australia, ABC NT Alice Springs	2310do	4835irr
2000	2100		Australia, ABC NT Katherine	2485do	
2000	2100		Australia, ABC NT Tennant Creek	2325do	
2000	2100		Australia, Radio 9500as	9580va	11650va
			11880va	12080va	
2000	2100	as	Australia, Radio 6080pa		
2000	2100	vi	Australia, Voice Intl 11685as		
2000	2100		Botswana, Radio 4820do	4830af	
2000	2100		Canada, CBC Northern Service	9625do	
2000	2100		Canada, CFRX Toronto ON	6070do	
2000	2100		Canada, CFPV Calgary AB	6030do	
2000	2100		Canada, CKZN St John's NF	6160do	
2000	2100		Canada, CKZU Vancouver BC	6160do	
2000	2100		Costa Rica, University Network	5030am	6150am
			7375am	9725sa	11870am
			17645as		
2000	2100		Eqt Guinea, Radio Africa	7189af	15184af
2000	2100	1st a	Finland, Scandinavian Weekend	Radio	5990eu
			11690eu		
2000	2100		Germany, Deutsche Welle	13590af	13780af
			15205af	15410af	
2000	2100		Germany, Overcomer Ministries	9755af	
2000	2100	vi	Ghana, Ghana BC Corp	3366do	4915do
2000	2100		Indonesia, Voice of 15150eu		
2000	2100	s	Ireland, Reflections Europe	3910eu	6295eu
			12255eu		
2000	2100	vi	Italy, IRRS 5775va		
2000	2100		Kuwait, Radio 11990va		
2000	2100		Latvia, Laser Radio 9290eu		
2000	2100		Liberia, ELWA 4760do		
2000	2100		Malaysia, RTM Radio 4	7295do	
2000	2100		Namibia, Namibian BC Corp	3270af	3290af
			6060af		
2000	2100		New Zealand, Radio NZ Intl	15265pa	
2000	2100		Nigeria, Radio/Enugu	6025do	

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2000	2100	Nigeria, Radio/Ibadan	6050do	
2000	2100	Nigeria, Radio/Kaduna	4770do	6090do
2000	2100	Nigeria, Radio/Lagos	3226do	4990cca
2000	2100	Nigeria, Voice of	17800af	
2000	2100	Papua New Guinea, NBC	4890da	9675irr
2000	2100	Russia, Voice of	6145eu	6235eu
		7360eu		7290eu
2000	2100	Sierra Leone, Radio UNAMSIL	6139af	
2000	2100	Sierra Leone, SLBS	3316do	
2000	2100	vi Solomon Islands, SIBC	5020do	9545ao
2000	2100	South Africa, AWR Africa	15295af	
2000	2100	South Africa, Channel Africa	3345af	
2000	2100	Syria, Radio Damascus	12085eu	13610eu
2000	2100	Uganda, Radio	4976da	5026do
2000	2100	UK, BBC World Service	3255af	6005af
		6190af	6195eu	9410eu
		15400af	17830af	
2000	2100	USA, Armed Forces Radio	4319usb	5446usb
		5765usb	6350usb	7507usb
		12133usb	12579usb	13362usb
2000	2100	USA, KAJI Dallas TX	13815va	
2000	2100	USA, KTBN Salt Lake City UT	15590na	
2000	2100	USA, Voice of America	4950af	6035a:
		6095va	7415af	7415af
		9690va	9760va	11855af
		13710af	15240af	11975af
		17895af	15580af	17885af
2000	2100	USA, WBOH Newport NC	5920am	
2000	2100	USA, WERN Birmingham AL	13615na	17595af
2000	2100	USA, WHRA Greenbush ME	17650as	
2000	2100	USA, WHRI Noblesville IN	5745va	9495am
2000	2100	USA, WINB Red Lion PA	9930am	
2000	2100	USA, WJIE Louisville KY	7490am	11515va
		13595am		
2000	2100	USA, WMLK Bethel PA	9465eu	
2000	2100	USA, WRMI Miami FL	15725na	
2000	2100	USA, WSHB Cypress Creek SC	15665af	
2000	2100	USA, WTJC Newport NC	9370na	
2000	2100	USA, WWCR Nashville TN	9475na	12160na
		13845na	15825na	
2000	2100	USA, WWRB Manchester TN	9320na	12172na
2000	2100	USA, WYFR Okeechobee FL	3230af	5810eu
		7580eu	15195sa	15565sa
2000	2100	vi Vanuatu, Radio	3945af	7260do
2000	2100	Zambia, Radio Christian Voice	4965do	
2000	2100	v Zimbabwe, ZBC Corp	5975do	
2025	2045	Italy, RAI Intl	5985af	9515af
2030	2045	Thailand, Radio	9535eu	
2030	2056	Romania, Radio Romania Intl	6110eu	7105eu
2030	2057	Vietnam, Voice of	7280eu	9730eu
2030	2059	Belgium, Radio Vlaanderen Intl	7330eu	
2030	2100	th Belarus, Radio Belarus Intl	7105eu	7210eu
2030	2100	Cuba, Radio Havana	9505eu	11760eu
2030	2100	Egypt, Radio Cairo	15375af	
2030	2100	Sweden, Radio	6065va	9400va
2030	2100	USA, Voice of America	4950af	
2030	2100	as Uzbekistan, Radio Tashkent Intl	5025eu	7185eu
		11905eu		
2040	2100	mtwhfa Armenia, Voice of	4810eu	9960eu
2045	2100	India, All India Radio	7410eu	9445eu
		9575au	9910au	9950eu
		11715au		11620va
2045	2100	USA, WBCQ Kennebunk ME	7415na	
2045	2100	mtwhfa USA, WBCQ Kennebunk ME	7495na	9330nc
		17495na		
2050	2100	Vatican City, Vatican Radio	4005eu	5890eu
2055	2100	DRM Vatican City, Vatican Radio	9800eu	

## 2100 UTC - 4PM EST / 3PM CST / 1PM PST

2100	2110	Vatican City, Vatican Radio	4005eu	5890eu
		7250eu		
2100	2115	Egypt, Radio Cairo	15375af	
2100	2115	mtwhf UK, BBC World Service	5975ca	
2100	2127	Czech Rep, Radio Prague Intl	5930eu	9430va
2100	2130	Australia, ABC NT Katherine	2485do	
2100	2130	Australia, ABC NT Tennant Creek	2325do	
2100	2130	China, China Radio Intl	5965eu	9840eu
		11640af	13630af	
2100	2130	Cuba, Radio Havana	9505na	11760eu
2100	2130	vi Italy, IRRS	5775va	
2100	2130	mtwhf Nigeria, Radio Jakada Intl	7380af	
2100	2130	mtwhfa USA, WBCQ Kennebunk ME	5105na	9330na
		17495na		
2100	2130	DRM Vatican City, Vatican Radio	9800eu	
2100	2155	DRM Netherlands, Radio	11730eu	
2100	2156	North Korea, Voice of	4405as	7505eu
		11335eu		
2100	2159	Canada, Radio Canada Intl	5850va	7235va
		7425va	9770va	9805va
2100	2200	Anguilla, Caribbean Beacon	11775am	
2100	2200	Australia, ABC NT Alice Springs	2310do	4835irr
2100	2200	Australia, Radio	9500as	9660pa
		11880va	12080va	13630va
2100	2200	Australia, Voice Intl	9795as	
2100	2200	Austria, AWR Europe	9660af	
2100	2200	vi Botswana, Radio	4820do	4830af
2100	2200	Canada, CBC Northern Service	9625do	

2100	2200	Canada, CFRX Taranto ON	6070do	
2100	2200	Canada, CFVP Calgary AB	6030do	
2100	2200	Canada, CKZN St John's NF	6160do	
2100	2200	Canada, CKZU Vancouver BC	6160do	
2100	2200	Costa Rica, University Network	5030am	6150am
		7375am	9725sa	11870am
		17645as		13750na
2100	2200	Eqt Guinea, Radio Africa	7189af	15184af
2100	2200	1st f Finland, Scandinavian Weekend	11720eu	5990eu
		11720eu		
2100	2200	Germany, Deutsche Welle	9615af	13780af
		15410a:		
2100	2200	vi Ghana, Ghana BC Corp	3366do	4915do
2100	2200	Guyana, Voice of	5949do	
2100	2200	India, All India Radio	7410eu	9445eu
		9575au	9910au	9950eu
		11715au		11620va
2100	2200	s Ireland, Reflections Europe	3910eu	6295eu
		12255eu		
2100	2200	Japan, Radio	6090eu	6180eu
		11920va	17825na	21670as
2100	2200	Latvia, Laser Radio	9290eu	
2100	2200	Liberia, ELWA	4760do	
2100	2200	Malaysia, RTM Radio 4	7295do	
2100	2200	Namibia, Namibian BC Corp	3270af	3290af
		6060af		
2100	2200	New Zealand, Radio NZ Intl	15265pa	
2100	2200	Nigeria, Radio/Enugu	6025dc	
2100	2200	Nigeria, Radio/Ibadan	6050do	
2100	2200	Nigeria, Radio/Kaduna	4770do	6090do
2100	2200	Nigeria, Radio/Lagos	3326do	4990do
2100	2200	Nigeria, Voice of	17800af	
2100	2200	Papua New Guinea, NBC	4890do	9675irr
2100	2200	Russia, Voice of	6235eu	7290eu
2100	2200	Sierra Leone, Radio UNAMSIL	6139af	
2100	2200	Sierra Leone, SLBS	3316do	
2100	2200	South Africa, Channel Africa	3345af	
2100	2200	Syria, Radio Damascus	12085eu	13610eu
2100	2200	UK, BBC World Service	3255af	3915as
		5965as	5975ca	6005af
		6195va	9410eu	9605af
		15400af		12095sa
2100	2200	USA, Armed Forces Radio	4319usb	5446usb
		5765usb	6350usb	7507usb
		12133usb	12579usb	13362usb
2100	2200	USA, KAJI Dallas TX	13815va	
2100	2200	USA, KTBN Salt Lake City UT	15590na	
2100	2200	USA, Voice of America	6035af	6040va
		6095va	7415af	9595va
		9760va	11870va	9670va
		15185va	15240af	11975af
		17820va	17895af	15580af
		17895af		17375va
2100	2200	USA, WBCQ Kennebunk ME	7415na	17495na
2100	2200	USA, WBOH Newport NC	5920am	
2100	2200	USA, WERN Birmingham AL	13615na	17595af
2100	2200	USA, WHRA Greenbush ME	17650a:	
2100	2200	USA, WHRI Noblesville IN	5745va	9495am
2100	2200	USA, WINB Red Lion PA	9930am	
2100	2200	USA, WJIE Louisville KY	7490am	11515va
		13595am		
2100	2200	USA, WRMI Miami FL	15725na	
2100	2200	USA, WSHB Cypress Creek SC	15665af	
2100	2200	USA, WTJC Newport NC	9370na	
2100	2200	USA, WWCR Nashville TN	9475na	9475na
		12160na	13845na	
2100	2200	smtwhf USA, WWRB Manchester TN	9320na	12172na
2100	2200	USA, WYFR Okeechobee FL	5810eu	7580eu
		11740na	15565af	
2100	2200	vi Vanuatu, Radio	3945af	7260do
2100	2200	Zambia, Radio Christian Voice	4965do	
2100	2200	vi Zimbabwe, ZBC Corp	5975do	
2115	2130	mtwhf UK, BBC World Service	5975ca	11675ca
		15390ca		
2115	2200	Egypt, Radio Cairo	9989eu	15375af
2123	2130	vi Libya, Voice of Africa	15105af	15315af
2130	2156	China, China Radio Intl	5965eu	9840eu
2130	2200	Australia, ABC NT Katherine	5025do	
2130	2200	Australia, ABC NT Tennant Creek	4910do	
2130	2200	th Belarus, Radio Belarus Intl	7105eu	7210eu
2130	2200	Guam, AWR/KSDA	11980as	12010as
2130	2200	Iran, Voice of the Islamic Rep	9870au	11740au
2130	2200	f/vl Italy, IRRS	5775va	
2130	2200	DRM Netherlands, Radio	9800na	
2130	2200	Turkey, Voice of	9525as	
2130	2200	f UK, Wales Radio Intl	7110eu	
2130	2200	mtwhfa USA, WBCQ Kennebunk ME	5105na	9330na
		17495na		
2130	2200	Uzbekistan, Radio Tashkent Intl	5025eu	7185eu
		11905eu		

## 2200 UTC - 5PM EST / 4PM CST / 2PM PST

2200	2220	Turkey, Voice of	9525as	
2200	2228	Hungary, Radio Budapest	6025eu	11965af
2200	2229	Belgium, Radio Vlaanderen Intl	11730na	
2200	2230	Canada, Radio Canada Intl	5850va	6045va
		9770va	12005vo	

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2200	2230	India, All India Radio 9575au 9910au 11715au	7410eu 9445eu 9950eu 11620va		2245	2300	India, All India Radio 11620as 13605as	9705as 9950as
2200	2230	Iran, Voice of the Islamic Rep	9870au	11740au				
2200	2230	s Ireland, Reflections Europe 12255eu	3910eu	6295eu				
2200	2230	Italy, IRRS 5775va						
2200	2230	Liberia, ELWA 4760do						
2200	2230	Serbia & Montenegro, Intl Radio	6100eu					
2200	2230	South Korea, Radio Korea Intl	3955eu					
2200	2230	mtwhf USA, Voice of America 11655af 11975af	6035af 13710af	7415af				
2200	2240	New Zealand, Radio NZ Intl	15265pa					
2200	2245	Egypt, Radio Cairo 9989eu						
2200	2256	China, China Radio Intl	7170eu					
2200	2256	Romania, Radio Romania Intl 9550na 11830na	5975eu	7250eu				
2200	2300	Anguilla, Caribbean Beacon	6090am					
2200	2300	Australia, ABC NT Alice Springs	2310do	4835irr				
2200	2300	Australia, ABC NT Katherine	5025do					
2200	2300	Australia, ABC NT Tennant Creek	4910do					
2200	2300	Australia, Radio 9660va 13620va 13630va	11880va 15230as	12080va 21740va				
2200	2300	vi Australia, Voice Intl 9795as						
2200	2300	Botswana, Radio 4820do	4830al					
2200	2300	Bulgaria, Radio 5800eu	7500eu					
2200	2300	Canada, CBC Northern Service	9625do					
2200	2300	Canada, CFRX Toronto ON	6070do					
2200	2300	Canada, CFPV Calgary AB	6030do					
2200	2300	Canada, CKZN St John's NF	6160do					
2200	2300	Canada, CKZU Vancouver BC	6160do					
2200	2300	DRM Canada, Radio Canada Intl	9800eu					
2200	2300	Costa Rica, University Network 7375am 9725sa	5030am 11870am	6150am 13750na				
2200	2300	Eq Guinea, Radio Africa	7189af	15184al				
2200	2300	1st f Finland, Scandinavian Weekend 11720eu	5980af	5980eu				
2200	2300	Germany, Deutsche Welle	6180as	6225as				
2200	2300	Germany, Overcomer Ministries 6045na 6055na 7145ca 9480sa 9730as	6175as 7105sa 9490as	7105sa 9695af				
2200	2300	vi Ghana, Ghana BC Corp	3366do	4915do				
2200	2300	Guyana, Voice of 3291do	5949do					
2200	2300	Malaysia, RTM Radio 4	7295do					
2200	2300	Namibia, Namibian BC Corp 6060af	3270af	3290af				
2200	2300	DRM Netherlands, Radio 15530na						
2200	2300	Netherlands, Radio 15530eu						
2200	2300	Nigeria, Radio/Enugu	6025do					
2200	2300	Nigeria, Radio/Ibadan	6050do					
2200	2300	Nigeria, Radio/Kaduna	4770do	6090do				
2200	2300	Nigeria, Radio/Logos	3326do	4990do				
2200	2300	Nigeria, Voice of 15120af	17800al					
2200	2300	Papua New Guinea, NBC	4890do	9675irr				
2200	2300	Sierra Leone, Radio UNAMSIL	6139af					
2200	2300	vi Spain, Radio Exterior Espana	5020do	9545do				
2200	2300	as Solomon Islands, SIBC	9595af	9680eu				
2200	2300	Taiwan, Radio Taiwan Intl	9355eu					
2200	2300	UK, BBC World Service 6195va 7105as 11955os 12095sa	5965as 9605af 15400af	5975ca 9740as				
2200	2300	Ukraine, Radio Ukraine Intl	5840eu					
2200	2300	USA, Armed Forces Radio	4319usb	5446usb				
2200	2300	USA, KAJJ Dallas TX 13815va	5765usb 12133usb	7507usb 10320usb 13855usb				
2200	2300	USA, KTBN Salt Lake City UT	15590na					
2200	2300	USA, KWHR Noalehu HI	17510as					
2200	2300	USA, Voice of America 9890va 11760va 15305va 17735va	7215va 15185va 17820va	9705va 15290va				
2200	2300	mtwhfo USA, WBCQ Kennebunk ME 9330na 17495na	5105na	7415na				
2200	2300	USA, WBOH Newport NC	5920am					
2200	2300	USA, WEWN Birmingham AL	9975na	17595af				
2200	2300	USA, WHRA Greenbush ME	17650af					
2200	2300	USA, WHRI Noblesville IN	5745va	9495om				
2200	2300	USA, WINB Red Lion PA	9930am					
2200	2300	USA, WJIE Louisville KY 13595am	7490am	11515va				
2200	2300	USA, WRMI Miami FL	15725na					
2200	2300	ws USA, WSHB Cypress Creek SC	7510eu	15285sa				
2200	2300	USA, WTJC Newport NC	9370na					
2200	2300	USA, WWCR Nashville TN 9475na 13845na	5070na	7465na				
2200	2300	smtwhf USA, WWRB Manchester TN	9320na	12172na				
2200	2300	USA, WYFR Okeechobee FL 21525af	7580eu	11740na				
2200	2300	vi Vanuatu, Radio 3945al	7260do					
2200	2300	Zambia, Radio Christian Voice	4965do					
2205	2230	Italy, RAI Intl	11895os					
2230	2257	Czech Rep, Radio Prague Intl	7345na	9435af				
2230	2300	mtwhfo Albania, Radio Tirana Intl	7130eu	9530eu				
2230	2300	f/occasional Italy, IRRS 5775va						
2230	2300	Sweden, Radio 6065va						
2241	2300	New Zealand, Radio NZ Intl	17675pa					
2300	0000	Anguilla, Caribbean Beacon	6090am					
2300	0000	Australia, ABC NT Alice Springs	2310do	4835irr				
2300	0000	Australia, ABC NT Katherine	5025do					
2300	0000	Australia, ABC NT Tennant Creek	4910do					
2300	0000	Australia, Radio 9660pa 13620as 13630as	11695as 15230as	12080va 17750as				
2300	0000	17795va 21740va						
2300	0000	vi Australia, Voice Intl 13620as						
2300	0000	Botswana, Radio 4820do	4830al					
2300	0000	Canada, CBC Northern Service	9625do					
2300	0000	Canada, CFRX Toronto ON	6070do					
2300	0000	Canada, CFPV Calgary AB	6030do					
2300	0000	Canada, CKZN St John's NF	6160do					
2300	0000	Canada, CKZU Vancouver BC	6160do					
2300	0000	Costa Rica, University Network 7375am 9725sa	5030am 11870am	6150am 13750na				
2300	0000	17645as						
2300	0000	Cuba, Radio Havana	9550am					
2300	0000	Egypt, Radio Cairo 11725na						
2300	0000	1st f Finland, Scandinavian Weekend 11690eu	Radio	5980eu				
2300	0000	Germany, Deutsche Welle 12035as	7250as	9815as				
2300	0000	DRM Germany, Deutsche Welle	9800as					
2300	0000	vi Ghana, Ghana BC Corp	3366do	4915do				
2300	0000	Guyana, Voice of 3291do	5949do					
2300	0000	India, All India Radio 11620as 13605as	9705as 9950as					
2300	0000	Malaysia, RTM Radio 4	7295do					
2300	0000	Namibia, Namibian BC Corp 6060af	3270af	3290af				
2300	0000	New Zealand, Radio NZ Intl	17675pa					
2300	0000	Papua New Guinea, NBC	4890do	9675irr				
2300	0000	Sierra Leone, Radio UNAMSIL	6139af					
2300	0000	Sierra Leone, SLBS 3316do						
2300	0000	Singapore, Mediacorp Radio	6150do					
2300	0000	vi Solomon Islands, SIBC	5020do	9545do				
2300	0000	UK, BBC World Service 6035as6195va 9740as	3915as 11945os	5965as 11955as				
2300	0000	12095sa 15280as						
2300	0000	USA, Armed Forces Radio	4319usb	5446usb				
2300	0000	USA, KAJJ Dallas TX 13815va	5765usb 12133usb	7507usb 10320usb 13855usb				
2300	0000	USA, KTBN Salt Lake City UT	15590na					
2300	0000	USA, KWHR Noalehu HI	17510as					
2300	0000	USA, WBCQ Kennebunk ME 9330na	5105na	7415na				
2300	0000	USA, WBOH Newport NC	5920am					
2300	0000	USA, WEWN Birmingham AL	9975na	17595af				
2300	0000	USA, WHRA Greenbush ME	17650af					
2300	0000	USA, WHRI Noblesville IN	5745va	9495om				
2300	0000	USA, WINB Red Lion PA	9930am					
2300	0000	USA, WJIE Louisville KY 13595am	7490am	11515va				
2300	0000	USA, WRMI Miami FL	15725na					
2300	0000	mtwhf USA, WSHB Cypress Creek SC	7510va					
2300	0000	ws USA, WSHB Cypress Creek SC	7510va					
2300	0000	s USA, WTJC Newport NC	9370na					
2300	0000	as USA, WWCR Nashville TN 9475na 13845na	5070na	7465na				
2300	0000	USA, WWRB Manchester TN	9320na	12172na				
2300	0000	USA, WYFR Okeechobee FL 21525af	7580eu	11740na				
2300	0000	vi Vanuatu, Radio 3945al	7260do					
2300	0000	Zambia, Radio Christian Voice	4965do					
2300	2329	Canada, Radio Canada Intl 11865am	5960am	9590am				
2300	2330	USA, Voice of America 9780va 11735va	6180va 15150va	7205va				
2300	2330	w USA, WBCQ Kennebunk ME	17495na					
2300	2350	Turkey, Voice of 6015va	9655va					
2300	2356	China, China Radio Intl 13680na	5990ca	6040na				
2300	2356	Romania, Radio Romania Intl 15145ou 15370au	11840ou	11940au				
2304	0000	USA, WYFR Okeechobee FL	15400sa					
2315	2330	Croatia, Voice of 7285so						
2330	0000	Canada, Radio Canada Intl	5960na	9590na				
2330	0000	Lithuania, Radio Vilnius	9875na					
2330	0000	Switzerland, Swiss Radio Intl	9885sa	11660sa				
2330	0000	USA, Voice of America 7205va 9620va	6180va 9780va	7130va 11735va				
2330	0000	11805va 13640va	15110va	15205va				
2330	2357	Czech Rep, Radio Prague Intl	5915na	7345na				
2330	2357	Vietnam, Voice of 9840os						
2330	2359	DRM Sweden, Radio 9800na						



**Headnotes:**

1. **BBCWS** stream abbreviations: (am)=Americas; (eas)=East Asia.  
 2. During the winter months, the sole **Deutsche Welle** transmission that has proven reliable in North America is the 2100 broadcast on 15410 kHz., relayed via Kigali, Rwanda and beamed toward west Africa. Listings for this broadcast are in the program guide this month.

**0000 UTC / 7pm E / 4pm P - Page 45 Freqs**

**NEWSCASTS (\*extended)**

- 0000 BBCWS(am) D... News
- R. Australia D... World News
- R. Canada Int. D... News
- R. Japan D... World News
- R. Netherlands S/M News
- R. New Zealand Int. D... News
- Spanish Foreign R. T-A Ibero-American News\*
- VOA News Now .... T-A News & Reports\*

**CURRENT AFFAIRS MAGAZINES/FEATURES**

- 0000 R. Netherlands T-A Newswire
- 0005 BBCWS(am) T-A Outlook
- R. Canada Int. T-A As It Happens (from 2330)
- 0006 R. Netherlands M... Wide Angle (one topic focus)
- 0010 R. Australia H... Background Briefing (documentaries)
- 0015 R. Japan T-A 44 Minutes
- 0030 R. Canada Int. H... Dispatches

**BUSINESS/ECONOMICS (also in Newscasts & Current Affairs)**

- 0005 R. Australia A... The Business Report
- 0030 R. Netherlands A... A Good Life (development issues)

**SCIENCE/TECHNOLOGY (incl. Health & Environment)**

- 0005 R. Canada Int. S... Quirks & Quarks
- R. New Zealand Int. A. Digital Life
- 0010 R. Australia T... The Science Show
- 0030 R. Australia A... Ockham's Razor (opinion)
- R. Netherlands T... The Research File
- 0034 R. Australia S... Ockham's Razor

**ARTS & CULTURE**

- 0000 Spanish Foreign R. M Window on Spain
- 0005 R. New Zealand Int. S. At the Movies
- 0010 R. Australia M... Away! (Aboriginal life/culture)
- 0030 R. Netherlands M... Vox Humana
- R. New Zealand Int. S. Bookmarks
- 0035 Spanish Foreign R. H Entremeses (food & travel)

**LOCAL LIVES & VIEWS**

- 0006 R. Netherlands S... Europe Unzipped (weekly review)
- 0010 R. Australia W... The National Interest (politics)
- F Hindsight (social history)
- R. Japan M Weekend Japanology
- 0125 R. Netherlands S... Insight (commentary)
- 0030 R. Australia A... Country Breakfast (rural Australia)
- R. Netherlands W... EuroQuest (Europe in context)
- F Dutch Horizons
- 0033 VOA News Now .... T-A Coast to Coast

**INFORMATIONAL FEATURES**

- 0006 BBCWS(am) M... Documentaries
- 0030 R. Netherlands S... Amsterdam Forum (topical discussion)
- H Documentary
- 0045 R. Australia A... Lingua Franca (about language)
- 0047 Spanish Foreign R. T-A Spanish Language Course
- 0054 R. Japan M Sights & Sounds of Japan

**MUSIC**

- 0000 WBCQ Maine A... Lost Discs Radio Show

- (7415 kHz.)
- 0005 R. Australia S... Keys to Music (music appreciation)
- R. Canada Int. M... Global Village (world/folk)
- R. New Zealand Int. M-F .... Wayne's Music (nostalgia)
- 0010 R. Japan T-A Songs for Everyone

**ENTERTAINMENT**

- 0000 WBCQ Maine M... Le Show
- 0006 BBCWS(am) S... Pick of the World (BBC's best)
- 0030 R. New Zealand Int. A. Comedy Zone
- 0032 BBCWS(am) M... Quiz or panel game
- 0045 BBCWS(am) T-A Off the Shelf (readings)

**SWL, MEDIA & COMMUNICATIONS**

- 0000 WBCQ Maine S... Real Amateur Radio Show
- H Off the Hook
- 0035 Spanish Foreign R. S/T Radio Waves
- 0045 R. Bulgaria A... R. Bulgaria Calling

**LISTENER CONTACT/INTERACTIVE**

- 0010 R. Japan S Hello from Tokyo
- 0030 R. Australia A... Feedback
- 0035 Spanish Foreign R. A Radio Club
- 0045 BBCWS(am) S... Write On

**SPORT**

- 0023 VOA News Now .... T-A Sports

**0100 UTC / 8pm E / 5pm P - Page 45 Freqs**

**NEWSCASTS (\*extended)**

- 0100 BBCWS(am) D... News
- China R. Int. D... News & Reports\*
- R. Australia D... News
- R. Habana Cuba... D News
- R. Netherlands S/M News
- R. New Zealand Int. D News
- R. Prague D News
- R. Ukraine Int. D... News
- VOA News Now .... T-A News & Reports\*
- Voice of Vietnam ... D News
- 0130 VOA Spec. Eng. ... T-A News

**CURRENT AFFAIRS MAGAZINES/FEATURES**

- 0100 R. Netherlands T-A Newswire
- 0105 R. Australia S... Correspondents' Report
- A Asia Pacific Weekend Edition
- 0106 BBCWS(am) F... Assignment (behind the news)
- R. Netherlands M... Wide Angle (one topic focus)
- 0110 China R. Int. S... Report on Developing Countries
- R. Australia M-F Asia Pacific
- R. Habana Cuba... M Weekly Review
- 0115 R. Austria Int. T-A Report from Austria
- R. Habana Cuba... T-S Viewpoint
- VOA News Now .... T-A Focus (one story in depth)
- 0140 R. Habana Cuba... A Weekly Review
- VOA Spec. Eng. ... A In the News
- 0145 R. Austria Int. T-A Report from Austria
- VOA News Now .... T-F Dateline

**BUSINESS/ECONOMICS (also in Newscasts & Current Affairs)**

- 0115 R. Prague F Economic Report
- Voice of Vietnam ... F Vietnam Economy
- 0130 China R. Int. T... Biz China
- R. Netherlands A... A Good Life (development)
- 0132 BBCWS(am) F... The Music Biz
- 0133 VOA News Now .... T-F Business News
- 0140 VOA Spec. Eng. ... T Development Report

**SCIENCE/TECHNOLOGY (incl. Health & Environment)**

- 0105 R. New Zealand Int. A. Eureka!
- 0115 China R. Int. A... Cutting Edge
- 0130 R. Australia M... The Health Report
- R. Netherlands T... Research File
- R. New Zealand Int. A. Health [or Environment] Matters
- 0133 VOA News Now .... A Our World
- 0140 VOA Spec. Eng. ... W Agriculture Today

- H Health Report
- A Environment Report
- 0145 VOA Spec. Eng. ... W Science in the News
- H Explorations
- 0150 R. Habana Cuba... M Breakthrough

**ARTS & CULTURE**

- 0106 BBCWS(am) W... Masterpiece (cultural ideas)
- 0115 R. Prague M Czech Books (fortnightly)
- A The Arts
- Voice of Vietnam ... W Culture & Society
- 0120 China R. Int. S... In the Spotlight
- Voice of Vietnam ... A Literature & Arts
- 0130 R. Netherlands M... Vox Humana
- R. Ukraine Int. M... Roots
- 0145 VOA Spec. Eng. ... A American Stories
- H The Making of a Nation

**LOCAL LIVES & VIEWS**

- 0105 R. Austria Int. S/M Insight Central Europe
- R. New Zealand Int. M-F .... In Touch with New Zealand
- R. Prague S Insight Central Europe
- T-A Current Affairs
- Voice of Vietnam ... D Current Affairs
- 0106 R. Netherlands S... Europe Unzipped (weekly review)
- 0110 R. Ukraine Int. T-A Ukraine Today
- Voice of Vietnam ... T Vietnam: Land and People
- A Rural Vietnam
- 0115 R. Prague W Witness (oral history)
- 0120 R. Prague W One on One (interview)
- H Czechs in History [or] Spotlight (places)
- 0125 R. Netherlands S... Insight (commentary)
- 0130 China R. Int. M... People in the Know
- W China Horizons
- H Voices from Other Lands
- F Life in China
- R. Australia A... The Lounge (interesting people)
- R. Netherlands W... EuroQuest (Europe in context)
- F Dutch Horizons
- 0135 R. Austria Int. S/M Insight Central Europe
- 0140 R. Habana Cuba... T/H/F Caribbean Outlook
- 0145 VOA Spec. Eng. ... T This is America
- F Making of a Nation
- A American Mosaic

**INFORMATIONAL FEATURES**

- 0105 R. New Zealand Int. S. Documentaries
- 0106 BBCWS(am) M... Everywoman (magazine)
- T/H Documentaries
- 0130 R. Australia T... The Law Report
- W The Religion Report
- R. Netherlands S... Amsterdam Forum (topical discussion)
- H Documentary
- 0140 VOA Spec. Eng. ... F Education Report

**MUSIC**

- 0100 WBCQ Maine S... A Different Kind of Oldies Show
- 0106 BBCWS(am) S... Top of the Pops (UK music charts)
- 0110 R. Ukraine Int. M... Music from Ukraine
- 0120 Voice of Vietnam ... S Vietnamese Music
- 0132 BBCWS(am) T... The Music Feature (documentaries)
- W White Label (new music reviewed)
- H Charlie Gillett (world)
- A John Peel (an eclectic mix)

**ENTERTAINMENT**

- 0100 WBCQ Maine M... Radio NY International (to 0400)
- A Allan Weiner Worldwide
- 0110 Voice of Vietnam ... M Sunday Show
- 0130 BBCWS(am) M... Westway Omnibus (drama serial)

**SWL, MEDIA & COMMUNICATIONS**

- 0115 R. Ukraine Int. S... Whole World on Radio
- Dial
- 0130 R. Australia H... The Media Report
- WBCQ Maine S... World of Radio (on 9330)

# Shortwave Guide



kHz.)  
0140 R. Habana Cuba .. S/WDXers Unlimited

## LISTENER CONTACT/INTERACTIVE

0105 R. Prague M Mailbox  
0115 Voice of Vietnam ... H Letterbox  
0125 R. Austria Int. S/A Listener Letters  
0130 China R. Int. A ... Listeners' Garden  
R. Ukraine Int. S ... Hello from Kiev  
0140 R. Habana Cuba .. M Mailbag Show  
0155 R. Austria Int. S/A Listener Letters

## SPORT

0105 R. Australia S/A Grandstand (live sport)\*  
0106 BBCWS(am) A ... Sports International (documentaries)  
0123 VOA News Now ... T-A Sports Report  
0130 R. Australia F ... The Sports Factor  
0135 R. Habana Cuba .. T-A Time Out  
0135 R. New Zealand Int. S/A ... Live Sport (occasional)

\*special service on 9660, 12080, 17580, 21725 kHz.

## 0200 UTC / 9pm E / 6pm P - Page 46 Freqs

## NEWSCASTS (\*extended)

0200 BBCWS(am) D ... News  
R. Australia D ... News  
R. Budapest D ... News  
R. Canada Int. D ... News  
R. Habana Cuba .. D News  
R. Korea Int. D ... News  
R. New Zealand Int. D News  
R. Prague D News  
R. Taiwan Int. D ... News  
Voice of Russia D ... News  
0230 Voice of Vietnam ... D News

## CURRENT AFFAIRS MAGAZINES/FEATURES

0205 R. Australia A ... Background Briefing (documentaries)  
0210 R. Australia M-F The World Today  
R. Korea Int. T-A News Commentary  
0211 Voice of Russia S ... News and Views  
M Sunday Panorama  
T-A Commonwealth Update  
0215 R. Korea Int. T-A Seoul Calling  
0230 R. Sweden T-A 60 Degrees North

## BUSINESS/ECONOMICS (also in Newscasts & Current Affairs)

0205 R. Budapest M ... Europe Unlimited (trade-monthly)  
R. Canada Int. S ... Business Sense  
0215 R. Prague F Economic Report  
0235 R. Canada Int. F ... Business Sense  
0245 Voice of Vietnam ... F Vietnam Economy

## SCIENCE/TECHNOLOGY (incl. Health & Environment)

0206 BBCWS(am) T ... Health Matters  
W Go Digital  
H Discovery (research)  
F One Planet (ecology)  
A Science in Action  
0235 R. Canada Int. S/A Sci-Tech File  
0245 R. Sweden F Greenscan (ecology-2nd wk.)  
Heartbeat (health-3rd wk.)

## ARTS & CULTURE

0205 R. Budapest M ... Spotlight (monthly)  
0206 BBCWS(am) M ... The Ticket (reports/performances)  
0215 R. Prague M Czech Books (fortnightly)  
A The Arts  
R. Taiwan Int. T ... Culture Express  
0230 R. Sweden S Spectrum (3rd wk.)  
0232 BBCWS(am) F ... The Word (considering literature)  
World Book Club (book & author) [last wk.]  
0235 R. Canada Int. M/H Spotlight  
0245 Voice of Vietnam ... W Culture & Society  
0250 Voice of Vietnam ... A Literature and Arts

## LOCAL LIVES & VIEWS

0205 R. Budapest S ... Insight Central Europe

M Heading for Hungary (monthly)  
T-A Hungary Today  
R. Canada Int. T-A Canada Today  
R. New Zealand Int. M-F ... In Touch with New Zealand (from 0105)

R. Prague S Magazine (local color)  
T-A Current Affairs  
0215 R. Prague S Letter from Prague  
W Witness (oral history)  
R. Taiwan Int. S ... Hakka World (Hakka culture)

W Taiwan Today  
H Discover Taiwan  
F Taipei Magazine

0220 R. Prague S/W One on One (interview)  
0230 R. Korea Int. T ... Korea Today & Tomorrow  
W Korean Kaleidoscope (society)

H Wonderful Korea (travel)  
F Seoul Report (from the capital)

R. Sweden S Network Europe (magazine-1st wk.)

Sweden Today (2nd wk.)  
Studio 49 (topical discussion-4th wk.)

0232 Voice of Russia S ... Moscow Yesterday and Today

0235 R. Canada Int. T ... Media Zone (journalists' perspective)

0245 R. Sweden W Close Up (profiles-1st wk.)  
F Nordic Lights (1st wk.)

The S-Files (things Swedish-4th wk.)  
A Review of the Newsweek

Voice of Vietnam ... T Vietnam: Land & People  
A Rural Vietnam

0254 Voice of Russia H ... Russia: People and Events

## INFORMATIONAL FEATURES

0205 R. New Zealand Int. S. RPM (international documentaries)

0232 Voice of Russia A ... Christian Message from Moscow

0235 R. Habana Cuba .. S The World of Stamps  
0245 BBCWS(am) H ... Heart & Soul (beliefs & values)

A What's the Problem? (advice)  
R. Taiwan Int. M-F Let's Learn Chinese

## MUSIC

0205 R. New Zealand Int. A. Home Grown (Kiwi music)

0210 R. Habana Cuba .. M From Habana  
R. Korea Int. M ... Korean Pop Interactive

0215 R. Prague S Encore (classical monthly)  
Magic Carpet (world music monthly)

R. Taiwan Int. M ... Jade Bells & Bamboo Pipes (traditional)

0230 R. Habana Cuba .. M The Jazz Place [or] Top Tens

R. New Zealand Int. A. Musical Chairs (artist profile)

R. Sweden M Sounds Nordic (exc. 1st wk.)  
0232 BBCWS(am) W ... Music Review (explorations)

Voice of Russia T ... Folk Box  
W Jazz Show

H Musical Portraits  
F Music Around Us

0246 Voice of Russia F ... Music At Your Request  
0250 Voice of Vietnam ... S Music (Vietnamese)

## ENTERTAINMENT

0200 WBCQ Maine S ... Marion's Attic (vintage recordings)

0201 BBCWS(am) S ... Play of the Week (radio theatre)

0205 R. Australia S ... Margaret Throsby (interview w/music)

0232 BBCWS(am) T ... Quiz or panel game  
H/A Westway (drama serial)

Voice of Russia M ... Timelines  
0240 Voice of Vietnam ... M Sunday Show

## SWL, MEDIA & COMMUNICATIONS

0220 R. Budapest A ... DX Corner

## LISTENER CONTACT/INTERACTIVE

0205 R. Budapest M ... And the Gatepost (monthly)  
R. Canada Int. M ... Maple Leaf Mailbag  
R. Prague M Mailbox

0210 R. Korea Int. S ... Worldwide Friendship  
0230 R. Sweden M In Touch with Stockholm (1st wk.)

R. Taiwan Int. S ... Mailbag Time

0235 R. Canada Int. W ... Maple Leaf Mailbag  
0245 Voice of Vietnam ... H Letterbox

## SPORT

0200 R. New Zealand Int. S/A ... Live Sport (occasional)

0205 BBCWS(am) H ... Sparts International (magazine)

R. Australia S/A Grandstand (live sports action\*)

0245 R. Sweden T Sportskan  
(\*special on 9660, 12080, 17580, 21725 kHz. only.)

## 0300 UTC / 10pm E / 7pm P - Page 46 Freqs

## NEWSCASTS (\*extended)

0300 BBCWS(am) S/A News  
M-F The World Today\*

China R. Int. D ... News & Reports  
R. Australia D ... News

R. Habana Cuba .. D News  
R. New Zealand Int. S/A ... News

M-F Pacific Regional News  
R. Taiwan Int. D ... News

Voice of Russia D ... News  
R. Budapest D ... News

0330 Voice of Vietnam ... D News

## CURRENT AFFAIRS MAGAZINES/FEATURES

0306 BBCWS(am) S ... From Our Own Correspondent  
A Assignment (inside the news)

0310 China R. Int. S ... Report on Developing Countries

R. Habana Cuba .. M Weekly Review  
R. New Zealand Int. M-F ... Dateline Pacific

0315 R. Habana Cuba .. T-S Viewpoint  
0330 R. New Zealand Int. F. Pacific Correspondent

R. Sweden T-A 60 Degrees North  
0332 BBCWS(am) S ... The Interview (ideas & trends)

0340 R. Habana Cuba .. T/H/F Caribbean Outlook  
A Weekly Review

0345 BBCWS(am) TWFA Analysis  
H From Our Own Correspondent

R. Sweden A Review of the Newsweek

## BUSINESS/ECONOMICS (also in Newscasts & Current Affairs)

0315 R. Taiwan Int. M ... Taiwan Economic Journal  
0330 China R. Int. T ... Biz China

R. New Zealand Int. W Tradewinds  
0332 BBCWS(am) M ... World Business Review

T-A World Business Report  
0335 R. Budapest M ... Europe Unlimited (trade-monthly)

0345 Voice of Vietnam ... F Vietnam Economy

## SCIENCE/TECHNOLOGY (incl. Health & Environment)

0315 China R. Int. A ... Cutting Edge  
0345 R. Sweden F Greenscan (ecology-2nd wk.)  
Heartbeat (health-3rd wk.)

0350 R. Habana Cuba .. M Breakthrough

## ARTS & CULTURE

0315 R. Taiwan Int. F ... Taiwan Gourmet  
0320 China R. Int. S ... In the Spotlight

0330 R. Sweden S Spectrum (3rd wk.)  
0335 R. Budapest M ... Spotlight (monthly)

0345 Voice of Vietnam ... W Culture and Society  
0350 Voice of Vietnam ... A Literature & Arts

## LOCAL LIVES & VIEWS

0305 R. Australia A ... Rural Reporter (the outback)

0315 R. Taiwan Int. S ... Hakka World (Hakka culture)

H News Talk  
A Kaleidoscope

# Shortwave Guide



## 0400 UTC / 11pm E / 8pm P - Page 47 Freqs

- 0320 R. Australia M-F Life Matters (Aussie social issues)
- 0330 China R. Int. M... People in the Know  
W China Horizons  
H Voices from Other Lands  
F Life in China  
R. Sweden S Network Europe (magazine-1st wk)  
Sweden Today (2nd wk)  
Studio 49 (topical discussion-4th wk)
- 0332 Voice of Russia M... This is Russia  
T Kaleidoscope (events)  
H Moscow Yesterday and Today
- 0335 R. Budapest S... Insight Central Europe  
M Heading for Hungary (monthly)  
T-A Hungary Today
- 0345 R. Sweden W Close Up (profiles - 1st wk.)  
F Nordic Lights (1st wk.)  
The S-Files (things Swedish-4th wk.)  
A Review of the Newsweek  
Voice of Vietnam ... T Vietnam: Land and People  
A Rural Vietnam
- 0354 Voice of Russia W... Russia: People & Events

### INFORMATIONAL FEATURES

- 0330 R. Australia S... All in the Mind (the brain)
- 0332 Voice of Russia F... Russian by Radio
- 0345 BBCWS(am) M... The Instant Guide (quick background)  
R. Taiwan Int. M-F Let's Learn Chinese

### MUSIC

- 0305 R. New Zealand Int. A. Home Grown (from 0205)
- 0315 R. Taiwan Int. T... Jade Bells & Bamboo Pipes (traditional)
- 0330 R. Australia S... Music Deli (international)  
A Australian Country Style  
R. New Zealand Int. M New Music Releases  
R. Sweden M Sounds Nordic (rock-exc. 1st wk.)
- 0332 Voice of Russia S... Songs from Russia  
W Musical Portraits
- 0350 Voice of Vietnam ... S Music (Vietnamese)

### ENTERTAINMENT

- 0305 R. New Zealand Int. S. Sunday Drama (radio theatre)
- 0332 Voice of Russia A... Audio Book Club
- 0340 Voice of Vietnam ... M Sunday Show

### SWL, MEDIA & COMMUNICATIONS

- 0300 WWCR Tennessee ... S DX Partyline (5070 kHz)  
KWHR Hawaii M... DXing with Cumbre
- 0310 R. New Zealand Int. M RNZI Talk (biweekly)  
Mailbox (biweekly)
- 0330 WHRA Maine S... DXing with Cumbre (7580 kHz)  
WHRI Indiana M... DXing with Cumbre (5745 kHz)  
WWCR Tennessee ... S World of Radio (5070 kHz)
- 0340 R. Habana Cuba ... S/WDXers Unlimited
- 0345 R. Bulgaria S... R. Bulgaria Calling
- 0350 R. Budapest A... DX Corner

### LISTENER CONTACT/INTERACTIVE

- 0330 China R. Int. A... Listeners' Garden  
R. Sweden M In Touch with Stockholm (1st wk.)  
R. Taiwan Int. A... Mailbag Time
- 0335 R. Budapest M... And the Gatepost (monthly)
- 0340 R. Habana Cuba ... M Mailbag Show
- 0345 Voice of Vietnam ... H Letterbox
- 0346 Voice of Russia S... You Write to Moscow

### SPORT

- 0300 R. Australia S/A Grandstand (live action)\*  
R. New Zealand Int. S/A ..... Live Sport (occasional)
- 0310 R. Australia M-F Regional Sports Report
- 0330 R. New Zealand Int. H The World in Sport
- 0335 R. Habana Cuba ... T-A Time Out
- 0345 R. Sweden T Sportscan  
(\*special on 9660, 12080, 17580, 21725 kHz. only)

### NEWSCASTS (\*extended)

- 0400 BBCWS(am) S/M World Briefing\*  
M-A News  
China R. Int. D... News & Reports  
R. Australia D... News  
R. Habana Cuba ... D News  
R. Netherlands S/M News  
R. New Zealand Int. D News  
R. Prague D News  
Voice of Russia D... News

### CURRENT AFFAIRS MAGAZINES/FEATURES

- 0400 R. Netherlands T-A Newsline
- 0405 R. New Zealand Int. M-F ..... Checkpoint
- 0406 BBCWS(am) M... Talking Point (interactive discussion)  
T-A Outlook (magazine)
- 0410 China R. Int. S... Report on Developing Countries

### BUSINESS/ECONOMICS (also in Newscasts & Current Affairs)

- 0415 R. Prague F Economic Report
- 0430 China R. Int. T... Biz China  
R. Netherlands A... A Good Life (development)
- 0432 BBCWS(am) S... Global Business

### SCIENCE/TECHNOLOGY (incl. Health & Environment)

- 0405 R. Australia S... All in the Mind (the brain)
- 0415 China R. Int. A... Cutting Edge
- 0430 R. Netherlands T... Research File

### ARTS & CULTURE

- 0415 R. Prague M Czech Books (fortnightly)  
A The Arts
- 0420 China R. Int. S... In the Spotlight
- 0430 R. Netherlands M... Vox Humana
- 0432 Voice of Russia W/F Russian history/culture program

### LOCAL LIVES & VIEWS

- 0405 R. Prague S Magazine (local co or)  
T-A Current Affairs
- 0406 R. Netherlands S... Europe Unzipped (weekly review)
- 0410 R. New Zealand Int. A. Tagata o te Moana (Pacific magazine)
- 0415 R. Prague S Letter from Prague  
W Witness (oral history)
- 0420 R. Prague S/W One on One (interview)  
H Czechs in History or Spotlight (places)
- 0425 R. Netherlands S... Insight (commentary)
- 0430 China R. Int. M... People in the Know  
W China Horizons  
H Voices from Other Lands  
F Life in China  
R. Australia S... The Lounge (interesting people)  
R. Netherlands W... EuroQuest (Europe in Context)  
F Dutch Horizons
- 0435 R. Netherlands S... Europe Unzipped

### INFORMATIONAL FEATURES

- 0410 R. New Zealand Int. S. Feature on religion/spirituality
- 0430 R. Netherlands S... Amsterdam Forum (topical discussion)  
H Documentary
- 0432 Voice of Russia T/H/A 20th Century
- 0435 R. Habana Cuba ... S The World of Stamps

### MUSIC

- 0405 R. Australia A... The Music Show
- 0410 R. Habana Cuba ... M From Habana
- 0411 Voice of Russia S... Music & Musicians
- 0415 R. Prague S Encore (classical monthly)  
Magic Carpet (world music monthly)
- 0430 R. Habana Cuba ... M The Jazz Place [or] Top Tens
- 0440 R. New Zealand Int. S... Jazz Spotlight

### ENTERTAINMENT

- 0400 WBCQ Maine S... Michael Ketter Show (7415 kHz.)
- 0406 BBCWS(am) A... Pick of the World (BBC's best)
- 0410 R. Australia M-F Margaret Throsby (interview w/music)
- 0432 Voice of Russia M... Audio Book Club
- 0445 BBCWS(am) T-A Off the Shelf (readings)

### SWL, MEDIA & COMMUNICATIONS

- 0400 WWCR Tennessee ... S Spectrum (5070 kHz)
- 0430 WHRI Indiana M... DXing with Cumbre (7315 kHz)

### LISTENER CONTACT/INTERACTIVE

- 0405 R. Prague M Mailbox
- 0430 China R. Int. A... Listeners' Garden
- 0445 BBCWS(am) A... Write On

### SPORT

- 0400 R. Australia S/A Grandstand (live action)\*  
(\*special on 9660, 12080, 17580, 21725 kHz. only.)

## 0500 UTC / 12am E / 9pm P - Page 47 Freqs

### NEWSCASTS (\*extended)

- 0500 BBCWS(am) D... World Briefing\*  
China R. Int. D... News & Reports  
R. Australia D... News  
R. Habana Cuba ... D News  
R. Japan D News  
R. New Zealand Int. D News  
RVI, Belgium T-A News  
Voice of Nigeria ... S/A News  
Voice of Russia D... News
- 0530 BBCWS(am) M-F The World Today\*
- 0545 R. New Zealand Int. M-F ..... Pacific News

### CURRENT AFFAIRS MAGAZINES/FEATURES

- 0500 Voice of Nigeria ... M-F VON Scope
- 0505 R. New Zealand Int. M-F ..... Worldwatch
- 0510 China R. Int. S... Report on Developing Countries  
R. Habana Cuba ... M Weekly Review  
R. Habana Cuba ... T-S Viewpoint  
R. Japan M-F 44 Minutes
- 0520 R. New Zealand Int. M-F ..... Pacific Report
- 0530 R. New Zealand Int. M Letter from America (Alistair Cooke)
- 0540 R. Habana Cuba ... T/H/F Caribbean Outlook  
A Weekly Review

### BUSINESS/ECONOMICS (also in Newscasts & Current Affairs)

- 0511 Voice of Russia H... Newmarket
- 0530 China R. Int. T... Biz China
- 0545 R. Australia A... Business Weekend

### SCIENCE/TECHNOLOGY (incl. Health & Environment)

- 0511 Voice of Russia W/A Science and Engineering
- 0515 China R. Int. A... Cutting Edge
- 0550 R. Habana Cuba ... M Breakthrough

### ARTS & CULTURE

- 0520 China R. Int. S... In the Spotlight

### LOCAL LIVES & VIEWS

- 0504 RVI, Belgium T-A Flanders Today (variety magazine)
- 0505 R. New Zealand Int. S. Mana Korero (Maori magazine)
- 0508 RVI, Belgium M... Tourism in Flanders
- 0510 R. Australia M-F Pacific Beat (islands magazine)
- 0530 China R. Int. M... People in the Know  
W China Horizons  
H Voices from Other Lands  
F Life in China  
R. New Zealand Int. T-H ..... Today in Parliament
- 0532 BBCWS(am) A... People & Politics (Parliament)  
Voice of Russia W... Moscow Yesterday and Today

# Shortwave Guide



## INFORMATIONAL FEATURES

- 0505 R. Australia S ... The Europeans  
 0530 R. Australia S ... The Ark (religious history)  
 0532 BBCWS(am) S ... Reporting Religion

## MUSIC

- 0500 R. Australia S ... The Music Show (cont'd.)  
 R. New Zealand Int. A. The Mix  
 Voice of Nigeria ... A VON Link-Up (requests)  
 0510 R. Japan S Pop Joins the World  
 0511 Voice of Russia S/MMusical Portraits  
 0532 Voice of Russia M ... Jazz Show  
 T Music Around Us  
 H Folk Box  
 0547 Voice of Russia T ... Music At Your Request

## ENTERTAINMENT

- 0500 WBCQ Maine M-A Amos 'n Andy (classic comedy)  
 0530 Voice of Nigeria ... D Moving On (variety)  
 0532 Voice of Russia F ... Audio Book Club  
 S/A Timelines  
 0545 R. New Zealand Int. M-F ... Storytime

## SWL, MEDIA & COMMUNICATIONS

- 0500 R. Vi, Belgium M ... Radio World  
 WBCQ Maine S ... Tom & Darryl  
 WWCR Tennessee ... S Cyber Line (digital)  
 0505 Voice of Nigeria ... S This Week on VON  
 0515 WBCQ Maine M ... World of Radio  
 0530 WHRA Maine A ... DXing with Cumbre (7580 kHz)  
 0540 R. Habana Cuba ... S/WDXers Unlimited

## LISTENER CONTACT/INTERACTIVE

- 0510 R. Japan A Hello from Tokyo  
 0511 Voice of Russia T/F Moscow Mailbag  
 0514 R. Vi, Belgium M ... Brussels 1043  
 0530 China R. Int. A ... Listeners' Garden  
 0540 R. Habana Cuba ... M Mailbag Show

## SPORT

- 0500 R. Australia S/A Grandstand (live action)\*  
 0520 BBCWS(am) D ... Sports Roundup  
 0535 R. Habana Cuba ... T.A Time Out  
 R. New Zealand Int. S/A ... Live Sport (on occasion)  
 (\*special on 9660, 12080, 17580, 21725 kHz. only.)

## 0600 UTC / 1am E / 10pm P - Page 48 Freqs

### NEWSCASTS (\*extended)

- 0600 R. Australia D ... News  
 R. Habana Cuba ... D News  
 R. Japan D News  
 R. New Zealand Int. D News  
 Voice of Nigeria ... D News\*

### CURRENT AFFAIRS MAGAZINES/FEATURES

- 0615 R. Japan M-F Asian Top News (region's radio)  
 0630 Voice of Nigeria ... S In the News  
 A News Maker

### SCIENCE/TECHNOLOGY (incl. Health & Environment)

- 0620 R. Australia M ... Ockham's Razor (opinion)  
 T In Conversation  
 0630 R. Australia S ... In Conversation

### ARTS & CULTURE

- 0605 R. Australia S ... The Arts  
 0620 R. Australia F ... The Maker

### LOCAL LIVES & VIEWS

- 0610 R. Japan S Weekend Japonology  
 0635 R. Australia F ... The Lounge (interesting people)  
 R. New Zealand Int. S. This Week in Parliament  
 0645 Voice of Nigeria ... A Window on Abuja  
 0654 R. Japan S Sights & Sounds of Japan

### INFORMATIONAL FEATURES

- 0605 R. Australia S ... The Europeans  
 R. New Zealand Int. S. One in Five (disabilities)

- 0620 R. Australia W Lingua Franca (about language)  
 H The Ark (religious history)  
 0625 R. Japan T Let's Try Japanese  
 H Brush Up Your Japanese  
 0635 R. Habana Cuba ... S World of Stamps

## MUSIC

- 0610 R. Habana Cuba ... M From Havana (Cuban musicians)  
 R. Japan M-F Songs for Everyone  
 A Pop Joins the World  
 0625 R. Japan M Japan Music Treasure Box  
 W Japan Musicscape  
 F Music Beat (pop)  
 0630 R. Australia A Hit Mix  
 R. Habana Cuba ... M The Jazz Place [or] Top Tens  
 0635 R. Australia M Hit Mix  
 T Music Deli (international)  
 W Jazz Notes  
 H Australia Country Style

## ENTERTAINMENT

- 0600 WBCQ Maine S ... Juliet's Wild Kingdom  
 0605 R. New Zealand Int. A Saturday Night (variety)

## SWL, MEDIA & COMMUNICATIONS

- 0600 KWHR Hawaii A ... DXing with Cumbre (17780 kHz)

## SPORT

- 0600 R. Australia S/A Grandstand (live action)\*  
 0610 R. Australia M-F Regional Sports Report  
 0635 R. New Zealand Int. S/A Live Sport (on occasion)  
 (\*special on 9660, 12080, 17580, 21725 kHz. only.)

## 1000 UTC / 5am E / 2am P - Page 49 Freqs

### NEWSCASTS (\*extended)

- 1000 BBCWS(am) S/A News  
 M-F World Update\*  
 R. Australia D ... News  
 R. New Zealand Int. D News

### CURRENT AFFAIRS MAGAZINES/FEATURES

- 1005 R. Australia M-F Asia Pacific  
 A Background Briefing (documentary)  
 1006 BBCWS(am) S ... From Our Own Correspondent  
 A Assignment (inside the news)  
 1032 BBCWS(am) A ... The Interview (ideas & trends)  
 1055 R. Australia A ... Correspondent's Notebook

### SCIENCE/TECHNOLOGY (incl. Health & Environment)

- 1030 R. Australia M ... Health Report

### LOCAL LIVES & VIEWS

- 1005 R. New Zealand Int. T-H ... Today in Parliament

### INFORMATIONAL FEATURES

- 1030 R. Australia T ... Law Report  
 W Religion Report  
 1032 BBCWS(am) S ... Reporting Religion

## MUSIC

- 1005 R. Australia S ... Keys to Music (music appreciation)  
 R. New Zealand Int. S. Nightcap  
 M The Mix  
 F Jazz  
 A Music 'til Midnight  
 1010 R. New Zealand Int. T. Showtime (show music)  
 W In a Mellow Tone  
 H Beale Street Caravan (jazz)

## SWL, MEDIA & COMMUNICATIONS

- 1000 KWHR Hawaii A ... DXing with Cumbre (11565 kHz)  
 1030 R. Australia H ... Media Report

## SPORT

- 1030 R. Australia F ... Sports Factor

## 1100 UTC / 6am E / 3am P - Page 50 Freqs

### NEWSCASTS (\*extended)

- 1100 BBCWS(am) D ... World Briefing\*  
 BBCWS(eas) M-A News  
 R. Australia D ... News  
 R. Japan D News  
 R. New Zealand Int. S/A ... News  
 M-F Pacific Regional News  
 1120 BBCWS(am) D ... British News  
 1130 R. Korea Int. D ... News

### CURRENT AFFAIRS MAGAZINES/FEATURES

- 1100 China R. Int. D ... Realtime Beijing  
 1105 BBCWS(am) M-F Caribbean Morning Report  
 R. Australia S ... Correspondents' Report  
 M-A Asia Pacific  
 1106 BBCWS(eas) M-F Outlook (magazine)  
 1108 R. New Zealand Int. M-F ... Dateline Pacific  
 1115 R. Japan M-F Asian Top News (region's radio)  
 1132 BBCWS(am) S ... The Instant Guide (quick background)  
 1145 R. Korea Int. M-F Seoul Calling

### BUSINESS/ECONOMICS (also in Newscasts & Current Affairs)

- 1130 R. New Zealand Int. T. Tradewinds  
 1132 BBCWS(am) M-F World Business Report

### ARTS & CULTURE

- 1105 R. Australia S ... The Arts  
 1106 BBCWS(am) A ... The Ticket (reports/performances)

### LOCAL LIVES & VIEWS

- 1105 R. New Zealand Int. S/A ... NZ Forces Radio  
 1115 BBCWS(am) M-F Caribbean Magazine  
 1130 R. Australia M-F Bush Telegraph (rural life)  
 R. New Zealand Int. H Pacific Correspondent

### INFORMATIONAL FEATURES

- 1125 R. Japan T Let's Learn Japanese  
 H Brush Up Your Japanese  
 1130 R. Australia A ... The Europeans  
 1132 BBCWS(eas) S ... Reporting Religion

## MUSIC

- 1110 China R. Int. S ... China Beat (pop)  
 A China Roots (traditional/folk)  
 R. Japan M-F Songs for Everyone  
 A Pop Joins the World  
 1125 R. Japan M Japan Music Treasure Box  
 W Japan Musicscape  
 F Music Beat (pop)  
 1140 R. Korea Int. S ... Korean Pop Interactive

## ENTERTAINMENT

- 1100 BBCWS(eas) S ... Play of the Week (radio theatre)[cont'd]  
 1145 BBCWS(am) M-F Off the Shelf (readings)

## SWL, MEDIA & COMMUNICATIONS

- 1130 R. New Zealand Int. M Mailbox (fortnightly)  
 RNZI Talk (fortnightly)

## LISTENER CONTACT/INTERACTIVE

- 1110 R. Japan S Hello From Tokyo  
 1140 R. Korea Int. A ... Worldwide Friendship

## SPORT

- 1110 BBCWS(am) M-F Sports Caribbean  
 1130 R. New Zealand Int. W The World in Sport  
 F Sports Story  
 1132 BBCWS(am) A ... World Football (global soccer)  
 1145 BBCWS(am) S-F Sports Roundup

## 1200 UTC / 7am E / 4am P - Page 50 Freqs

### NEWSCASTS (\*extended)

- 1200 BBCWS(am)(eas) ... D Newshour\*  
 R. Australia D ... News  
 R. Netherlands S/A News

# Shortwave Guide



R. New Zealand Int. S/A News  
M-F Late Edition\*

## CURRENT AFFAIRS MAGAZINES/FEATURES

1200 R. Netherlands M-F Newline  
1206 R. Netherlands S ... Wide Angle (one topic focus)  
1210 BBCWS(am) M-F Caribbean Morning Report  
1230 R. Sweden M-F 60 Degrees North

## BUSINESS/ECONOMICS (also in Newscasts & Current Affairs)

1205 BBCWS(am) M-F Caribbean Business  
1230 R. Netherlands F ... A Good Life (development issues)

## SCIENCE/TECHNOLOGY (incl. Health & Environment)

1230 R. Netherlands M ... Research File  
1245 R. Sweden H Greenscan (ecology-2nd wk.)  
Heartbeat (3rd wk.)

## ARTS & CULTURE

1230 R. Netherlands S ... Vox Humana  
R. Sweden A Spectrum (3rd wk.)

## LOCAL LIVES & VIEWS

1205 R. Australia M-H Late Night Live (discussion)  
R. New Zealand Int. A NZ Forces Radio  
1206 R. Netherlands A ... Europe Unzipped (weekly review)  
1225 R. Netherlands A ... Insight (commentary)  
1220 BBCWS(am) M-F Caribbean Magazine  
1230 R. Netherlands T ... EuroQuest (Europe in context)  
H Dutch Horizons  
R. Sweden A Network Europe (magazine-1st wk.)  
Sweden Today (2nd)  
Studio 49 (discussion-4h)  
1245 R. Sweden T Close-Up (profiles-1st wk.)  
H Nordic Lights (1st)  
The S-Files (things Swedish-4th)  
F Review of the Newsweek

## INFORMATIONAL FEATURES

1205 R. Australia S ... The Spirit of Things (spiritual matters)  
1230 R. Netherlands W ... Documentary  
A Amsterdam Forum (topical discussion)

## MUSIC

1205 R. Australia F ... Sound Quality (innovative)  
A The Music Show  
1230 R. Sweden S Sounds Nordic (rock-exc. 1st wk.)

## ENTERTAINMENT

1205 BBCWS(eas) A ... Quote, Unquote (or other game/quiz)

## SWL, MEDIA & COMMUNICATIONS

1230 HCJB Ecuador A ... DX Partyline

## LISTENER CONTACT/INTERACTIVE

1230 R. Sweden S In Touch with Stockholm (1st wk.)

## SPORT

1205 R. New Zealand Int. S Sportsworld (weekend review)  
1245 R. Sweden M Sportscan

## 1300 UTC / 8am E / 5am P - Page 51 Freqs

### NEWSCASTS

1300 BBCWS(am)(eas) ... D News  
China R. Int. D ... News & Reports\*  
R. Australia D ... News  
R. Canada Int. M-F News  
R. New Zealand Int. S/A ... News  
M-F Pacific Regional News  
1332 BBCWS(eas) M-F British News

### CURRENT AFFAIRS MAGAZINES/FEATURES

1305 R. Canada Int. M-F The Current  
1306 BBCWS(am) M-F Outlook  
BBCWS(eas) S ... From Our Own Correspondent  
H Assignment (inside the news)

1308 R. New Zealand Int. M-F ... Dateline Pacific

1310 China R. Int. S ... Report on Developing Countries

1330 R. Sweden M-F 60 Degrees North

1355 R. Australia S ... Perspective (informed commentary)

### BUSINESS/ECONOMICS (also in Newscasts & Current Affairs)

1330 China R. Int. T ... Biz China  
R. New Zealand Int. T ... Tradewinds

### SCIENCE/TECHNOLOGY (incl. Health & Environment)

1305 R. Australia S ... The Science Show  
1315 China R. Int. A ... Cutting Edge  
1345 R. Sweden H Greenscan (ecology-2nd wk.)  
Heartbeat (health-3rd wk.)

### Arts/Culture

1306 BBCWS(eas) T ... Masterpiece (cultural ideas)  
1320 China R. Int. S ... In the Spotlight  
1330 R. Sweden A Spectrum (3rd Sat.)

### LOCAL LIVES & VIEWS

1330 China R. Int. M ... People in the Know  
W China Horizons  
H Voices from Other Lands  
F Life in China  
R. New Zealand Int. H Pacific Correspondent  
R. Sweden A Network Europe (magazine-1st wk.)  
Sweden Today (2nd wk.)  
Studio 49 (discussion-4th wk.)  
1345 R. Sweden T Close Up (profiles - 1st wk.)  
H Nordic Lights (1st wk.)  
The S-Files (things Swedish-4th wk.)  
F Review of the Newsweek

### INFORMATIONAL FEATURES

1306 BBCWS(am) S ... Documentaries  
BBCWS(eas) M/W Documentaries  
1332 BBCWS(am) S ... In Praise of God (worship service)  
BBCWS(eas) S ... Reporting Religion

### MUSIC

1301 BBCWS(eas) A ... In Concert (classical recitals)  
1305 R. Australia S ... The Music Show (from 1205)  
M-F The Planet (international)  
1308 R. New Zealand Int. S ... Wayne's Music (nostalgia)  
A New Music Releases  
1330 R. New Zealand Int. A ... Hymns  
R. Sweden S Sounds Nordic (rock/pop-exc. 1st wk.)

### ENTERTAINMENT

1306 BBCWS(am) A ... Pick of the World (BBC's best)  
1345 BBCWS(am); M-F Off the Shelf (read ngs)

### SWL, MEDIA & COMMUNICATIONS

1330 R. New Zealand Int. M Mailbox (fortnightly)  
RNZI Talk (fortnightly)  
WHRI Indico A ... DXing with Cumbre (15105 kHz)

### LISTENER CONTACT/INTERACTIVE

1330 China R. Int. A ... Listeners' Garden  
R. Sweden S In Touch with Stockholm (1st wk.)  
1345 BBCWS(am) A ... Write On

### SPORT

1310 R. Australia M-F Regional Sports Report  
1330 R. New Zealand Int. W The World in Sport  
F Sports Story  
1345 BBCWS(eas); M-H Sports Roundup  
F Football Extra  
R. Sweden M Sportscan

## 1400 UTC / 9am E / 6am P - Page 51 Freqs

### NEWSCASTS (\*extended)

1400 BBCWS(am) D ... News  
BBCWS(eas) S/A News  
China R. Int. D ... News & Reports\*  
R. Australia D ... News  
R. Canada Int. D ... News  
R. Japan D News  
R. Prague D News  
1432 BBCWS(eas) M-F Newshour\*

### CURRENT AFFAIRS MAGAZINES/FEATURES

1400 BBCWS(eas) M-F East Asia Today  
1406 BBCWS(am)(eas) ... S Talking Point (interactive discussion)  
BBCWS(am) H ... Assignment (inside the news)  
1410 China R. Int. S ... Report on Developing Countries  
1415 R. Japan M-F 44 Minutes  
1430 R. Sweden M-F 60 Degrees North

### BUSINESS/ECONOMICS (also in Newscasts & Current Affairs)

1410 China R. Int. T ... Biz China  
1415 R. Prague W Economic Report  
1432 BBCWS(am) H ... The Music Biz

### SCIENCE/TECHNOLOGY (incl. Health & Environment)

1415 China R. Int. A ... Cutting Edge  
1445 R. Sweden H Greenscan (ecology-2nd wk.)  
Heartbeat (health-3rd wk.)

### ARTS & CULTURE

1405 R. Australia S ... Books & Writing  
1406 BBCWS(am) M ... Masterpiece (cultural ideas)  
1415 R. Prague F The Arts  
A Czech Books (fortnightly)  
1420 China R. Int. S ... In the Spotlight  
1430 R. Sweden S Spectrum (3rd wk.)

### LOCAL LIVES & VIEWS

1405 R. Canada Int. S ... The Sunday Edition (interviews/documentaries)  
M-F Sounds Like Canada  
A The House (Parliament)  
R. Prague M-F Current Affairs  
A Insight Central Europe  
1410 R. Japan A Weekend Japonology  
1415 R. Prague T Witness (oral history)  
1420 R. Prague T One on One (interview)  
W Czechs in History (or) Spotlight (places)  
1430 China R. Int. M ... People in the Know  
W China Horizons  
H Voices from Other Lands  
F Life in China  
R. Canada Int. W ... C'est la Vie (French Canada)  
R. Sweden A Network Europe (Europe magazine-1st wk.)  
Sweden Today (2nd wk.)  
Studio 49 (discussion-4th wk.)  
1445 R. Sweden T Close Up (profiles-1st wk.)  
H Nordic Lights (1st wk.)  
The S-Files (things Swedish-4th wk.)  
F Review of the Newsweek  
1454 R. Japan A Sights & Sounds of Japan

### INFORMATIONAL FEATURES

1405 R. Australia A ... The Comfort Zone (design & ritual)  
1406 BBCWS(am) M/W Documentaries

### MUSIC

1405 R. Japan S Pop Joins the World  
1430 R. Sweden S Sounds Nordic (rock/pop-exc. 1st wk.)  
1432 BBCWS(am) M ... The Music Feature (documentaries)  
T White Label (new music reviewed)  
W Charlie Gillett (world)  
F John Peel (eclectic mix)

# Shortwave Guide



## ENTERTAINMENT

1405 R. Australia M-F Margaret Throsby (interview w/music)

## LISTENER CONTACT/INTERACTIVE

1405 R. Prague S Mailbox  
1430 China R. Int. A ... Listeners' Garden  
R. Sweden S In Touch with Stockholm (1st wk.)

## SPORT

1406 BBCWS(am) F ... Sports International (documentaries)  
BBCWS(am)(eas) ... A Sportsworld (live action)  
1445 R. Sweden M Sportscan

## 1500 UTC / 10am E / 7am P - Page 52 Freqs

### NEWSCASTS

1500 BBCWS(am)(eas) ... D News  
China R. Int. D ... News  
R. Australia D ... News  
R. Canada Int. D ... News

### CURRENT AFFAIRS MAGAZINES/FEATURES

1505 R. Australia M-F Asia Pacific  
1506 BBCWS(am) S ... Assignment (inside the news)  
BBCWS(eas) S ... Documentaries  
1510 China R. Int. S ... Report on Developing Countries

### BUSINESS/FINANCE (also in Newscasts & Current Affairs)

1530 China R. Int. T ... Biz China  
1555 R. Australia S ... Business Weekend

### SCIENCE/TECHNOLOGY (incl. Health & Environ.)

1506 BBCWS(am)(eas) ... M Health Matters  
T Go Digital  
W Discovery (research)  
H One Planet (ecology)  
F Science in Action (magazine)

1515 China R. Int. A ... Cutting Edge  
1530 R. Australia M ... The Health Report

### ARTS & CULTURE

1520 China R. Int. S ... In the Spotlight  
1532 BBCWS(am)(eas) ... H The Word (considering literature)  
World Book Club (book & author)(last wk.)

### LOCAL LIVES & VIEWS

1505 R. Canada Int. S ... The Sunday Edition (from 1405)  
M-F Sounds Like Canada  
1530 China R. Int. M ... People in the Know  
W China Horizons  
H Voices from Other Lands  
F Life in China  
1532 BBCWS(am)(eas) ... S People & Politics (Parliament)

### INFORMATIONAL FEATURES

1505 R. Australia S ... Encounter (spiritual beliefs)  
1530 R. Australia T ... Law Report  
W Religion Report  
1545 BBCWS(am)(eas) ... W Heart & Soul (beliefs & values)  
F What's the Problem (advice)  
R. Canada Int. M-H Out Front (first person views)

### MUSIC

1505 R. Australia A ... Nocturne (music of the millenia)  
1532 BBCWS(am) T ... Music Review (explorations)

### ENTERTAINMENT

1505 R. Canada Int. A ... Vinyl Cafe (music/humor)  
1532 BBCWS(am)(eas) ... M Quiz or panel game  
W/F Westway (drama serial)

### SWL, MEDIA & COMMUNICATIONS

1530 R. Australia H ... The Media Report

## LISTENER CONTACT/INTERACTIVE

1530 China R. Int. A ... Listeners' Garden

## SPORT

1505 BBCWS(am)(eas) ... A Sportsworld (from 1405)  
1530 R. Australia F ... The Sports Factor

## 1600 UTC / 11am E / 8am P - Page 52 Freqs

### NEWSCASTS (\*extended)

1600 BBCWS(am) S-F World Briefing\*  
A News  
R. Australia D ... News  
R. Canada Int. S/A News  
1620 BBCWS(am) S-F British News

### CURRENT AFFAIRS MAGAZINES/FEATURES

1615 R. Austria Int. M-F Report from Austria  
1645 BBCWS(am)S The Instant Guide (quick background)  
M/T/H/F Analysis  
W From Our Own Correspondent  
1645 R. Austria Int. M-F Report from Austria

### BUSINESS/ECONOMICS (also in Newscasts & Current Affairs)

1632 BBCWS(am)S World Business Review  
M-F World Business Report

### SCIENCE/TECHNOLOGY (incl. Health & Environment)

1605 R. Canada Int. A ... Quirks and Quarks

### LOCAL LIVES & VIEWS

1605 R. AustraliaS The National Interest  
M-F Bush Telegraph (rural life)  
R. Austria Int. S/A Insight Central Europe  
R. Canada Int. S ... The Sunday Edition (from 1405)  
1635 R. Austria Int. S/A Insight Central Europe

### INFORMATIONAL FEATURES

1605 R. AustraliaT The Comfort Zone (homes/gardens/food)

### MUSIC

1605 R. AustraliaA Nocturne (from 1505)

### SWL, MEDIA & COMMUNICATIONS

1600 KWHR Hawaii A ... DXing with Cumbre (9930 kHz)  
WHRI Indiana A ... DXing with Cumbre (13760 kHz)

### LISTENER CONTACT/INTERACTIVE

1625 R. Austria Int. S/A Listener Letters  
1655 R. Austria Int. S/A Listener Letters

## SPORT

1606 BBCWS(am) S/A Sportsworld (live action)  
1640 BBCWS(am) M-F Sports Roundup

## 1700 UTC / 12pm E / 9am P - Page 53 Freqs

### NEWSCASTS (\*extended)

1700 R. AustraliaD News  
R. Japan D News

### CURRENT AFFAIRS MAGAZINES/FEATURES

1700 R. Africa Int. D ... Reports, features, music  
1715 R. Japan M-F 44 Minutes

### LOCAL LIVES & VIEWS

1705 R. AustraliaM-F Australia Talks Back (national call-in)

### INFORMATIONAL FEATURES

1705 R. AustraliaA The Spirit of Things (spiritual matters)

### MUSIC

1705 R. AustraliaS Sound Quality (innovative)  
1710 R. Japan M-F Songs for Everyone  
A Pop Joins the World  
1730 VOA Africa S Music Time in Africa

## LISTENER CONTACT/INTERACTIVE

1706 VOA Africa M-F Talk to America (listener phone-in)

1710 R. Japan S Hello from Tokyo

## 1900 UTC / 2pm E / 11am P - Page 54 Freqs

### NEWSCASTS

1900 R. AustraliaD News  
1930 R. Netherlands S/A News

### CURRENT AFFAIRS MAGAZINES/FEATURES

1933 VOA News Now ... F News Review  
1936 R. Netherlands S ... Wide Angle (one topic focus)

### BUSINESS/ECONOMICS (also in Newscasts & Current Affairs)

1930 R. AustraliaA The Business Report

### SCIENCE/TECHNOLOGY (incl. Health & Environment)

1905 R. AustraliaA Earthbeat (environment)

### ARTS & CULTURE

1900 R. Netherlands A ... Vox Humana

### LOCAL LIVES & VIEWS

1905 R. AustraliaF Rural Reporter  
1910 R. AustraliaS-H Pacific Beat (islands magazine)  
1936 R. Netherlands A ... Europe Unzipped (weekly review)  
1955 R. Netherlands A ... Insight (commentary)

### INFORMATIONAL FEATURES

1900 R. Netherlands S ... Documentary

### MUSIC

1905 VOA News Now ... M-F Border Crossings  
1930 R. AustraliaF Australian Country Style

## SPORT

1929 R. AustraliaS-H Sport

## 2000 UTC / 3pm E / 12pm P - Page 54 Freqs

### NEWSCASTS

2030 R. Netherlands S/A News

### Current Affairs Magazine/Features

2036 R. Netherlands S ... Wide Angle (one topic focus)

### SCIENCE/TECHNOLOGY (incl. Health & Environment)

2030 R. AustraliaF The Buzz (technology)

### ARTS & CULTURE

2000 R. Netherlands S ... Vox Humana

### LOCAL LIVES & VIEWS

2005 R. AustraliaF Pacific Review  
A Australia All Over (nationwide)  
2010 R. AustraliaS-H Pacific Beat (islands magazine)  
2036 R. Netherlands A ... Europe Unzipped (weekly review)

### INFORMATIONAL FEATURES

2000 R. Netherlands A ... Amsterdam Forum (topical discussion)

## SPORT

2029 R. AustraliaS-H Sport

## 2100 UTC / 4pm E / 1pm P - Page 55 Freqs

### NEWSCASTS (\*extended) ...

2100 BBCWS(am) D ... Newshour\*  
Deutsche Welle D ... News  
R. AustraliaD News  
R. Japan D News  
R. Prague D News

### CURRENT AFFAIRS MAGAZINES/FEATURES

2105 Deutsche Welle M-F Newslink Africa  
2110 R. AustraliaS-H AM (morning news magazine)  
2115 R. Japan M-F Asian Top News (region's radio)  
2130 Deutsche Welle A ... Africa This Week

# Shortwave Guide



2133 VOA News Now ..... S On the Line (US foreign policy)

## BUSINESS/ECONOMICS (also in Newscasts & Current Affairs)

2130 R. Australia T Innovations (new products)

## SCIENCE/TECHNOLOGY (incl. Health & Environment)

2130 R. Australia M Earthbeat (environment)  
H All in the Mind (the brain)  
F In Conversation

2133 VOA News Now ..... A Our World

## ARTS & CULTURE

2115 R. Prague S Czech Books (..... fortnightly)  
2130 Deutsche Welle T ... Arts on the Air  
H Cool (youth culture)

## LOCAL LIVES & VIEWS

2105 R. Australia A Australia All Over (from 2005)  
R. Prague M-F Current Affairs  
A Magazine (local color)  
2110 R. Japan A Weekend Japanology  
2115 BBCWS(am) M-F Caribbean Report\*  
R. Prague T Witness (oral history)  
A Letter from Prague  
2120 R. Prague M Talking Point  
T/A One on One (interview)  
W Czechs in History [or] Spotlight (places)  
2130 BBCWS(am) T/F Calling the Falklands ^  
Deutsche Welle W ... Living in Germany  
R. Australia S Country Breakfast (rural issues)  
H Rural Reporter  
2145 Deutsche Welle W ... Europe in CAPITALS  
2154 R. Japan A Sights & Sounds of Japan  
(\*special service on 5975, 6135, 11675, 15390 kHz. only.)  
(^ special service on 11680 kHz.)

## INFORMATIONAL FEATURES

2105 Deutsche Welle S ... Religion & Society  
2115 Deutsche Welle S ... Inspired Minds  
A German by Radio  
R. Japan T Let's Learn Japanese  
H Brush Up Your Japanese

## MUSIC

2105 VOA News Now ..... M American Gold (oldies)  
T Roots & Branches (folk)  
W Classic Rock  
H Top 20 ...  
F Country Hits  
2110 R. Japan S Pop Joins the World  
M-F Songs for Everyone  
2115 R. Prague A Encore (classical-monthly)  
Magic Carpet (world-monthly)  
2125 R. Japan M Japan Music Treasure Box  
W Japan Musicscapes  
F Music Beat  
2130 Deutsche Welle S ... Hits in Germany [or]  
Melody Time  
M A World of Music  
F Focus on Folk

## SWL, MEDIA & COMMUNICATIONS

2100 WWCRTennessee .... H DX Partyline

## SPORT

2105 Deutsche Welle A ... Hard to Beat

## 2200 UTC / 5pm E / 2pm P - Page 55 Freqs

### NEWSCASTS (\*extended)

2200 BBCWS(am) D ... News  
R. Australia D News  
RVi Belgium M-F News  
2230 R. Prague D News

### CURRENT AFFAIRS MAGAZINES/FEATURES

2205 R. Australia F Asia Pacific  
A Correspondents' Report  
2210 R. Australia S-H AM  
2230 R. Australia F AM Saturday

### SCIENCE/TECHNOLOGY (incl. Health & Environment)

2206 BBCWS(am) M ... Health Matters  
T Go Digital  
W Discovery (research)

H One Planet (ecology)  
F Science in Action (magazine)

### ARTS & CULTURE

2232 BBCWS(am) H ... The Word (considering literature)  
World Book Club (book & author)[last wk.]  
2245 R. Prague S Czech Books (fortnightly)  
F The Arts

### LOCAL LIVES & VIEWS

2204 RVi Belgium M-F Flanders Today (variety magazine)  
2208 RVi Belgium S ... Tourism in Flanders  
2235 R. Prague S Letter from Prague  
M-F Newsview  
A insight Central Europe  
2240 R. Australia S Australia Wide (national news)  
2245 R. Prague T Witness (oral history)  
A Letter from Prague  
2250 R. Prague M Talking Point (Czech issues)  
T/A One on One (interview)  
W Czechs in History [or] Spotlight (places)

### INFORMATIONAL FEATURES

2206 BBCWS(am) S ... Documentaries  
2232 BBCWS(am) S ... In Praise of God (worship service)  
2245 BBCWS(am) W ... Heart & Soul (beliefs & values)  
F What's the Problem? (advice)

### MUSIC

2200 RVi Belgium A ... Music from Flanders  
2232 BBCWS(am) T ... Music Review (explorations)  
2230 R. Australia A Music Deli (international)

### ENTERTAINMENT

2200 WBCQ(7415kHz) .... S Radio Free Euphoria  
M Jean Shepherd  
F Pan Global Wireless  
2201 BBCWS(am) A ... Play of the Week (radio theatre)  
2230 WBCQ(7415kHz) .... F The Pab Sungenis Project  
2232 BBCWS(am) M ... Quiz or panel game  
W/F Westway (drama serial)

### SWL, MEDIA & COMMUNICATIONS

2200 RVi Belgium S ... Radio World  
WHRA Maine F ... DXing with Cumbre (17650 kHz)  
WHRI Indiana S ... DXing with Cumbre (5745 kHz)  
2230 WHRA Maine A ... DXing with Cumbre (17650 kHz)

### LISTENER CONTACT/INTERACTIVE

2214 RVi Belgium S ... Brussels 1043  
2235 R. Prague S Mailbox

## 2300 UTC / 6pm E / 3pm P - Page 56 Freqs

### NEWSCASTS (\*extended)

2300 BBCWS(am) D ... The World Today\*  
China R. Int. D ... News & Reports\*  
R. Australia D News  
R. Canada Int. M-F The World at Six\*  
R. New Zealand Int. S-H Midday Report\*  
F/A News  
2330 R. Prague D News

### CURRENT AFFAIRS MAGAZINES/FEATURES

2300 R. Canada Int. S/A The World This Weekend  
2310 China R. Int. A ... Report on Developing Countries  
R. Australia S-H Asia Pacific  
2330 R. Canada Int. M-F As It Happens  
2332 BBCWS(am) A ... The Interview (ideas & trends)

### BUSINESS/ECONOMICS (also in Newscasts & Current Affairs)

2330 China R. Int. M ... Biz China  
R. Australia S The Business Report  
A Innovations  
2332 BBCWS(am) F ... Global Business

2345 R. Prague H Economic Report

### SCIENCE/TECHNOLOGY (incl. Health & Environment)

2305 R. Australia A All in the Mind (the brain)  
2315 China R. Int. F ... Cutting Edge  
2330 R. Australia H The Buzz (technology)

### ARTS & CULTURE

2320 China R. Int. A ... In the Spotlight  
2330 R. Australia W The Arts  
2345 R. Prague F The Arts  
A Czech Books (fortnightly)

### LOCAL LIVES & VIEWS

2312 R. New Zealand Int. F Focus on Politics  
A This Week in Parliament  
2330 China R. Int. S ... People in the Know  
T China Horizons  
W Voices from Other Lands  
H Life in China  
R. Australia T Rural Reporter (outback)  
R. New Zealand Int. A Spectrum (life in NZ)  
2335 R. Prague S Letter from Prague  
M-F Newsview  
A Magazine  
2345 R. Prague A Letter from Prague  
T Witness (oral history)  
2350 R. Prague T/A One on One (interview)  
W Czechs in History [or] Spotlight (places)

### INFORMATIONAL FEATURES

2330 R. Australia M The Europeans

### MUSIC

2330 R. Australia F Hit Mix  
R. New Zealand Int. F The Sampler (latest CDs)  
2345 R. Prague A Encore (classical-monthly)  
Magic Carpet (world-monthly)

### ENTERTAINMENT

2300 WBCQ Maine A ... Radio Timtron Worldwide  
2330 R. Canada Int. A ... Madly Off in All Directions (comedy/satire)  
WBCQ Maine H ... Uncle Ed's Musical Memories  
F WDCD

### SWL, MEDIA & COMMUNICATIONS

2300 WBCQ Maine W ... World of Radio  
2330 WHRI Indiana A ... DXing with Cumbre (9495 kHz)

### LISTENER CONTACT/INTERACTIVE

2330 China R. Int. F ... Listeners' Garden  
2340 R. Prague S Mailbox

### SPORT

2330 R. Canada Int. S ... The Inside Track

## Thank You ...

### Additional Contributors to This Month's Shortwave Guide:

Rich D'Angelo, *NASWA Flash Sheet*;  
Glenn Hauser, Enid, OK, *DX Listening Digest, World of Radio*; Jose Jacob VU2JOS, India; Anker Petersen, *DX Window*; Harold Sellers, Canada, *ODXA/DX Ontario*; Adrian Sainsbury, Radio New Zealand Intl; Klaus Schneider, Germany; Larry Van Horn, MT Asst. Editor; *BBC On Air*; *BCL News*; *BCDXC*; *CIDX*; *Cumbre DX*; *DX News*; *Fineware*; *Hard Core DX*; *NASWA Journal*; *Observer*; *Worldwide DX Club*.

## Monitoring Military Flight Demonstration Groups - Our Annual Frequency, Equipment, and Schedule Report

**T**here is nothing quite as thrilling as going to one of the many public air shows across the country and watching the Blue Angels or Thunderbirds flight demonstration team strut their stuff in front of thousands of fans. But if you add to the visual drama in front of you the element of monitoring the team's radio communication, you will have a whole new perspective that few get to enjoy.

Since the 2004 air show season starts this month, in this edition of *Milcom* we will present our annual frequencies to monitor, review of equipment, and the military flight demonstration team schedules (Table One) for the upcoming 2004 air show season.

### ◆ So where is the action?

You will need to concentrate on several different bands for air show activity. Search the following bands in the modes indicated:

118.0-137.0 MHz	AM mode (AM)	25 kHz steps
122.7-123.575 MHz	AM	25 kHz steps
138.0-144.0 MHz	AM/Narrowband FM (NBFM)	12.5 kHz steps
148.0-150.8 MHz	AM/NBFM	12.5 kHz steps
225.0-389.0 MHz	AM	25 kHz steps
389.0-400.0 MHz	AM/NBFM	25 kHz steps
406.1-420.0 MHz	NBFM	12.5 kHz steps

### U.S. Military Flight Demonstration Teams

The U.S. Navy (USN)/Marine Corps (USMC) team is represented on the air show circuit by the Blue Angels flying their F/A-18 Hornet aircraft. The other major piece of hardware in the squadron is their C-130 Hercules transport aircraft, affectionately known as Fat Albert. It is the only Marine Corps aircraft permanently assigned to support a Navy squadron and is flown by an all-Marine Corps crew of three pilots and five enlisted personnel. Fat Albert flies more than 140,000 miles during the course of a show season.

The following discrete frequencies have been reported in use by the U.S. Navy Blue Angels during the past six air show seasons. An \* indicates a frequency that has not been reported recently and may no longer be in use.

U.S. Navy Blue Angels	Frequency	Usage
	142.000*	Ground Comm Cart/Ground maintenance personnel (NBFM)
	143.000*	Tower observer (AM)
	143.600	Ground support, occasional BA air-to-air during cross country trips (AM)
	164.900	Ground Comm Cart/Ground maintenance personnel (NBFM)
	168.900	Ground Comm Cart/Ground maintenance personnel (NBFM)
	169.400*	Ground Comm Cart/Ground maintenance personnel (NBFM)
	170.900	Ground Comm Cart/Ground maintenance personnel (NBFM)
	236.450	Fat Albert (C-130 transport) aircraft (AM)
	238.150	Taxi Out (Aircraft 1/2)/Show center/Diamond formation aircraft (1-4)/Commonly reported air-to-air enroute (AM)
	251.600*	Solo aircraft (5/6) air-to-air (AM)
	256.250*	Usage unknown (AM) Note: Reported at a Texas airshow.
	263.350	Diamond formation aircraft (1-4)/Fat Albert (C-130 transport) aircraft JATO flight demonstration (AM)
	263.500	Fat Albert C-130 aircraft (AM)
	264.550	Diamond aircraft (1-4)/Solo aircraft (5-6) formations (AM)

275.350	Note: Last heard at Dayton Air Show. Taxi Out (Aircraft 3/4)/Diamond formation aircraft (1-4) air-to-air and all six aircraft air-to-air (AM) [Channel 9]
286.000*	Usage unknown (AM) Note: Reported at two Texas airshows.
302.150	Miscellaneous air-to-air (AM) Note: Reported on the west coast.
307.700	Show center/Diamond formation aircraft (1-4) (AM) Note: Reported on west coast.
345.900	Taxi out (Aircraft 5/6)/Solo aircraft (5/6) air-to-air (AM)

The premier U.S. Air Force (USAF) flight demonstration team is known as the Thunderbirds. This team uses a mix of six aircraft, performing formation flying and solo routines. The four-aircraft diamond formation demonstrates the training and precision of Air Force pilots, while the solos highlight the maximum capabilities of the Lockheed Martin F-16 Fighting Falcon. The pilots perform approximately 30 maneuvers in a demonstration. The entire show, including ground and air, runs about an hour and 15 minutes.

The list below has frequencies reportedly used by the Thunderbirds during the last six air show seasons. It should be noted that at some shows 143.850 and 235.250 MHz roles get reversed from what is published below. An \* indicates a frequency that has not been reported recently and may no longer be in use.

### USAF Thunderbirds

Frequency	Usage
140.400*	Support aircraft and show aircraft cross country air-to-air (AM)
141.850	Pre-take off checklist/Four ship formation air-to-air which is linked to public address system (AM) [Victor 1]
143.850	Four, five and six aircraft on/off show center (AM) [Victor 2]
235.250	Solo aircraft on/off show center (AM)
322.950	Engine Starts/Solo aircraft (5-6) air-to-air (AM)
413.000	Maintenance/ground teams (NBFM) Digital comms
413.025	Maintenance crews/ground teams (NBFM) Analog and digital comms
413.100	Maintenance/ground teams (NBFM) Analog and digital comms
413.250	Maintenance/ground teams (NBFM) Analog comms
413.275	Maintenance/crew chiefs (NBFM) Analog comms
413.350	Maintenance/ground teams (NBFM) Digital comms
413.375	Maintenance/ground teams (NBFM) Digital comms

Both the Navy and the Air Force have other special flight demonstration units in addition to those units mentioned above. Listings below transmit in the AM mode. Here is a list of those units and their frequencies.

### Special Flight Demonstration Teams

#### USAF ACC A-10 Thunderbolt demonstration teams

123.150	123.475	269.900	384.550
East: 347FW/23FG Pope AFB, NC			
139.625	139.975	140.400	236.850 343.000
West: 355FW Davis Monthan AFB, AZ			
123.475	138.050	138.100	138.200 138.250 138.300
	138.475	138.500	139.625 139.725 139.800 142.200
	123.475	305.400	327.700

#### USAF ACC F-15 Eagle demonstration teams

276.675	376.025	384.500	384.550	384.850
East: 1FW/10G Langley AFB, VA				
225.650	228.450	228.950	233.525	236.550 238.625
238.825	252.775	257.075	262.025	262.050 264.975
275.675	279.650	282.675	282.800	285.150 287.775

296.925 298.350 301.525 305.650 315.125 315.850  
 317.800 319.325 325.325 325.725 325.775 333.550  
 359.225 364.125 385.700 391.200 396.900 397.100

West: 33FW Eglin AFB, FL

232.150 234.600 236.150 237.400 239.400 252.525  
 252.575 254.675 258.375 259.550 260.275 264.875  
 266.550 268.175 292.725 303.950 330.125 333.550  
 338.750 351.050 355.750 384.550 399.750 399.850

USAF ACC F-16 Fighting Falcon demonstration teams

East: 20FW/78FS Shaw AFB

138.025 138.100 138.200 138.250 138.475 138.425  
 138.900 139.750 139.825 139.900 139.925 139.975  
 140.375 141.600 229.075 261.200 336.925 344.900

West: 388FW/4FS Hill AFB

138.025 138.100 138.200 138.250 317.800

USN VF-101 F-14 flight demonstration team

261.100 299.500 311.500 341.200 342.900 342.950  
 345.000

USAF Combat search and rescue demonstrations

139.700 225.450 236.000 242.000 251.900 252.800  
 259.000 280.500 282.800 381.000

USN Search and Rescue demonstrations

242.500 282.000 283.100

US Coast Guard aircraft demonstrations

122.900 (SAR) 157.050 (Drug Interdiction demo) 381.700 (SAR)  
 381.800 (SAR) 383.9 (SAR)

### Military Parachute Teams

The colorful U.S. Navy Seal Parachute Team, known as the Leap Frogs, are frequent visitors around the country at various sporting events and air shows. This team has been regularly reported on their 407.500 MHz (NBFM) frequency nationwide the last several years. Last year we got a report of team communications on 134.100 and 270.000 MHz (AM).

The U.S. Army Parachute Team is known as the Golden Knights. They also make the rounds during the air show season. Look for their communications on 123.400, 123.475 or 123.500 MHz. You should also keep 32.300, 32.400, 122.575, 124.875, 284.900 and 367.700 MHz plugged in for possible GK activity.

During 2001 and 2002 seasons I received several reports that the Golden Knights were using civilian UHF frequencies (such as 462.625 MHz, a business itinerant frequency known as Black Dot) and two FRS frequencies: 467.5625, and 467.6125 MHz. These reports suggest that the Golden Knights might be using Family Radio Service radios. It might be a good idea to keep FRS frequencies in your scanner since you might hear some interesting activity on these frequencies anyway during air shows. The standard FRS frequencies are (NBFM mode):

### Family Radio Service

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

We did receive a report of the ground pyrotechnics personnel from the Tora Tora Tora and Warbirds flight demonstration team using FRS radios for communications during one show last year. You will also find other military monitoring enthusiasts who use FRS radios at the show to meet fellow enthusiasts. Load them up in your scanner and you might make a new Milcom friend or two.

One final note regarding military UHF frequencies. The government's version of the Family Radio Service is known as the Inter-Squad Radio or ISR. I have seen a couple of scattered reports over the last couple of years that these radios might be in use at air shows by military units. At this point it might be a good idea to program these frequencies in also as part of your air show loadout. As always, field reports are requested.

### Inter-Squad Radio

396.8750	Channel 1	397.1250	Channel 2
397.1750	Channel 3	397.3750	Channel 4
397.4250	Channel 5	397.4750	Channel 6
397.5500	Channel 7	397.9500	Channel 8
398.0500	Channel 9	399.4250	Channel 10
399.4750	Channel 11	399.7250	Channel 12
399.9250	Channel 13	399.9750	Channel 14

### Civilian/Foreign Air Demonstration Teams

The Canadian Forces Snowbird aircraft demonstration team (431 Air Demonstration Squadron) is another regular on the U.S./Canada air show circuit. The following frequencies have been recently reported for this popular aerial team: 123.325 242.600 245.500 245.750 246.500 272.100 (Primary) 284.900 299.500 333.300 MHz.

Some frequencies for other foreign military and US civilian flight demonstration teams that have been reported to us during the past few years include:

### Civilian Flight Demonstration Teams

Aeroshell Aerobatics Team 123.150  
 All American Firebirds Flight Demonstration Team - 122.775  
 Bud Light Air Force (ex- Coors Microjet) - 122.925 123.350 123.475  
 Firecat (Rich Perkins) - 123.500  
 French Connection Airshow - 122.925 122.975 129.975  
 Ian Grooms FedEx Red Bull Aerobatic Team (US) - 122.825 123.150  
 Lima Lima Flight Team - 123.150 123.175 123.425  
 Manfred Radius Glider Aerobatics Team - 123.150  
 North American Jet Airshows Team - 122.775 122.925 129.650  
 129.925  
 Northern Lights Aerobatic Team] - 123.325 136.975  
 P-51 Mustang Flight Team - 122.850 122.875 (Commemorative Air Force)  
 Patty Wagstaff Airshows Inc - 122.750  
 Rayban Gold Aerobatics Team - 122.925  
 Red Baron Stearman Squadron - 122.725 122.775 123.150  
 Sean Tucker Power Aerobatics - 122.950 123.150  
 Skytypers Team - 122.775  
 Swift Magic Aerobatic Team - 122.775 122.925  
 Tora Tora Tora Warbirds Team - 123.450 469.500 469.550 (Commemorative Air Force)

### Foreign Military Flight Demonstration Teams

Asas de Portugal, Esquadra 103 (Wings of Portugal 103 Squadron) Flight Team - 262.150  
 Blue Eagles Royal Army Air Corps Flight Team (UK) - 136.975  
 Brazilian Air Force Team (Brazil) - 130.550 130.650 132.250  
 Canadian Forces Skyhawks Parachute Jump Team (Canada) - 123.000  
 294.700  
 Falcons Royal Air Force Parachute Jump Team (UK) - 255.100 465.100  
 Frece Tricolori Military Flight Team (Italy) - 307.800 381.000  
 Grasshopper Helicopter Team (Netherlands) - 281.100  
 Halcones Military Flight Team (Chile) - 136.175  
 La Patrouille Adecco Air Force Flight Team (France) - 138.450 141.825  
 143.100 143.850 242.650  
 La Patrulla Aguila Military Flight Team (Spain) - 130.500 252.500  
 Military Stars Flight Team (Turkey) - 264.400 279.600  
 Patrouille Suisse Military Flight Team (Switzerland) - 288.850  
 Red Arrows Royal Air Force Flight Team (UK) - 242.200 242.050  
 243.450 253.450

### ❖ Not Just Any Old Scanner Will Do

Some of the handheld scanners currently marketed are *not* suited for air show monitoring. There are certain requirements your air show has to meet in order to successfully monitor the two major military aerial demonstration teams – the Blues and T-Birds.

If you are going to a Thunderbird show you will need a scanner that can monitor the 138-150 MHz military land mobile band in the AM mode. Most of the older Uniden scanners cannot be used for air show monitoring due to their lack of independent transmission mode selection.

You also need a scanner that has the 225-400 MHz military aeronautical band in it. Most of the action (especially the Blues) will be heard in this military UHF portion of the spectrum. Adding this criteria to the mix of possible radios again narrows down our choice for air show scanners even more.

I am frequently asked on the Grove Tech Line which scanner we recommend for air show monitoring. While I don't have a favorite in this regard, I have prepared the list below as a purchase guide for receivers that meet all the requirements outlined above.

Information below includes current Grove stock codes/prices (as of presstime) for the items indicated, but the price does not include shipping or taxes (if applicable). Prices are subject to change without notice, so be sure to call our Grove order department at 800-438-8155 or visit our website at <http://www.grove-ent.com> for current pricing.

Continued on page 85

## Handoff Completed

**T**he aircraft column has been handed off to a new column editor, so an introduction is in order. My name is Iden Rogers and I was probably born a radio nut. I am now retired and still a radio nut. By age seven, with no one's encouragement or assistance, I would dial around for hours at a time on an old floor-standing radio in the corner of my grandmother's living room – just to see what stations I could receive.

Decades ago, when the fictional Dick Tracy wrist radio was still in the comics, the idea of two-way communications without wires excited my imagination. Who knows? Maybe I have some of the shared predisposing "radio genes," since radio pioneer Reginald Fessenden (<http://www.hammondmuseumofradio.org/fessenden.html>) and I have a common ancestor.

By age twelve, I bought my first serious radio, a used Hallicrafters S-20R shortwave receiver, with money I had saved. At age fifteen, I earned my Novice Class amateur radio license and was a regular on 40 and 15 meters CW. I also began monitoring, first in the low band (30-50 MHz) and later, the high band (150-174 MHz) – both by way of tube-type Hallicrafters tunable receivers. Next to follow was the VHF aircraft band (118-136 MHz) with a military surplus BC-639 receiver. Aircraft listening was a fascinating new world compared to "police calls." I was hooked.

### In Order Not to be Drafted

I joined the Air Force to have better educational opportunities and was trained for aircraft electronic countermeasures equipment (radar signal detection and jamming) on EB-57 aircraft, including the high altitude "D" model, a version akin to the U-2 that required pilots to wear pressure suits. I enjoyed working on the planes and being around a variety of other aircraft – with the "Century Series Fighters" being the most thrilling (<http://www.wpafb.af.mil/museum/tours/vt2.htm>).

After four years in the Air Force, I began to monitor military aircraft in the 225-400 MHz band with a military surplus URR-35 receiver. (This band is often called the "UHF aircraft band" or "military aircraft band," though it is also used, to a degree, for other government and military communications.) I lived 50 miles east of Los Angeles at the time, so had nice listening opportunities with the fully-operational March and Norton Air Force bases nearby. Though inland, I could hear some of the Navy and Marine aircraft activity from El Toro MCAS and south to in-

clude the San Diego area.

I had reception in varying degrees from Edwards AFB, when the aircraft were above about 16,000 feet ("flight level one six zero" FL 160). One exciting series of communications catches in 1977 were the Space Shuttle *Enterprise* drop tests before there were any Shuttle launches. The *Enterprise* was never launched but only used for drop tests from a modified Boeing 747 – exciting listening and part of history nevertheless. (<http://www.dfrc.nasa.gov/gallery/photo/ALT/Small/ECN-8923.jpg>)

Like other listeners my age, I progressed from tunable tube receivers through the first multi-channel solid-state crystal receivers, to crystal scanners, to the Bearcat BC-101 and others, to the current crop of scanners of today – wonderful receivers that were beyond our wildest dreams.

### Some Things Missing

In the middle of this progression, I found something missing – a club just for scanner listeners. There were clubs for shortwave listeners, longwave listeners, TV and FM DXers, AM broadcast DXers, but nothing for scanner listeners. I joined with a few others and became a driving force in creating and shaping the Radio Communications Monitoring Association (RCMA). It became a large, successful club for scanner listeners and with a nice monthly publication. Perhaps some of you were members. Bob Grove was even a column editor with RCMA for a time before the emergence of *Monitoring Times*.

To help give legitimacy to the RCMA as a club of dedicated and true radio hobbyists, I went through the process of gaining membership in the Association of North American Radio Clubs (ANARC), a federation of North American radio listening clubs. It took some time and convincing to enter an established world of radio listening hobbyists by us less-well-regarded newcomers, with scanners of all things, but it all came to pass and eventually RCMA became respected and the largest of the ANARC member clubs. ANARC (<http://www.anarc.org/>) still exists though RCMA does not, except in fond memories.

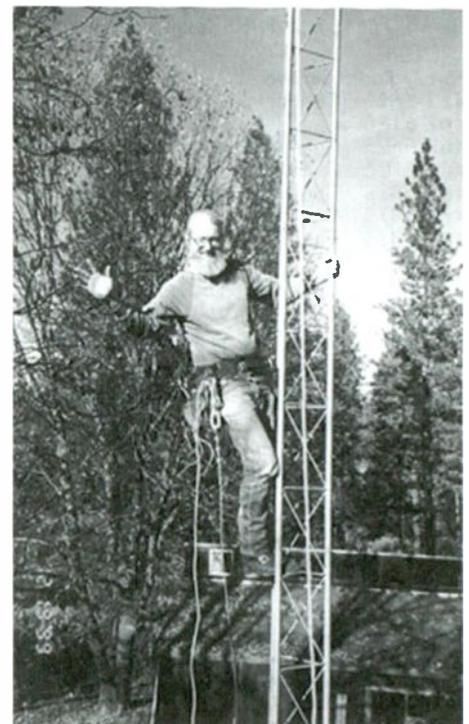
Again, there was something missing. After scanners came into being, none of them included the VHF aircraft band, not to mention the UHF aircraft band. So, being kind of an instigator, I took a survey among RCMA members and asked if they wanted to have aircraft reception capabilities in future scanners and the answer was a definite "yes." Another RCMA "founding fa-

ther." Bob Leef, contacted the prominent scanner manufacturers with our survey results and presented the case for the inclusion of the VHF aircraft band. I would like to think that our efforts influenced the evolution of scanners, since they did begin to include the aircraft band soon after. Later, the UHF aircraft band was, and still is, included many scanner models.

### ◆ Getting It Together

A good part of the fun of aircraft communications listening is in learning about what is going on in the skies and on the ground as it applies generally to any area, then applying it more specifically within your own unique geographic listening environment as you listen in real time.

Each area is unique, with its own airports – some with control towers and some without, its own area-specific Air Traffic Control (ATC) and overhead flight paths, its terrain and weather peculiarities, runway numbers, radio frequencies, visual landmarks which you will hear mentioned on the radio, published approaches and departures by name, automated broadcasts, five-letter airspace fixes, and more.



*"Improving my own radio setup and my tower-mounted scanner antennas is an on-going process," says veteran hobbyist Iden Rogers.*

## Unscrambling the Puzzle

Aircraft listening is like a puzzle of sorts and one you can take to any level. The more pieces you fit together, the more enjoyment you will find in listening. At the same time, you will gain satisfaction during the process of mastering it, similar to mastering a video game. Be careful, though: you can get hooked.

Unlike public safety vehicles on the roadways, airborne aircraft – private, commercial, and military, move in three dimensions – often at hundreds of miles per hour. Thousands upon thousands of lives are at stake every day. At peak traffic periods in metro areas, it is fast-paced and complex. There is little room for error or for misunderstood communication exchanges.

Listening to an Approach Controller at any of the country's major airports at rush hour is something to behold – a magnificent orchestration. He or she is figuring out what to do with all these aircraft second by second. Our challenge is to understand what he is saying and what the aircraft are doing.

Fortunately, all the info available to pilots and much of the info available to air traffic controllers is also available to us as listeners. In fact, there is so much information that it can become a daunting, but interesting challenge to find what applies most directly to our hobby. Developing your detective and Internet searching skills can be a plus.

## Understanding the Lingo

What air traffic controllers and pilots say to each other is rather precise and carefully worded; in fact, it is standardized. It must be, in order to convey the needed information quickly, precisely, and unambiguously. The *Pilot/Controller Glossary (PCG)* can be a big help: <http://www2.faa.gov/atpubs/PCG/index.htm>. When you hear words and phrases from air traffic controllers that you don't understand, take a moment and look them up. Little-by-little, they will become part of your listening vocabulary.

If you are a more advanced listener or simply want "to read ahead," you might want to start becoming familiar with the *Aeronautical Information Manual (AIM) - Official Guide to Basic Flight Information and ATC Procedures*: <http://www1.faa.gov/atpubs/AIM/index.htm>. And next up, you may want to look through *Order 7110.65N Air Traffic Control* or at least be aware of its existence: <http://www2.faa.gov/atpubs/ATC/index.htm>. It is the air traffic controller's official handbook.

## Assigned Frequencies

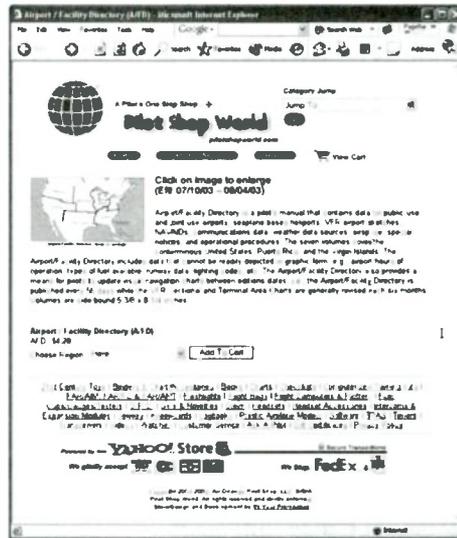
Needless to say, it is essential to find and program into your scanner the frequencies that will give you the full picture of aircraft activity in your area. A good place to start is AirNav: <http://www.airnav.com/airports/>. You can begin by selecting known airports in your listening radius or you can click on "Browse by U.S. State" to discover all the airports in your area, some of which may be unknown to you. Each airport listing will give the frequencies at the airport and those for Approach / Departure Controls.

For those who would like a printed guide, there is a good one that gives information similar to AirNav – the *Airport / Facility Directory*

(A/FD). It contains "data on public use and joint use airports, seaplane bases heliports, VFR airport sketches, NAVAIDs, communications data, weather data sources, airspace, special notices, and operational procedures."

The A/FD does not include UHF frequencies but it does include Air Route Traffic Control Center (ARTCC) frequencies which are necessary for complete frequency coverage. There are seven volumes, each for a part of the U.S. at \$4.20 each. To see which volume you want, go to [http://avn.faa.gov/content/naco/images/AFD\\_Index.gif](http://avn.faa.gov/content/naco/images/AFD_Index.gif). One among many retailers who carry the A/FD is: <http://store.pilotshopworld.com/airfacdirafd1.html>. A small airport near you may also carry them, or you can order them from the government; see below.

And, for the more advanced listener, or one who wants VHF and UHF frequencies for U.S. military airbases and ARTCC frequencies, the *IFR Supplement U.S.* is a must, and it's a deal at \$7.25. Civilian airports that have no military utility value are not included, but that doesn't matter if you also use AirNav or the



## A/FD.

For ordering info, go to <http://avn.faa.gov/index.asp?xml=naco/prices> and click on "NGA Aeronautical Price List . . . . PDF" for the *IFR Supplement U.S.* and see page 2, one third of the way down the first column. For the A/FD, instead click on "NACO Aeronautical Price List . . . . PDF." In both cases, you will note other items you may want to learn about and consider at some point.

## Frequency Allocations

A frequency allocation is a designation for the specific use of a given frequency. Users are then assigned to appropriate frequencies among the many allocations. It can be helpful to have references to frequencies by allocation, such as when programming a search range into your scanner. Take a look at the allocations list *National Civilian Aeronautical Band Assignments* By Larry Van Horn, Assistant Editor, *Monitoring Times* at: <http://www.monitoringtimes.com/html/mteivair.html>.

To see how all the frequency bands (blocks of similarly allocated frequencies) fit together,

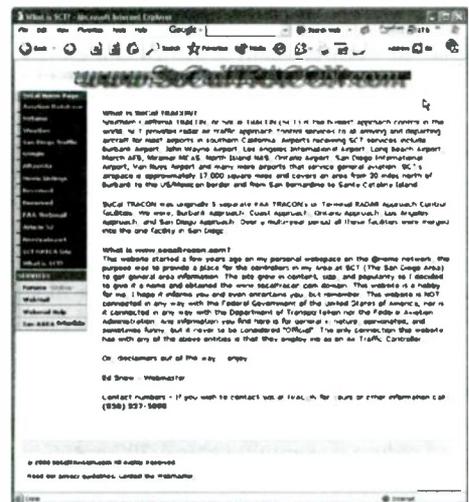
with the aircraft bands among them, see the *US Frequency Allocation Chart* at: <http://www.ntia.doc.gov/osmhome/allochrt.html>. It can be saved to disk as a PDF file and referred to at any time via your computer or ordered as a large wall chart – informative and great looking on the radio shack wall.

For advanced listeners, info nuts, and compulsive devourers of fine print, the *Code of Federal Regulations (CFR) Title 47, Part 87 Aviation Services* can be informative and includes all the frequency allocations. *Part 87* and many aircraft-related topics can be found with the outstanding search engine: <http://www.google.com/>

Give the above monitoring ideas a try and explore the Internet sites. Don't forget to write down what you hear and where you hear it for later reference. Good note-taking in this hobby is very important.

## ◆ The Aircraft Column

Though never a pilot nor an air traffic controller, I look forward to sharing my knowledge and listening experience with you. I have had opportunities to visit the Los Angeles Air Route Traffic Control Center (ARTCC) and the Ontario Terminal Radar Approach Control facility (TRACON), now part of SoCal TRACON (<http://www.socaltracon.com/WhatsSCT.php>), plus several control towers. Also, I, as many of you, have spent hours watching aircraft at large and at small airports and military bases – sadly, not such a good idea during these post 9-11 days. Improving my own radio setup and my tower-mounted scanner antennas is an ongoing process which also contributes information and knowledge to pass on.



I intend for this column to be informative and enjoyable over a broad range of civilian aircraft communications-related topics. We'll keep it simple enough for beginners but include things for more advanced listeners. Suggestions for future column topics are welcome, as are Internet links to sites that you find valuable to the hobby. I look forward to hearing what you enjoy most about listening in the 118-137 MHz band and on the HF (shortwave) transoceanic frequencies. Email is welcome or snail mail sent in care of *Monitoring Times*.

## Mailbag

**W**e've got a big stack of mail this month. (Okay, it's email, so it doesn't stack very high, but there's still plenty of it!)

### ◆ Power versus Height

We'll start in Lexington, Kentucky, with Timothy Kuryla. Timothy writes, "...when I once perused the *Broadcasting Yearbooks* in the 1970s, I noticed the New York City FM stations had rather puny powers. Nothing in the 50 or 100 kW range." He's right; with two exceptions, the most powerful FM station in NYC is WCBS-FM with 6,800 watts.

The FCC has established a power limit of 50,000 watts for AM stations. The same limit applies to FM in what they call "Zone I" (very roughly, the area northeast of the southwestern corner of Illinois). However, on FM power isn't the only determining factor for coverage. Antenna height is also critical. So, along with the 50,000-watt power limit, FM also carries a tower height limit. In Zone I, this limit is 150 meters or 492 feet.

In some cities – notably New York and Chicago – there are many buildings far taller than 150 meters. Any station with a lower antenna would suffer severe multipath interference, as their signals bounce off the buildings. The only really sensible place for FM transmitting antennas in these cities is atop the tallest skyscrapers.

The FCC allows stations to "violate" the 150-meter limit, provided power is reduced to compensate. For example, eight NYC stations are allowed to share a 415-meter-high antenna on the Empire State Building; in return, they're required to reduce power from 50,000 watts to 6,000. In Chicago, a number of stations share an antenna at 425 meters atop the Sears Tower, and must reduce power to roughly 5,700 watts.

(Television stations are similarly limited, though the limit is 300 meters in the Northeast; 600 meters for UHF. In the area outside Zone I, FM stations are limited to 100,000 watts at 600 meters, roughly 2,000 feet. For example, Albuquerque FM stations, atop Sandia Crest at roughly 1,260 meters, are limited to roughly 22,000 watts.)

### ◆ Promises as Empty as Air

Timothy also saw the ad for the "XiumAir Dish Type Antenna" on <http://www.goxium.com>. This \$129.95 antenna looks like a small microwave dish – the size is difficult to tell from the photo in the ad but

it looks like a foot or two in diameter. It looks like one of the 2 GHz microwave antennas used for "wireless cable" in the early 1990s. They claim it "works in conjunction with satellite systems" and contains "Patented Siplateral Technology." (The spelling error isn't mine!)

He asks, "how can such an antenna work?" My best guess is that it doesn't! In general, a dish antenna must be several wavelengths in diameter to behave like a dish. At 200 MHz (TV channel 11), a wavelength is 1.5 meters or about 5 feet. This Xium antenna is way too small to behave like a dish at channel 11. For FM radio and lower TV channels, it's even worse. If you live near a TV station, you can probably receive it on this antenna. A few feet of telephone wire will probably work just as well, and costs a lot less than \$130! There are a lot of, shall we say, *strange* TV antenna designs out there.

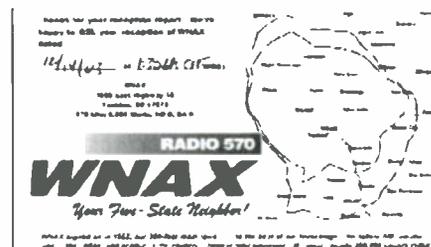
### ◆ Unusual Reception

James Maharg on the outskirts of Chicago reports some international DX. Using a Sony ICF-2010 and loop antenna, for several days in mid-December James was able to hear Radio Cadena Nacional from Colombia on 760 kHz, underneath Detroit's WJR. The station could be heard throughout the night, but seemed best around 1000UTC. James' best guess is he was hearing the Barranquilla outlet.

Ron Van Sant WA0JEN in the Quad Cities heard an unusual signal early December 28<sup>th</sup>. On 1640 kHz around 0623 UTC, he heard a repeated recording "CBS Radio Network Channel 42," followed by several seconds of tone. It was about S7 in eastern Iowa.

It would appear someone (probably a computer!) was asleep at the switch – failing to switch sources when the CBS News ended and carrying the "marker" CBS feeds between newscasts. My best guess is this was KMMZ Enid, Oklahoma, first reported by our own Glenn Hauser and QSLed by Patrick Griffith. The other stations on 1640 are a business-talk outlet near San Francisco; a religious station in Portland, Oregon; a Spanish-language station in Salt Lake City; and Radio Disney in Milwaukee. I don't believe any of these other stations would be likely to be carrying any CBS programs. (Though you can't rule out the possibility someone selected the wrong channel on their satellite receiver!)

Patrick Griffith has received two new QSLs. WGN-720 verified for a test on the morning of December 1<sup>st</sup>; the card came via



Patrick Griffith's QSL from WNAX-570

James Carollo, DE, 435 N. Michigan Ave., Chicago 60611. The QSL pictured here came from WNAX-570 Yankton, South Dakota. (David Onsted, GM, 1609 E. Highway 50, Yankton SD 57078) WNAX believes the 960-foot tower they use for non-directional daytime operation is the tallest in use by an AM station in the USA, and they believe their 250,000-square-mile daytime coverage area is the largest of any U.S. station. They're probably right!

### ◆ Bits and Pieces

**Frequency shifts and changes:** There's another new expanded-band station on the air. WFNA-1660 is in Charlotte, North Carolina, and runs a sports format. WFNA took over one of the towers of co-owned WGIV-1600's antenna; as a result, WGIV is now silent.

Another station isn't new to the air but has made a major frequency change: WKTW-1530 near Pittsburgh has moved to 770 kHz. They've actually *reduced* power slightly, but the lower dial position will greatly improve coverage. WKTW is a daytime-only station – try for them near sunrise and sunset.

Reports suggest CFAV-1570 Laval (Montreal), Quebec, is testing. 1570 has been a rather clear frequency in the East since the three dominant stations in Canada (CFOR, CHLO, and CKLM) went off the air. CFAV will be a French-language nostalgia station – and will probably be widely heard once routine nighttime broadcasts begin.

**Beverage URL:** Beverage antennas are generally acknowledged as the most effective type for AM broadcast DXing. Glenn Swanson KB1GW has posted a new web page devoted to these antennas. Check out <http://members.cox.net/kb1gw/bev-page.htm>.

Write me at 7540 Highway 64 West, Brasstown NC 28902-0098, or by email to [dougsmith@monitoringtimes.com](mailto:dougsmith@monitoringtimes.com). Good DX!

## Unusual Unlicensed BC QSLs

Perhaps we can tell that April Fool's Day will be coming up pretty soon, since bizarre and unusual QSLs have been frequent topics of discussion among DXers this winter. A topic like that is certainly fodder for the *Monitoring Times Outer Limits* column.

Harald Kuhl checks in with an unusual clandestine QSL that he received from the German Department of RAE Buenos Aires for an RAE sideband feeder transmission from Cable and Wireless Port Stanley during the Falklands/Malvinas War. He got this one despite the fact that he did not hear the actual Falkland Islands Broadcasting service on shortwave, but instead heard only the utility feeder broadcast. Congratulations on this one go to Harald.

The most unusual pirate QSL of all time clearly goes to **Spam Radio**, a legendary pornographic photo in extremely poor taste. The graphic nature of this QSL sheet was so extreme that we can't really discuss it in the pages of a family magazine distributed through the US mail.

Your editor's own most unusual QSL was the sheet that I received from the FCC itself, for their bust announcement on the occasion of the shutdown of pirate station **WHBH**. A copy of this highly unusual QSL is posted at <http://www.nacs.net/~georgez/WHBH.JPG> on the internet.

Do any of our readers have nominations for any other unusual QSLs for unlicensed broadcasting stations?

### ◆ Iraq Clandestine Shuffle

One of the little noted impacts of the war in Iraq has been a major shuffle among the various clandestine stations that have been broadcasting toward that country. Martin Schoech's outstanding *Clandestine Radio Watch* newsletter, citing information from the BBC Monitoring Service, notes that one of these changes has been the near-demise of the anti-Iran **Voice of the Mojahed** clandestine. Many have presumed that these transmissions were facilitated by Saddam Hussein's government, thus accounting for some of their erratic behavior lately. BBCMS further reports that the "Vision of Resistance TV" (*Sima-ye Moqavemat*) television station has now appeared on the same satellite frequency that was formerly used by the Mojahed clandestine.

Given the continuing conflict in Iraq, additional shakeups in the middle eastern clandestine broadcasting scene are virtually certain. If you would like to check out the web site of **Voice of the Mojahed**, <http://www.iran.mojahedin.org/> is the place to go on the internet. The People's Mojahedin of Iran web site is in Arabic, just like

the programming on many Middle Eastern clandestine stations.

### ◆ Pirate Radio at Fest

The time of year has arrived when we have to discuss the Winter Shortwave Listening Festival. It remains the largest annual gathering of radio monitoring hobbyists in the world. This year's gala 14<sup>th</sup> annual Fest is scheduled for March 12 and 13, 2004 in Kulpsville, PA, at the Best Western "The Inn at Towamencin" near Philadelphia. Detailed information is available at the new Fest web site found at <http://swlfest.com/> or via snail mail for an SASE at SWL Winterfest, PO Box 4153, Clifton Park, NY 12065.

This event covers all aspects of radio monitoring, not just pirate radio. But, there always is intensive interest in unlicensed broadcasting at the Fest, including an annual Forum discussion. Hundreds of DXers from all over the world are making plans to attend the Fest once again this year. Several *MT* staff will be among them, and we hope to meet you there!

### ◆ New Europirate Address

Courtesy of Martin Schoech, we now know that the SRS Germany Europirate maildrop sports a new address. The address is: SRS Deutschland, - station name - Postfach 101145, 99801 Eisenach, Deutschland. A number of European pirate stations, including **Crazy Wave Radio**, utilize this address. Return postage, normally \$2 US cash, is required for reports to this address.

### ◆ Florida/Pennsylvania Pirates

Historically, the state of Florida has been a hotbed of FM pirate and shortwave clandestine broadcasting. If you would like to keep up on the latest trends in this phenomenon, Terry Kreuger's outstanding web site at <http://home.earthlink.net/~tocobagadx/flortis.html> on the internet is well worth checking out.

Meanwhile, the well known W9Y1 amateur radio information resource reports that a Hispanic FM pirate has been very widely reported in Philadelphia and New Jersey, apparently running fairly high power on 95.3 MHz.

### ◆ What We Are Hearing

Our readers heard all of these North American pirate broadcasters this month, with apparently somewhat reduced volumes of shortwave pirate broadcasting lately. All pirates operate on a sporadic schedule, but shortwave pirate broadcasting increases noticeably on weekends, and during major holiday periods. You have to tune

your dial up and down through the pirate radio band to find the stations, but the new main North American pirate frequency of 6925 kHz, plus or minus 30 or 40 kHz is the place to scan for the pirates. The old 6955 and 6950 kHz frequencies are increasingly abandoned by pirates because of interference from licensed stations, but there are occasional broadcasts there.

**Border Radio**- The sly comedy on Static Phil's new pirate includes a "Mean Farmer Show" segment. (None announced)

**Grasscutter Radio**- Rock music and pirate radio issues always dominate their shows. (Uses [grasscutterrado@yahoo.com](mailto:grasscutterrado@yahoo.com) e-mail)

**KIPM**- Alan Maxwell's existentialism dramas remain the most complex literary fare on shortwave radio today, either licensed stations or pirates. Their elaborate web site at <http://homepage.mac.com/kipm/Menu5.html> is well worth a look. (Elkhorn)

**Oxycontin Radio**- The drug comedy and music on this station predated Rush Limbaugh. (None announced lately)

**Purple Nucleus of Creation**- Complex psychedelic rock compositions are the main fare here. (Elkhorn)

**Radio Free Speech**- Bill O. Rights has returned. His shows mix rock and comedy segments, but his primary ideology is the promotion of individual freedom. (Blue Ridge Summit)

**Radio Pigmeat International**- Their entertaining station name is a cover for programming that features mostly classic rock music. (Belfast)

**Radio Piraña International**- This well known South American pirate survived two disasters in late 1993. Their operator survived a serious automobile accident, and their transmitter went on the fritz. They say that they will still be active around 6300 kHz variable, at times. (Santiago)

**Radio Xanax**- Somebody dusted off an old tape of this classic pirate over the holidays. We see the old QSL here for "The Relaxation Station." (Try Blue Ridge Summit)



**Ragnar Radio**- Although this one is normally a rock music station, your editor is hearing them as he types this column in a QSO two-way conversation with **Border Radio** and **Grasscutter Radio**. They have been QSLing. (Uses [rangarradio@yahoo.com](mailto:rangarradio@yahoo.com) e-mail)

**Sunshine Radio**- There is some question about whether the announcer on this one is a female or a younger male. The format remains rock music with ID announcements in a heavy south-

## Telesat Canada Anik E1

### C-Band - 109.2 degrees West longitude

1A(H)	3720
1B(V)	3740
2A(H)	3760
2B(V)	780
3A(H)	3800
3B(V)	3820
4A(H)	3840
4B(V)	3860
5A(H)	3880
5B(V)	3900
6A(H)	3920
6B(V)	3940
7A(H)	3960
7B(V)	3980
8A(H)	4000
8B(V)	4020
9A(H)	4040
9B(V)	4060
10A(H)	4080
10B(V)	4100
11A(H)	4120
11B(V)	4140
12A(H)	4160
12B(V)	4180

No video observed after Anik E1 moved here from the 118.7 degrees West longitude orbital location.

## Telesat Canada Anik E1

### Ku-Band - 109.2 degrees West longitude

T01(V)	11717
T02(V)	11743
T03(V)	11778
T04(V)	11804
T05(V)	11839
T06(V)	11865
T07(V)	11900
T08(V)	11926
T09(V)	11961
T10(V)	11987
T11(V)	12022
T12(V)	12048
T13(V)	12083
T14(V)	12109
T15(V)	12144
T16(V)	12170
T17(H)	11730
T18(H)	11756
T19(H)	11791
T20(H)	11817
T21(H)	11852
T22(H)	11878
T23(H)	11913
T24(H)	11939
T25(H)	11974
T26(H)	12000
T27(H)	12035
T28(H)	12061
T29(H)	12096
T30(H)	12122
T31(H)	12157
T32(H)	12183

No video observed after Anik E1 moved here from the 118.7 degrees West longitude orbital location.

## Telesat Canada Anik E2R

### C-Band - 111.1 degrees West longitude

1A(H)	3720	(none)
1B(V)	3740	Occasional video
2A(H)	3760	Data Transmissions
2B(V)	3780	Data Transmissions
3A(H)	3800	Data Transmissions
3B(V)	3820	Occasional video
4A(H)	3840	Data Transmissions
4B(V)	3860	Telesat Canada services (digital) Meteo Media

5A(H)	3880	Data Transmissions
5B(V)	3900	Occasional video
6A(H)	3920	Occasional video
6B(V)	3940	Occasional video
7A(H)	3960	Occasional video
7B(V)	3980	Occasional video
8A(H)	4000	Occasional video
8B(V)	4020	Occasional video
9A(H)	4040	Data Transmissions
9B(V)	4060	Occasional video
10A(H)	4080	Data Transmissions
10B(V)	4100	Data Transmissions
11A(H)	4120	Data Transmissions / Analog SCPC audio services 1036.70 63.3 Wal-Mart In-Store Network (Canada) 1037.00 63.0 Wal-Mart In-Store Network (Canada) 1037.50 62.5 Wal-Mart In-Store Network (Canada)
11B(V)	4140	Data Transmissions
12A(H)	4160	Data Transmissions
12B(V)	4180	Occasional video

## Telesat Canada Anik E2R

### Ku-Band - 111.1 degrees West longitude

T01(H)	11720	Data Transmissions
T02(V)	11750	Data Transmissions
T03(H)	11750	Data Transmissions
T04(H)	11780	Data Transmissions
T05(V)	11810	Data Transmissions
T06(H)	11810	Data Transmissions
T07(H)	11840	Data Transmissions
T08(V)	11870	Data Transmissions
T09(H)	11870	Star Choice DBS (digital)
T10(H)	11900	Occasional video
T11(V)	11930	Data Transmissions
T12(H)	11930	Occasional video
T13(H)	11960	Star Choice DBS (digital)
T14(V)	11990	Star Choice DBS (digital)
T15(H)	11990	Star Choice DBS (digital)
T16(H)	12020	Star Choice DBS (digital)
T17(V)	12050	Star Choice DBS (digital)
T18(H)	12050	Star Choice DBS (digital)
T19(H)	12080	Star Choice DBS (digital)
T20(V)	12110	Occasional video
T21(H)	12110	Star Choice DBS (digital)
T22(H)	12140	Star Choice DBS (digital)
T23(V)	12170	Saskatchewan CommunicataNetwork (SCN) (digital)
T24(H)	12170	Star Choice DBS (digital)

## Satelites Mexicanos Solidaridad 2

### C-Band - 113 degrees West longitude

1N(V)	3720	PCTV - Television Por Cable (digital)
1W/L(H)	3740	Data Transmissions
2N(V)	3760	Data Transmissions / XEWH-TV Hermosillo (digital) / Radio Sonora (digital) / TvSat (digital)
1W/U(H)	3780	Data Transmissions / TeleMichoacan (digital) / Radio Michoacan (digital) Edusat (digital)
3N(V)	3800	Data Transmissions
2W/L(H)	3820	Data Transmissions / XHGV-TV Veracruz (digital) / Television Tabasquena (digital)
4N(V)	3840	Data Transmissions / XHIMT-TV TV Azteca (digital) / Television Mexiquense (digital) / Radio Mexiquense (digital)
5N(V)	3880	(none)

3W/L(H)	3900	Data Transmissions / Central TV (digi- tal)
6N(V)	3920	Television Mundo Maya (digital)
3W/U(H)	3940	Data Transmissions
7N(H)	3960	(none)
4W/L(H)	3980	Data Transmissions
8N(V)	4000	Data Transmissions
4W/U(H)	4020	Data Transmissions
9N(V)	4040	MVS Television Empresarial (digital)
5W/L(H)	4060	Data Transmissions
10N(V)	4080	Data Transmissions
5W/U(H)	4100	Data Transmissions / XHRCG-TV Saltillo (digital)
11N(V)	4120	(none)
6W/L(U)	4140	(none)
12N(V)	4160	Data Transmissions
6W/U(H)	4180	Data Transmissions / Hidalgo Televi- sion (digital) / Radio Hidalgo (digital) / TV Nuevo Leon (digital)

## Satelites Mexicanos Solidaridad 2

### Ku-band - 113 degrees West longitude

T01(H)	11730	(none)
T02(H)	11791	Data Transmissions
T03(H)	11852	(none)
T04(H)	11913	(none)
T05(H)	11974	Data Transmissions
T06(H)	12035	(none)
T07(H)	12096	Data Transmissions
T08(H)	12157	Data Transmissions
T09(V)	11743	Data Transmissions
T10(V)	11804	Data Transmissions
T11(V)	11865	Data Transmissions
T12(V)	11926	Data Transmissions
T13(V)	11987	Data Transmissions
T14(V)	12048	Data Transmissions
T15(V)	12109	(none)
T16(V)	12170	Data Transmissions

## Satelites Mexicanos Morelos 2

### C-Band - 114.8 degrees West longitude

1W/L(H)	3720
1N(V)	3740
1W/U(H)	3760
2N(V)	3780
2W/L(H)	3800
3N(V)	3820
2W/U(H)	3840
4N(V)	3860
3W/L(H)	3880
5N(V)	3900
3W/U(H)	3920
6N(V)	3940
4W/L(H)	3960
7N(V)	3980
4W/U(H)	4000
8N(V)	4020
5W/L(H)	4040
9N(V)	4060
5W/U(H)	4080
10N(V)	4100
6W/L(H)	4120
11N(V)	4140
6W/U(H)	4160
12N(V)	4180

This satellite operates in an inclined orbit. No activity has been observed.

## Satelites Mexicanos Morelos 2

### Ku-Band - 114.8 degrees West longitude

T01K(H)	11764
T02K(H)	11888
T03K(H)	12012
T04K(H)	12136

This satellite operates in an inclined orbit. No activity has been observed.

## Congratulations, LWCA!

**C**ongratulations to the Longwave Club of America (LWCA) on 30 years of service! In January 1974, a small but enthusiastic group of experimenters (mostly from the West Coast) started the club to promote listening on the frequencies below 550 kHz. From this small start, the club has grown to over 500 members and continues to publish the *Lowdown*, its monthly journal. The journal is the "glue" that holds the club together and is today the foremost publication for longwave news, loggings and technical topics for North American operators.

The first issue of the *Lowdown* was printed



The **LOWDOWN**  
Published By The  
LONGWAVE CLUB OF AMERICA  
Box 33188, Granada Hills, CA 91344 USA

Vol. 1 #1 Page 1 January, 1974

Published by the Long Wave Club of America to promote listening below 550 kHz. Bulletins are monthly and deadlines are the third Saturday of each month.

EDITOR: Jeff Brasier, 10341 Shirley St., Northridge, CA 91324.  
PUBLISHER: Don Erickson, 6059 Essex St., Riverside, CA 92504.  
PRESIDENT: John Clements, 11625 Albers St., #5, North Hollywood, CA 91601.

**Masthead from the first Lowdown journal, January 1974. For current information on the LWCA, including membership details, please visit <http://www.lwca.org>.**

in a standard 8.5" x 11" format and was just two sheets long. The page count grew steadily over the years and in the early 1980s it took on the now familiar 8.5" x 5.5" booklet format. I was very fortunate to receive a large number of back issues of the *Lowdown* from *MT* reader Martin Linke (IL), who was an early subscriber. Looking through these back issues gives an interesting view into how the club began and the enthusiasm of its pioneering members.

The February 1974 issue (#2) mentions a project that was underway to document aircraft beacons on the longwave band. Amazingly, computers were already being used for this work. Those familiar with computer history know that it wasn't until the late 1970s that desktop computers became generally available to individual users, and it wasn't until the early 1980s that they were commonly used for publishing applications. This early use of computers may be explained by the group's proximity to the "Silicon Valley."

Not everything was computerized in those early days, however. The September-October 1981 issue, for example, admonishes contributing editors to "keep the typewriter keys clean and use a good dark black ribbon!"

At this milestone of 30 years, we certainly owe a debt of gratitude to the founders of the LWCA and to those who have carried on the work over the years. While relatively few of the founders

and early members are with us today, their efforts are reflected in the large pool of information that we have available and in the advancements made in weak-signal reception and license-free "Lowfer" operation. I would like to offer my personal thanks to those pioneering members who made the LWCA what it is today.

Below is a list of the Charter Members of the club, as recorded in Volume 1, #1 of the *Lowdown*, January 1974. It is perhaps fitting that the one Charter Member who was *not* from the West Coast was from North Carolina – the birthplace and current home of *Monitoring Times* Magazine. Oh, and I almost missed it... a few years later, the September-October '81 issue reports a brand new member to the LWCA – Robert B. Grove, of Brasstown, NC!

### LWCA Charter Members

Louis A and Elinor F. Leistner (CA)  
Clinton E Tatro (CA)  
Walter K. Raes (CA)  
Dick Nelson (CA)  
Spence Naylor (CA)  
Stewart MacKenzie (CA)  
George McKay, Jr. (CA)  
Helmut K. Silge (CA)  
John Lauerman (WA)  
Greg Hardison (CA)  
Don Erickson (CA)  
Greg Allison (NC)  
Jeff Brasier (CA)  
John Clements (CA)

### Over to You

Speaking of history, I'd like to hear from *you* on how you got started in the longwave hobby. Many articles have appeared over the years on how people got started in radio, and I never tire of reading them. It occurred to me, however, that many folks undergo a "second epiphany" when they discover a part of the spectrum that is especially dear to them. Why not share the story of how you became interested in longwave and some of your favorite first moments in the hobby?

Your story needn't be long or fancy; just jot down the highlights of your first steps into longwave, and I'll take it from there. I'll share these stories as space allows, in future editions of *Below 500 kHz*. Who knows, it may be your experience that inspires someone else to check out the LF band for the first time.

### Out-of-Range

Although not technically longwave-related, an interesting news item on beacons appeared in the *Democrat & Chronicle Newspaper* (Rochester, NY). The November 30<sup>th</sup>, 2003, edition car-

ried a story about the first rescue in the contiguous United States using a Personal Locator Beacon (PLB). A lone hiker in the Adirondack Mountains activated his 406 MHz beacon to summon aid through the Satellite Alerting system, and a U.S. Army helicopter appeared a short time later.

PLBs are now approved by the FCC for use in the Lower 48, following extensive tests in Alaska. They range in cost from \$400 to \$1,000, according to the article. More info on PLBs can be found at <http://www.equipped.com/>.

### Winter SWL Festival

Ham radio has Dayton; we have Kulpville! The 17<sup>th</sup> annual *Winter SWL Festival* will be held March 12 - 13 in Kulpville, PA (near Philadelphia) at the Best Western Inn at Towamencin. This event has become the premier gathering for radio listeners in North America, and often features excellent programs on Longwave and Mediumwave DXing.

Attending the Fest is a great way to learn more about your hobby, meet fellow DXers, and see the latest gear that's available. The camaraderie at Kulpville is hard to describe, but I can tell you that after 25+ years of listening, my enthusiasm for the hobby was recharged after a visit to Kulpville in the late 1990s. For complete information on the SWL Fest, please visit <http://www.swlfest.com/>.

I will be presenting a program on Longwave Radio at this year's show. I look forward to meeting as many *Below 500 kHz* readers as possible. Drop me a line if you plan to go, and feel free to bring along your best loggings/QSLs for this forum. For complete information on the SWL Fest, please visit <http://www.swlfest.com/>.

73 and best LW DX.

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## The Rarest of DX

I've always been an "Accidental DXer." I've earned my DXCC but it took me something like 24 years to achieve it. I've been a bit more diligent in trying for QRP DXCC with about 75 verified countries in four years. In that rather meager effort, I only have an *Honor Roll* total of around 117 countries – well less than half of the potential DX targets over the horizon. I just have too much fun ragchewing to get all sweaty-palmed about DX pileups and such.

But for a good chunk of the amateur radio population, chasing DX is the be-all and end-all of the ham hobby experience. Even in the world of dedicated DX chasers with the best equipment they can afford and years of operating skill and savvy, there remain a handful of DXCC entities that seem to stay almost perpetually out of reach of even the most rabid DXer. There are always a few countries/entities that either have no active hams or who make it impossible for outsiders to come in and set up a station.

I can still remember the rush of excitement some years ago when China, long without ham activity, came back into the radio hobby world with the activation of BY1. Almost overnight they went from being the rarest of DX to an almost common DX contact. (Okay, I *still* don't have a China QSL card, but that is my laziness not the Chinese ham community's lack of effort.)

The list of the rarest of the rare, the top 10 tough contacts, as polled by various DX clubs and organizations, has remained fairly stable for a number of years. However, recent events in the world have caused a bit of

a shift in matters. Three of the all-time toughies have now moved down the list. Also, at any given time, there are hams worldwide who are chasing the challenge of further upsetting the list with activity from these rarest of the rare DX sites. Let's take a look at the lay of the land in the current top ten. But first, let's see how those three stations moved down the wish list recently.

### ◆ VP6D Ducie Island

Ducie Island was the hottest commodity to come along in ham radio in a long time. Ducie Island is a small uninhabited island in the Pitcairn group – Pitcairn Island being made famous by the story of the *Mutiny on the Bounty* but known also to hams for the operating activities of *Bounty* crew descendant Tom Christian VP6TC. Anyway, in late 2001 a determination was made that Ducie Island qualified as that rarest of all things, a brand new DXCC entity.

Think of it – all those Honor Roll folks who "worked 'em all" had to dust off their equipment for one more go. Once the word was given that Ducie was legal, it was quickly activated by the VP6DI DXpedition to the tune of over 40,000 QSOs! Consequently, Ducie Island slipped out of the number one most wanted slot rather rapidly and it is likely to stay in the realm of the merely difficult but not impossible DX destinations.

### ◆ P5 North Korea

A glance at the headlines will give you dozens of reasons why North Korea might not be the most ham friendly country in the world. As a matter of fact, until Ducie Island came along, it held the number one hard-to-get QSO spot for many years. The Democratic Peoples Republic of North Korea's government is just not in the habit of letting anyone from their country play radio, let alone anyone visiting their country. Operation from North Korea was closer to non-existent than it was to rare.

But then a funny thing happened in November 2001. Ed, 4L4FN, a Georgian citizen employed by the United Nations World Food Program, became active as P5/4L4FN in Pyongyang. He continued to operate for al-

most a year, logging over 16,000 QSOs and making a lot of hams very happy. Just as suddenly as he came on the air, in November 2002 representatives of the DPRK government came to his shack and told him to cease operating and dismantled his station.

Ed's operation as P5/4L4FN moved North Korea out of the top ten tough entities for now, but unless there are significant changes in the political mood towards the outside world in North Korea, it's a fairly safe bet that P5 will work its way back up the list to number one once again.

### ◆ VP8SA South Sandwich Islands

The South Sandwich Islands are about 1000 clicks east of the Falkland Islands. They are administered by the United Kingdom. The Islands are uninhabited except for scientists from the British Antarctic Survey. With no population to speak of and being essentially on the edges of the Antarctic, it's little wonder that this DX entity was "number six with a bullet" on the hard-to-get list for a long time. But recent activity, largely thanks to Carl G4VFU, has given a lot of hams the opportunity to put this one in the book.

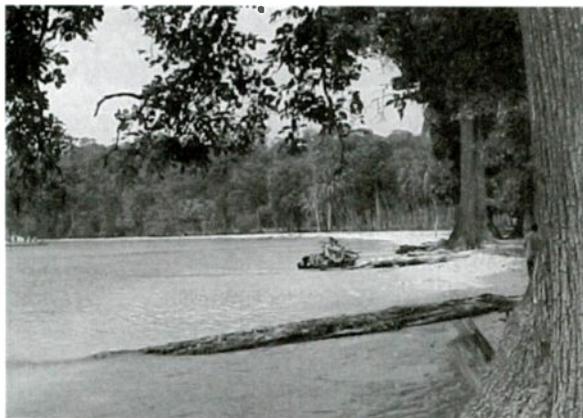
### ◆ Today's Top Ten

These three entities that dropped from the top ten most-wanted places reflect the basic reasons why entities move around on the lists over time: politics, population (or more accurately, lack thereof) and rule changes. Now let's take a look at what many folks consider to be the current top ten tough-to-get DXCC entities and see where there is (or isn't) cause to get our hopes up to fill out the full Honor Roll list.

### VU4 ANDAMAN & NICOBAR ISLANDS VU7 LACCADIVE (LAKSHDEEP) ISLANDS

Many DX groups see VU4 as the current number one hard to get QSO and list VU7 as the third hardest. I am not entirely clear as to why they are separated on the list, because both these DXCC entities are under the same restrictions. Both are islands belonging to the nation of India, a country with an active amateur radio population.

However, the Indian government ruled that only amateurs who were citizens living on those islands could operate under the VU4 and VU7 callsigns (effectively barring



Andaman Island is a prime Tourist destination but do not plan to bring any ham gear with you on your trip.

DXpedition activity). Since there were no hams and no one seeking licensure, there was no activity. More recently, in 1992, the Indian government went on to rule that they would no longer issue *any* call signs in the VU4/VU7 grouping, in essence, banning ham radio from the Andaman, Nicobar and Laccadive (Lakshdeep) Islands.

Another complication seems to be that the Indian government is very frustrated by attempts to get permission to operate from these islands. This is kind of ironic, because they widely advertise the islands as excellent tourist destinations. What better way to get folks to come over and spend their hard currency than to let some hams show up from time to time and rack up a few thousand QSOs? There have been a number of stations claiming to have operated as VU4 or VU7, but the current position of the DXCC ruling body is that these stations were pirates and their QSLs cannot be presented for DXCC credit.

### BS7 SCARBOROUGH REEF

(You know I am just dying to make a silly joke involving Simon and Garfunkle at this point, right?) Anyway, Scarborough Reef is the number two hardest to get DXCC entity in the minds of many DX chasers these days. Also known as Huang Yan Dao, Scarborough Reef is an isolated lump of coral in the South China Sea. It was last activated in 1997 as BS7H. And while the Peoples Republic of China has come a long way over the years in the amateur radio world, they do remain somewhat suspicious of foreign nationals running around their reefs carrying a bunch of radio equipment. Still, this is one of those places where diplomacy and world image can go a long way, so keep your eyes on this entity in the future.

### 3YP PETER 1 ISLAND

Number four in our top ten, Peter 1 Island was discovered in 1821 and the island was named after the Russian Czar, Peter the Great. Peter 1 was later claimed by Norway in 1929. The island is essentially an extinct volcano usually surrounded by pack ice. Direct access to the island is difficult at best and the expense of a DXpedition to such a location would be out of reach of even the deepest ham radio pockets. One DX source described it as being explored less frequently than the moon! Still, it has been activated by hams at least twice, most recently in 1996 as 3YOPI by a Russian science expedition.

### FRJ JUAN DE NOVA, EUROPA

Juan de Nova Island is a French possession since 1897. It is a small island in the Mozambique Channel near the Southern part of Africa, about one-third of the way between Madagascar and Mozambique.

Not totally unoccupied, there is a small French military garrison along with a few meteorologists. It is also occasionally visited by other scientists. I could find no information on any recent activations, but given that the "mother country" has many active hams,

maybe one day an amateur radio oriented soldier or scientist might get assigned there and change the top ten list once more.

### KP5 DESECHEO ISLAND

Desecheo Island is a U.S. Territory measuring a mere 360 acres (0.56 square miles). It is located in the Mona Passage between Puerto Rico and Hispaniola. Desecheo Island's terrain is rugged and it is home to the Desecheo National Wildlife Refuge. It is an important site for rare seabird nesting. Rarer still are ham radio operations. Desecheo Island was last activated in 1992.

### KP1 NAVASSA ISLAND

Navassa Island is a U.S. Territory located between Jamaica and Haiti. Its total land mass is only about 2 square miles. It is uninhabited and is administered by the U.S. Fish and Wildlife Service, U.S. Department of the Interior. Permission is required to travel to Navassa Island. It was activated most recently by K8RF in 1998 under the call sign N1V.

### YV0 AVES ISLAND

Aves Island belongs to Venezuela and it is situated right in the middle of the Caribbean Sea. Aves Island is only 150 yards long and 30 yards wide!

The island is slowly disappearing and it is possible that Venezuela will eventually lose its sovereignty to the Caribbean Sea. Further, Hams will be down one entity once again. There is some good news, however. By the time you read this, Aves Island should be well down the DX list because the Club Station YV5AJ will have completed its DXpedition to celebrate their 70<sup>th</sup> anniversary.

### 70 YEMEN

Yemen is still recovering from over two decades of civil war, during which ham radio operation was not a big concern for either the North or South Yemen governments. In spite of oil assets it remains one of the poorest Arab countries, with all the inherent infrastructure problems that would make hamming hard. But, since unification in 1990, there have been some attempts to get this one into people's log books, most notably OH2YY's operation in 2002.

### UNCLE SKIP'S CONTEST CORNER

**ARRL International DX Contest (Phone)**  
Mar 6 0000 UTC - Mar 7 2400 UTC

**RSGB Commonwealth Contest (CW)**  
Mar 13 1000 UTC - Mar 14 1000 UTC

**Wisconsin QSO Party**  
Mar 14 1800 UTC - Mar 15 0100 UTC

**Virginia QSO Party**  
Mar 20 1800 UTC - Mar 22 0200 UTC

**Spring QRP Homebrewer Sprint**  
Mar 22 0000 UTC - Mar 22 0400 UTC

**CQ WW WPX Contest (SSB)**  
Mar 27 0000 UTC - Mar 28 2400 UTC

### FT8X KERGUELEN ISLAND

Kerguelen Island is a French possession situated midway between Africa, Antarctica and Australia. Its weather is harsh, with rain and snow most days of the year. A very inhospitable place, it was last activated in 1995 by FB1LYF.

So there you have it. Keep an ear to the receiver and an eye to the DX spotting networks and you never know. One day you may be able to snag one of the top ten tough ones.

Have fun! I'll see you at the bottom end of forty meters.

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## Learning about Antennas

**L**earning more about antennas and their selection and utilization is not only fascinating, it is quite useful for getting better reception of the signals we want to monitor. Fortunately, there is quite a bit of information about antennas which is fairly easily available to radio enthusiasts. This month we'll explore some of these resources and what they can teach us about antennas.

### ◆ Starting Close to Home

At times I plan my *Antenna Topics* columns\* to serve as a primer on antennas. Two years ago I offered a six-part series which described how different types of antennas are found useful for different ranges of the radio-frequency spectrum. These columns were: "Antennas Across the Spectrum: VLF and LF" (March 2001); "Antennas Across the Spectrum: MF and HF" (April 2001); and "Antennas Across the Spectrum: VHF, UHF and Microwave" (May 2001).

Then each column in the second half of this series included construction information for a popular antenna design for the bands discussed: "An antenna for Low (and higher) Frequencies" features an active antenna (June 2001); "An antenna for medium and high frequencies" features constructing a Marconi, quarterwave grounded vertical antenna (July 2001); and "An Antenna for VHF and Higher Frequencies" features an axial mode helix antenna (August 2001).

Last year I took a somewhat different approach as described by the titles of the following series: "An Antenna Primer Part I: Definition, History, and Build Your Own Antenna," a random-length wire antenna (February 2002). "An Antenna Primer Part II: Learn Some Antenna Terms, and Build Your Own Dipole Antenna" (March, 2002). "An Antenna Primer Part III: Plus Building Your Own Groundplane Antenna" (April, 2002).

The combination of these two series is a good beginning for learning about antennas, and for some of us this may be as "in-depth" as we wish to go.

### ◆ Some Courses in Antenna Technology

The *ARRL Antenna Book* is probably the best technician-level source of information on antenna theory and application. It is not organized as a course, but could easily serve as a text book for an in-depth course in applied antenna technology. In fact it is an optional text for the ARRL's web-based course in introductory antenna design and construction. You can check out this course at their website: <http://www.arrl.org/ccc/>

[courses.html#ec009](http://www.ewh.ieee.org/soc/cpmt/newsletter/200103/ant.html#ec009)

The book *Practical Communication Antennas with Wireless Applications* by Leo Setian covers antenna theory and some applied information as well. This text reviews the necessary math, and covers antenna theory at a level suitable for an advanced technician level, or a beginning engineering level. The IEEE offers a practical course on antennas based on this book. You can check it out at: <http://www.ewh.ieee.org/soc/cpmt/newsletter/200103/ant.html>.

At the technician level the Electronics Technician Association offers *The Antenna Book*, a two-volume set for self-study. These books each have a quiz at the end of each chapter and an end-of-book exam. The goal of these texts is to give an understanding of how to install and utilize antennas, with emphasis on antenna systems for TV, MATV, cable, and satellite communications. The ETA has a testing program which can certify the applicant as qualified in several areas of antenna technology. Incidentally, they also offer certification testing in various areas of radio, TV, electronics, and other related-technology areas: <http://www.eta-sda.com/products/books.htm>.

Testing and certification in antenna technology, as well as many other related areas, is also available from the International Society of Electronics Technicians: <http://www.iscet.org/>.

### ◆ Some Useful Technician-Level Antenna Books

The texts referenced in this section are not organized to provide a course, but there is much to be learned by studying them. The *ARRL Antenna Book*, mentioned above, is an excellent source of basic theory, practical information, and a large number of practical antenna designs. Joe Carr's *Practical Antenna Handbook*, provides, as its name implies, much practical information on selecting and building antennas, as well as many different practical antenna designs.

Close to home again is the Grove Enterprises' CD *Antennas for Radio Communications*. This CD contains both the second edition of Bob Grove's *The Antenna Factbook*, and the second edition of my own *The Antenna Handbook*. *The Antenna Factbook* covers a great deal of interesting and useful information about how antennas function, their construction and utilization. *The Antenna Handbook* offers chapters on the history of antennas, types of antennas, construction of a wide variety of antennas, antenna maintenance, testing, repair, and more.

For an excellent microwave-antenna handbook very kindly made available by its author

without charge try: <http://www.qsl.net/n1bw/contents.htm>. The U. S. Marine Corps *Field Antenna Handbook* is also available without charge at <http://www.armymars.net/ArmyMARS/Antennas/Resources/usmc-antenna-hb.pdf>. This useful, 192 page book offers broad coverage of both basic theory and practical application.

There are many other technician-level antenna texts available besides those we have space to mention here. Sometimes technician-level antenna books can be found at public libraries or in the libraries of junior colleges or trade schools which have courses in radio technology. Generally they are available from radio supply houses which advertise in *Monitoring Times*. Amazon.com, Ebay.com and Half.com are also good sources.

### ◆ Some Antenna-Engineering Texts

There are quite a few engineering-level texts on antennas available. Typically these books utilize extensive math and require considerable study to master. It is possible to learn much of practical interest from a few of them by reading the text without dealing with the math. One such book is Gosling's *Radio Antennas and Propagation* which approaches antennas from the perspective of quantum theory. Many antenna engineers consider Kraus's *Antennas*, to be the bible of antenna engineering. Another highly respected antenna text is Jasik's *Antenna Engineering Handbook*, now several times revised by other writers.

Although engineering texts are sometimes found in public libraries, a more likely place to find them is in the electrical-engineering library of colleges or universities which have electrical-engineering departments. They are also available in the bookstores of these institutions as well as on Amazon.com., Ebay.com and Half.com.

### ◆ Learning by Modeling Virtual and Real Antennas

There are several antenna-modeling computer programs available which allow the user to design antennas which the program will then analyze. EZ NEC and NEC-Win Plus are two popular examples. Once you have entered the data describing the antenna of interest, the program then describes the antenna's functioning. Variables such as horizontal and vertical radiation and reception patterns (with gain level in all directions), feedpoint impedance, performance at frequencies of your interest, and much more are presented.

A lot can be learned about antennas just by mastering and using one of these programs. The

### This Month's Interesting Antenna-Related Web site:

This site has lessons and discussions on quite a number of topics in radio and electronics: I counted at least 15 lessons on antennas, or antenna-related topics:  
[http://www.st-andrews.ac.uk/~jcg1/Scots\\_Guide/contents.htm](http://www.st-andrews.ac.uk/~jcg1/Scots_Guide/contents.htm).

ARRL offers a web-based course in antenna modeling; see their website as listed above. These modeling programs are advertised in ham radio magazines, or you can put their names in an internet search engine to find sources.

For hands-on experience in antenna modeling by building actual miniature antennas, check my June 2002 column "Real Antenna Modeling." That column shows how to learn some practical antenna technology by building small, easy to handle antennas, and testing them by receiving VHF, UHF or microwave signals available in your area. This information is also given in my *Antenna Handbook*.

## RADIO RIDDLES

### Last Month:

I said: "What is over a mile tall, travels faster than a speeding bullet while keeping its feet in the ground, and yet progressively leans forward so much that it eventually topples onto the earth?"

Hint: It's not a tired, giant Super-radioman."

Well, at low frequencies signals are typically polarized vertically. The wave front a 100kHz signal produces will extend quite a distance upwards from the earth, certainly more than a mile. And, of course, these radio signals travel at the speed of light: faster than any bullet. Because they are vertically polarized they tend to propagate with their bottom end in contact with the ground. Thus they are sometimes said to have "their feet in the ground" as they propagate.

Consequently, unless they are intercepted by an antenna or some conductive obstacle, they continue propagating on around the world. As they continue they progressively lean farther and farther forward in the direction of propagation (fig. 1) until ultimately they are essentially parallel to, and dragging along the earth's surface. When this happens their energy is then dissipated and wasted in the electrical resistance of the earth. Sad, huh?

### This Month:

The physical length of one wavelength of the 100kHz signal above is well over a mile. Is this the reason the wave front is over a mile tall?

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.

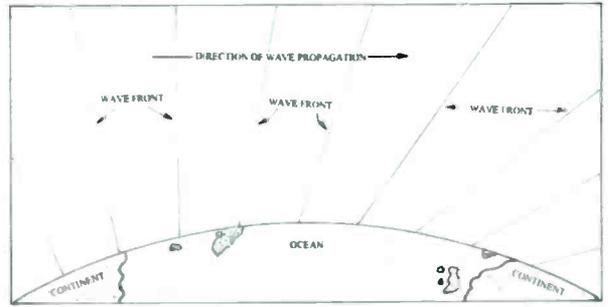


Fig 1. Visualization of the tilting of a vertically-polarized, low-frequency, signal's wave front as it propagates around the earth.

\* Reprints are not available on the internet, or by e-mail; however, you can purchase in-stock back issues for \$4.75 for the first magazine, \$3.75 for each additional. (Email [order@grove-ent.com](mailto:order@grove-ent.com) to discover availability.) Alternatively, you may wish to purchase an entire year on CD for \$19.95.

If the magazine is no longer in stock, reprints of individual articles may be made for \$3 per article plus self-addressed, stamped envelope. Specify column, title, month, and year. Send to Monitoring Times, 7540 Highway 64 West, Brasstown, NC 28902.

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## Continuing with the “All American Five”

Last month, I introduced the “All American Five” a.c.-d.c. set that is our current project. Even though we had worked on a very similar radio, a Philco “Transitone,” some time ago, this little RCA 5-tube presented some restoration problems we hadn’t encountered before. It also allowed me to dwell on some of what I called the “human aspects” of radio collecting: the opportunity to revisit one’s past, the lure of the quest for just the right piece to complete a project, the fun of the research and detective work sometimes necessary to identify a particular model.

After reviewing some of the problems to be solved in restoring this radio, we began the work by taking a look at the Bakelite cabinet. I had already ordered a new plastic dial window (contact information for the supplier given last month) and done some research on the best way to put a shine on the dull and dirty finish.

### ◆ Bakelite: A Tricky Material

It turns out that even though this material is really quite tough and hard (so dense, in fact, that most attempts at repairing cracks with glue end in failure), the surface finish is really quite fragile. By way of background, Bakelite is a trade name for a plastic made up of phenolic resins mixed with wood fiber and/or other filler materials. It is shaped into forms such as cabinets by being forced into molds at high temperatures and pressures.

The shiny surface comes from the fact that, when under pressure, the resins tend to migrate to the surfaces in contact with the mold. A crude analogy might be the troweling of concrete. When a slab is first poured, the surface looks discouragingly rough – showing mostly the aggregate (filler). But under the pressure applied during troweling, the finer material migrates to the surface, making a much smoother appearance.

The resins at the Bakelite surface tend to dissolve when subjected to harsh cleaners such as “409” or “Fantastic.” One article I came across described how the restorer used such a cleaner on some Bakelite dials and found that the rinse water was running brown. He assumed that this was the residue one often encounters when washing equipment that had been used by a habitual smoker. But when he dried off the dials, it was apparent that they had lost some of their original shine.

Once the high luster of a Bakelite surface is lost, it can’t be restored by polishing. What’s left underneath is simply too hard for that. Some restorers like to use a coat of paste wax brought to a high shine to simulate the original finish.



*Cleaned-up Bakelite cabinet makes a very satisfactory appearance.*

Polyurethane varnish has also been suggested by some writers, but I’d worry about the permanence of the adhesion.

The moral: don’t use anything stronger than dish detergent (the kind you use in the sink, not your dishwasher) to take the grime off your Bakelite cabinets or parts. What doesn’t come off that way can be buffed off with automobile rubbing compound applied with a damp cloth. After that, if you aren’t satisfied with the result, you might consider applying a hard wax.

Following my own advice, I washed the little RCA’s cabinet in dish detergent and dried it. Then I went over it briskly with Turtle Wax brand automotive rubbing compound, following the directions on the container. I was really quite pleased with the results. While the cabinet certainly didn’t look brand new, it now had an all-over satiny gleam and reflected the light nicely off its art deco curves.

### ◆ Mold and Mysteries

Putting the cabinet aside, I turned my attention to the radio chassis. It obviously wasn’t going to be the most pleasant set in the world to work on. Although physically complete and almost free of tampering, this radio had obviously been stored for a long time in a shed or garage.

There were no serious rust problems, but the wax-covered capacitors were covered with a deposit that looked like mold. And, remember, this set came to me without a cabinet, so it had likely been stored without one. Its thoroughly grimy condition certainly implied as much. Luckily, a lot of this was loose dust that I took care of with a small new paintbrush that I used as I uncovered various areas during the restoration work.

First order of business would be the usual complete recapping. The old dust-and-mold-

covered capacitors were certainly a sorry-looking lot. I wasn’t able to wipe enough of the junk away to read the original markings. However, I found that dampening the capacitors would make the deposits temporarily transparent enough so that I could read through them. In one or two cases, I did have to fall back on the Riders schematic for values – something I prefer not to do if the original caps are present and readable. Often values are changed during production and the documentation doesn’t always find its way into Riders.

When I studied the schematic in Riders, I found that I didn’t have a Model IAX (chassis number RC1003A) as I had thought. Mine was an apparently previous model, the IX (chassis number RC1003 – as indicated in Riders and stenciled on my set). Same schematic except for a small front-end change in the IAX, shown as an inset on the diagram.

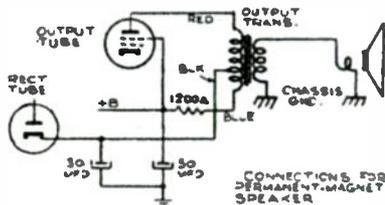
Yet the audio output circuit in my set didn’t match that in the Riders schematic for the Model IX. It showed a PM (permanent magnet) speaker and an output transformer with a tapped primary, while mine has a dynamic speaker (using an electromagnet instead of a permanent magnet) and no primary tap. I went back to my Riders index for the IX and found another entry – this one in a later volume (14) than that for the original schematic (12).

The volume 14 entry showed a design change that explained the discrepancy. The PM speaker and tapped output transformer of the original design had been replaced with a dynamic speaker and conventional output transformer. I found this to be quite surprising because we definitely think of the evolution of radio speakers as being in the opposite direction. Perhaps RCA had difficulty in finding a reliable source for PM speakers and temporarily reverted to the older type.

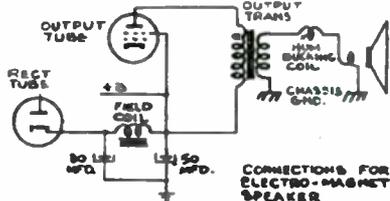
### ◆ Recapping and Rewiring

As I began the work of changing out capacitors, I quickly realized that I was going to have stop for awhile so that I could replace a lot of the wiring. The insulation, probably some sort of rubbery material, had deteriorated and hardened with age to the point where it would crumble to powder at a touch. The worst problems were found between the line of tube sockets and the rear chassis apron, where wires carrying heater and screen voltages – all with the crumbling insulation – ran along together.

The replacement process was a bit tedious, but this is a small radio and the wiring wasn’t



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Change notice in Riders 14 shows how dynamic speaker (below) was substituted for permanent magnet speaker.

that extensive. I was relieved to find that the i.f. transformer leads were cloth-covered and in decent shape. Pulling the i.f.s apart to get at internal connections would have been *really* annoying!

Working under the cramped chassis of the small radio, I began to wonder how the assembly-line operators who had put the sets together originally and the service people who had later repaired them managed with the clunky soldering irons of the day. I remember the fat tip of the American Beauty iron I had as a kid. The size of it didn't bother me at the time, but now I was using a modern iron with a pencil tip and finding it a little difficult to keep the heat on the solder joint and away from the insulation of adjoining wires.

I also found myself musing about the obviously hurried assembly techniques that had been used to put the radio together. Often the end of a wire to be connected to a solder lug was simply bent into a hairpin shape and pulled through the lug without crimping it. Of course that made my job of wiring and capacitor replacement much easier. Often I could just melt the solder at a joint and remove the old connection by sliding it out. This was definitely a radio designed to be mass produced for a very low labor cost.

With all of the wiring fixed and capacitors replaced, I finally replaced the cut-off line cord. Remember, these early a.c.-d.c. sets have one

side of the a.c. line grounded directly to the chassis when the power is turned on. To somewhat alleviate this dangerous condition, I used a modern cord equipped with a polarized plug. When inserted into a properly-wired a.c. outlet, the wide blade of the plug will be connected to the ground side of the line rather than the "hot" side. So I made sure that it was the lead from the wide blade that would be connected to chassis ground.

After I had located and tested a set of tubes and a pilot lamp to fill the empty sockets of this stripped and cast-off old receiver, the moment finally arrived when I could see the results of my labors. In spite of the radio's sorry original state and the extensive wiring overhaul that had to be done, I wouldn't have been surprised to find that it was now in working condition. Experience with many previous restorations has led me to expect that careful attention paid to housekeeping issues and capacitor replacement will almost invariably result in a radio that plays the first time.

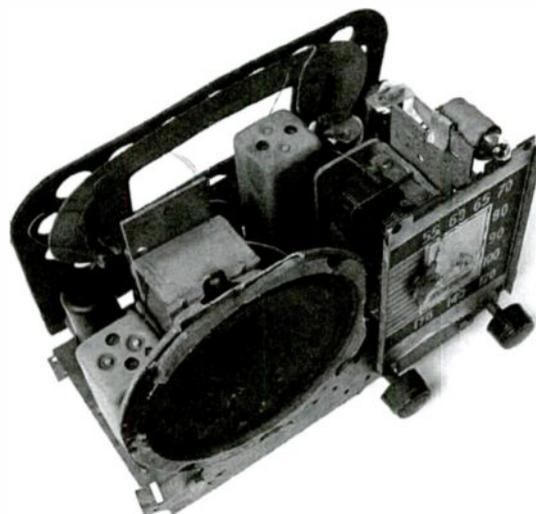
As a matter of fact, sometimes I feel I'm missing out on the opportunity to conduct interesting diagnoses because the wholesale replacement of capacitors eliminates so many problems in advance. However, this time I won't lack for diagnostic opportunities. After warm-up, I could hear no recognizable human sound from the set. Moving the tuning dial throughout its range yielded only a variety of exotic motorboating noises and heterodyne squeals. We'll look into that next time.

### ◆ To Recap or Not to Recap?

I recently followed a heated discussion in one of the on-line antique radio groups regarding the appropriateness of changing out capacitors. There was quite a lot of feeling that, if an original set of caps was present, they should be left alone and the radio maintained as a museum piece to show the manufacturer's original construction.

I subscribe to this idea – provided one is talking about exceedingly rare equipment from the dawn of radio. But the old capacitors do invariably become leaky over time, and to leave them in certainly impairs the performance of a set – if one indeed has the nerve to try to use it at all. I get my kicks from having my radios perform as closely as possible to how they did when new.

As far as radios mass produced in the '30s and '40s are concerned, I feel that we know enough about their construction not to need the evidence that might be preserved by keeping the caps. But one point that was made did impress me. We all know how frequent it is to find evidence of amateurish work or mindless modifi-



Here's the little Model 1X all retubed and ready for its first test. The result? It'll need more work.

cation when opening up an old set. A person seeing wholesale capacitor replacement, even if neatly done, might very well distrust the integrity of the radio.

Starting with this little RCA 1X, I'm going to slip a note under the chassis of every set I restore indicating that the capacitors have been replaced strictly in accordance with the manufacturer's original circuit and specifications. I hope such an action will help reassure future owners!

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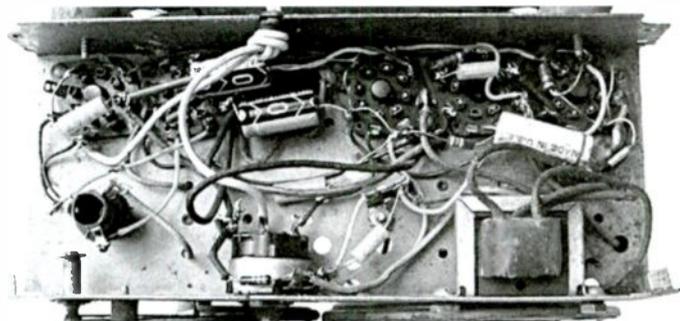
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Underside of chassis after completion of rewiring and recapping.

## Furniture Tips & PRO-96 Comments

**T**his column describes the shelving arrangements for my basement radio monitoring post and test bench and shows how to construct a simple portable scanner stand from wood scraps.

Reader Greg Guise uses scanners professionally and tells how his Radio Shack PRO-96 performs in the RF dense Washington, DC, area.

### ❖ Organizing the Radios at Home

I spent several hours while in graduate school cutting rectangular holes in rack panels for the university club radio station. The club already owned blank rack panels so cost wasn't a consideration. It took a lot of labor and a few skinned knuckles, but the radios and accessories looked great mounted in the panels.

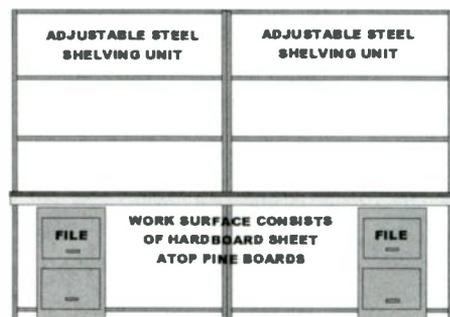
While a rack panel facade is attractive, it is not a good choice for my home radio station. Equipment at the school club station changed infrequently so new panels were rarely needed. Blank rack panels are expensive and cutting the holes for each piece of equipment is time consuming, especially if using hand tools.

My radio gear changes every so often. I enjoy rearranging the equipment frequently, especially when testing new models. I prefer the flexibility and simplicity afforded by keeping the equipment on metal shelves without the encumbrance of a metal rack panel facade.

The radios and accessories sit in adjustable steel shelving units which are open on all four sides. I bought the shelving surplus and it is industrial grade – strong enough to support lots of gear. A depth of 18 or more inches accommodates larger radios and provides space behind them to route cables.

The shelving units assemble akin to the old Gilbert Erector sets popular in the 1950s and 1960s. Bolting adjacent shelving units to each other aligns them and makes them sturdier.

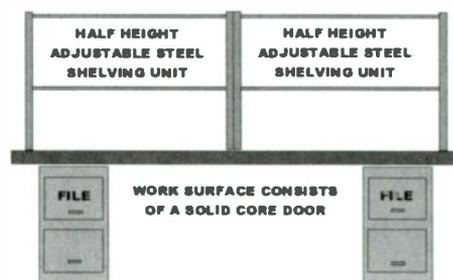
As shown in the accompanying figure, my



home made radio desk consists of two shallow 2-drawer file cabinets supporting a pair of 2 by 10 planks fastened side by side. A layer of 1/4 inch hard board nailed to the top provides a hard work surface for writing. Two coats of Krylon clear lacquer spray seal the hard board against moisture. Strips of 3/4 inch molding (not shown) guard the edges on 3 sides of the desk top, although the molding isn't essential.

The desk top is heavy enough to rest firmly atop the file cabinets without permanent attachment.

The other figure shows the home made test bench I use for equipment evaluation and repair. The shelves hold signal generators, audio analyzers, SINAD meters, CTCSS and DCS encoders, multimeters, etc.



I cut the rails from a full height shelving unit in half to yield two half height shelving units. They rest atop a solid core door, again supported by a pair of filing cabinets.

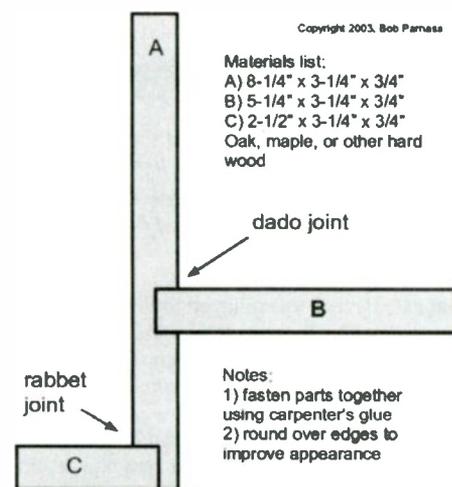
The radio monitor and test benches represent two different designs, but both are constructed of readily obtainable components. The radio monitor station arrangement is better suited to larger installations because you can employ several shelving units and are not constrained by the length of the door used for a desktop.

You can save money by shopping carefully. I bought all the steel shelving at an industrial surplus store. Two of the file cabinets were from a store fixture sale held when a large department store closed. I purchased the other two file cabinets from a used office furniture store.

### ❖ Portable Radio Stand

Did you ever notice how unstable a hand held scanner is when stood up on end? They are especially wobbly when fitted with a larger antenna.

I use several home made scanner stands for my portable scanners at home. The stands tilt the scanner at an angle for easy viewing.



Copyright 2003, Bob Parnass

Materials list:  
A) 8-1/4" x 3-1/4" x 3/4"  
B) 5-1/4" x 3-1/4" x 3/4"  
C) 2-1/2" x 3-1/4" x 3/4"  
Oak, maple, or other hard wood

Notes:  
1) fasten parts together using carpenter's glue  
2) round over edges to improve appearance

### PORTABLE SCANNER STAND

side view

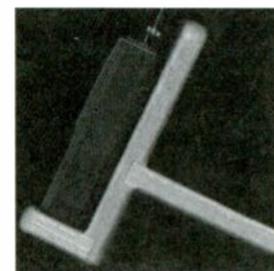
Woodworking is one of my other hobbies so I built the stands from oak, maple, and walnut scraps instead of bending up a simple metal bookend to serve as a stand.

I recycled some of the wood from the rails of an old discarded bed.

The stands are generally built by cutting 3-1/4" by 3/4" piece of wood into three pieces: 8-1/4", 5-1/4", and 2-1/2". I design stands large enough to hold my bigger radios, but you can change the sizes to suit your radios.

I cut the dado and rabbet slots in the wood by making repeated passes with a radial arm saw fitted with a common combination blade. You can make them using a dado blade or a router instead.

You don't need any screws or nails. Carpenter's glue holds the three pieces of wood together securely. Be



sure to clamp the pieces together firmly while the glue dries.

To give each stand a finished appearance, I rounded the edges using a router fitted with a round over bit.

### ◆ Radio Shack PRO-96

The following comments about the PRO-96 are from Greg Guise, an MT reader who uses a PRO-96, BC250d, and other radios professionally as a photojournalist for WUSA-TV. Thanks, Greg, for sharing your evaluation with other readers.

"Just read your fine review of the Radio Shack (GRE) Pro 96.

"... for some, like me, it is more than a hobby. The use of scanner and fixed channel radios allow me to at least be an ear-witness to the news. Few of us, unless embedded in Iraq or in the eye of Isabel (I was 40 miles East of the eye at landfall) have the luck of being an EYE witness to news.

"In the competitive world of big market and network news in Washington DC., good radios are a powerful tool for coverage.

"All this leads to this: The real world performance of these radios vary greatly from conditions in the lab and on the bench.

"Specifically, in side by side tests, using both the 'rubber duck' antenna as well as an 800 MHz 3 dB trunked mounted antenna, the Radio Shack unit outperforms the Uniden BC250d and BC785d most of the time.

"After a month of trial, the PRO-96 hears about 90 percent of transmissions. The Uniden pair about 70 percent. The Radio Shack [PRO-96], as best as I can tell (driving 3,000 miles/month) is somewhat more immune to Nextel and 850 MHz desense. This is true in both the analog and digital modes.

"The PRO-96 is substantially improved over the PRO-95 in the UHF T-band. (Prince Georges County).

"But the best feature is the digital AGC. This is especially noticeable on the new MP-DC 460 MHz digital system. This system has greatly varying audio levels. The PRO-96 outperforms the XTS 300 and 5000 issued to MPD staff (by their own ears).

"In banks with mixed mode operation: i.e. Montgomery, Md. Astro digital system mixed with analog PG fire, the Uniden radios often 'hang up' on the trunked control channel and do not scan the analog channels. The Radio Shack acquires the control channel faster than the Uniden.

"In the extremely high noise floor sections of the District of Columbia such as upper Wisconsin Avenue, the Uniden [models] seem to have better VHF High Band rejection. The Radio Shack [models are] a bit better on UHF 460 and 490 MHz.

"Neither have the RF rejection of my Spectra W-7; however, the Radio Shack comes close *unless* the desense is from a nearby A side cellular 868 - 880 MHz or one of the many Nextel sites."



### ◆ 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 14895; PO Box 28413, Providence, RI 02908; PO Box 69, Elkhorn, NE 68022; PO Box 109, Blue Ridge Summit, PA 17214; and Box 159, Santiago 14, Chile. Some pirates prefer e-mail, bulletin logs or internet web site reports instead of snail mail correspondence. The best bulletins for sending pirate loggings with a hope that pirates might QSL them remain *The ACE* (\$2 US for sample copies via the Belfast address above) and the e-mailed Free Radio Weekly newsletter, still free to contributors via [niel@ican.net](mailto:niel@ican.net). The Free Radio Network web site, another outstanding source of content about pirate radio, is found at <http://www.frn.net> on the internet.

### ◆ Thanks

Your loggings and news about unlicensed broadcasting stations are always welcome via 7540 Highway 64 W, Brasstown, NC 28902, or via the e-mail address atop the column. We thank this month's valuable contributors: John T. Arthur, Belfast, NY; Dave Balint, Wooster, OH; Scott R. Barbour Jr., Intervale, NH; Artie Bigley, Columbus, OH; Cachito, Santiago, Chile; Jerry Coatsworth, Merlin, Ontario; Ross Comeau, Andover, MA; Rich D'Angelo, Wyomissing, PA; Bill Finn, Philadelphia, PA; Harold Frodge, Midland, MI; William T. Hassig, Mount Prospect, IL; Harry Helms, Las Vegas, NV; Fred Kohlbrenner, Philadelphia, PA; Terry Kreuger, Clearwater, FL; Kraig Krist, Annandale, VA; Chris Lobdell, Stoneham, MA; Greg Majewski, Oakdale, CT; Larry Magne, Penn's Park, PA; Bill Matthews, Columbus, OH; Bill McClintock, Wellington, OH; Bill Montney; Lachine, MI; Mark Morgan, Cincinnati, OH; Adrian Peterson, Indianapolis, IN; Mike Prindle, New Suffolk, NY; Lee Reynolds, Lempster, NH; Don Ruokonen, Annapolis, MD; Robert Ross, London, Ontario; Martin Schoech, Merseburg, Germany; John Sedlacek, Omaha, NE; Doug Smith, Pleasant View, TN; Ronnie Stroup, Wooster, OH; Ed Walsh, AL; and Niel Wolfish, Toronto, Ontario.

### Outer Limits continued from page 69

ern accent. (None, but some replies have resulted via the [grasscutterrado@yahoo.com](mailto:grasscutterrado@yahoo.com) e-mail address)

**Sycko Radio-** By now this one is a veteran pirate station. But, the miscellaneous format on their shows remains difficult to characterize. The station name is pronounced Psycho. (None)

**Take it Easy Radio-** This veteran pirate took its name from an Eagles rock tune, but they play a variety of rock music, as well as seasonal tunes around holidays. (Uses [takeiteasyradio@yahoo.com](mailto:takeiteasyradio@yahoo.com) e-mail)

**Undercover Radio-** Dr. Benway, still "broadcasting from the middle of nowhere," now features poetry mixed with his rock tunes. (Merlin and [undercoverradio@mail.com](mailto:undercoverradio@mail.com) e-mail)

**Voice of the Abnormal-** The programming matches the station name on this one; it is liberally steamed in beer. (Elkhorn)

**Voodoo Radio-** Although this one is not a new pirate, its rock music is back on the pirate bands despite its very sporadic schedule. (Elkhorn)

**Voice of Captain Ron Shortwave-** Captain Ron's rock and comedy has become a staple on the North American pirate bands. (Uses [Captainron6955@hotmail.com](mailto:Captainron6955@hotmail.com) e-mail)

**WHYP-** The James Brownyard's memorial station has been playing original airchecks of its licensed North East, PA inspiration. (Providence)

**WMPR-** Their techno rock "dance party" music was supplemented with holiday music at Christmas, but the techno rock remains their primary format. (None)

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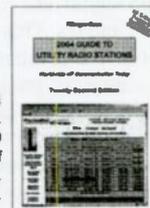


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## Flying High with AirNav's ACARS Decoder 2

This month we look at a new offering, ACARS Decoder 2, from AirNav, a leader in software for aircraft flight tracking and monitoring. Then we'll do an update of the world of DRM, Digital Radio Mondiale. So let's get started!

### AirNav ACARS Decoder 2

We looked at our first AirNav product many years ago. Since then this company has continued to improve and enhance reception of aircraft position report using the ACARS system. In the past we have looked at numerous AirNav products, including AirNav Suite 4, AirNav Internet Lite, AirNav Selcal Decoder and AirNav ACARS Decoder. This time we'll look at their latest offering: AirNav ACARS Decoder 2.

### ACARS Who?

Aircraft Communication Addressing and Reporting System – that's where the acronym ACARS originates. ACARS is a digital mode, which is transmitted by commercial and business aircraft in a range of frequencies around 133 MHz.

The message content varies but usually includes aircraft identification (usually referred to as the tail number), flight number, current position coordinates, estimated future coordinates, aircraft abnormalities and specific aircrew requirements. When received on an AM aircraft radio it sounds like a burst of buzz. Just put "ACARS" into <http://www.google.com> for lots of background information on ACARS.

### ACARS Decoding Development

The first ACARS decoders used the audio output of an airband receiver to feed a hardware Interface Box. The Interface Box took the audio signal and converted it into a data stream of 1's and 0's. This digital stream was then connected to a computer via its serial port. Finally the computer program decoded and displayed it plain language data.

With the advent of faster, more powerful computers and sound cards with greater data conversion capability, ingenious programmers wrote the Interface Box out of the loop. Now the receiver's audio could go directly into the computer via the sound card input.

The first AirNav products were used in just such a manner and decoded and displayed live, off-air ACARS messages. Other software manufacturers also took this interfaceless route to ACARS decoding. But AirNav had something more up their sleeve ...the "radioless"

ACARS decoder!

We were first introduced to Internet ACARS by AirNav's Internet Lite a few years

ago in this column. Instead of using the output of a radio, this program connected via the Internet to ACARS receiving stations around

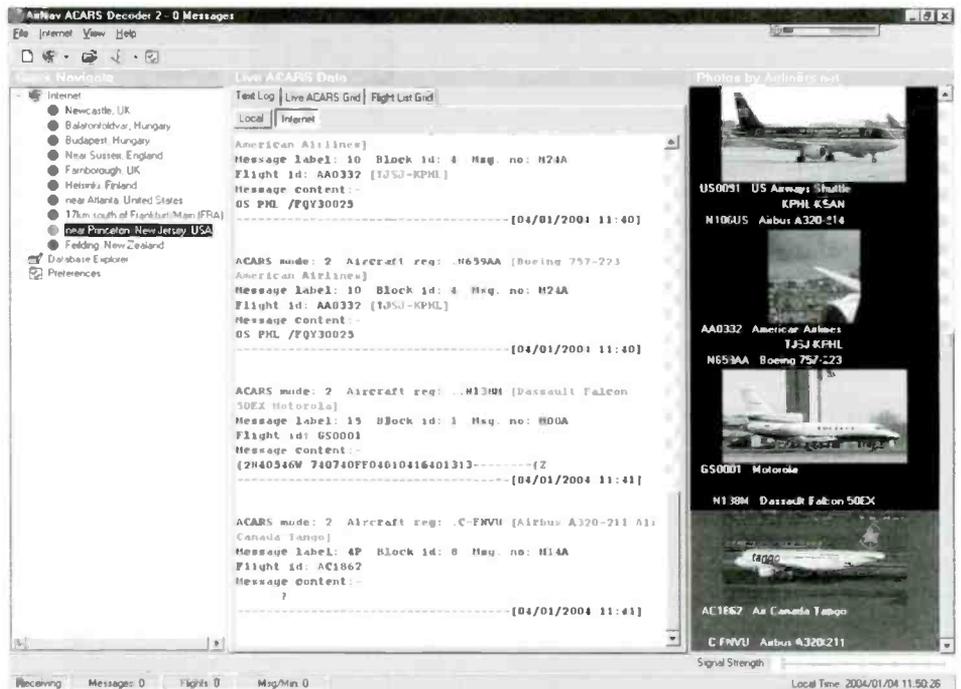


Figure 1 – AirNav's ACARS Decoder 2 Radioless Running with Photos!

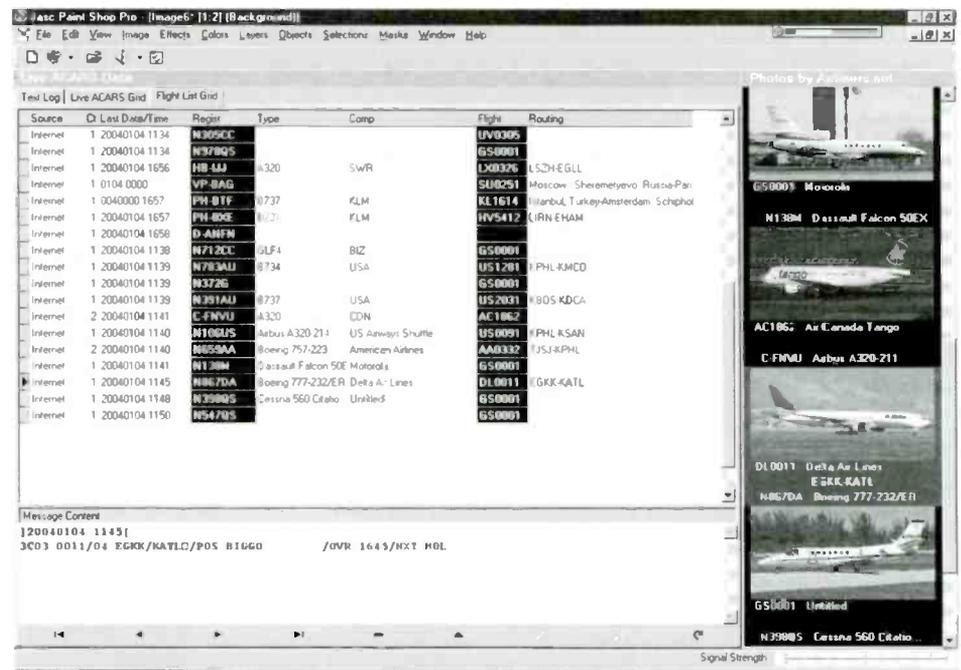


Figure 2 – Flight List Grid Display of "Received" ACARS Aircraft

the world. No longer was the listener constrained to receiving ACARS messages from aircraft in the vicinity of their station.

### Live or Memorex™?

That's what the commercial for the famous recording tape once asked. It's now hard to tell when monitoring ACARS via AirNav's ACARS Decoder 2. The user has the option of either using ACARS audio output from his airband receiver or connecting it to the Internet network of ACARS receiving stations.

I still find the capability of displaying ACARS messages from aircraft flying in Europe, USA, Asia or Australia fascinating! In theory you could "hear" an aircraft immediately after takeoff in Europe and then again upon landing in the USA. But the program does not stop with decoding ACARS messages any more. Let's see what else AirNav's ACARS Decoder 2 can do.

### Requirements

All it takes to run the program is "MS Windows any version." It ran as well on my old Pentium I 233 MHz as it did on my Pentium III 1Gig PC. The 4.8 Meg file can be downloaded from <http://www.airnavsystems.com/> for a one-time cost of \$59.95. After that you are home free with no monthly costs. There is a discount for users of older versions offered on the website.

Download and installation went quickly and without problem. Once downloaded I was receiving Internet ACARS in less than 5 minutes.

### ✦ AirNav Decoder 2 at Work

Immediately upon looking at Figure 1 you can see a very unique feature of this program. Not only does it decode ACARS messages but it also displays a photo of the transmitting aircraft. These photos come from the Airliners.net database.

In Figure 1 we are looking at three different displays of Live ACARS data coming from the Internet. The user can configure the screen in many different ways. I have the Quick List of Internet "stations" on the left where you can see that we are "listening" to data from a station near Princeton, New Jersey, USA.

The "Text Log," at the center, displays all ACARS information and messages. For example, if you look at the next to the last entry, Aircraft registration N138M, we can see that the aircraft is a Dassault Falcon 50EX. The AirNav Decoder 2 then goes on to tell us that this aircraft is owned by Motorola. Finally the Message content shows position and time information.

The Flight Id, GS0001, is not very useful for private aircraft. However, for commercial aircraft this is where the Flight Number, as seen on your ticket, is displayed. For example, the previous listing is from a commercial American Airlines aircraft Flight Number AA332.

Since we have chosen to display the photos of the received aircraft on the right we can see that actual airplane (second from bottom).

The user can choose to display this data in a number of different ways. Figure 2 displays all the same data on a single line. In this format, routing information is much more clearly identifiable. The four-letter airport codes can be seen for many entries in the last column - "Routing." In this view Message Content is displayed in the lower window when a row is chosen. Using the arrow keys on the bottom frame, the user can navigate to different received aircraft. Notice that in Figure 2 new aircraft have been received since it was captured a few minutes after Figure 1.

### What Do I Think?

AirNav Decoder 2 is one of the best ACARS programs I have used. Since it is a new program it does have some bugs. The Internet connection seems to hang up after a few downloads. This requires the user to click off the selected site and then back on. When this is done a large amount of new aircraft data flows to the screen. Also the Help file did not work properly. AirNav is aware of the problems and will be releasing a patch by the end of January 2004.

AirNav also says that their Internet network of stations will be improving their coverage. Currently some of the sites are rarely available and others are not continually available. 24 hours a day, seven days a week.

There is only one modification that I would suggest. With data "flying" in from all around the world it would be very helpful if the exact originating website was recorded in the data. Currently the only "Source" listed in the first column of Figure 2 is either Internet or Local. It would be better to list, for example Princeton, USA, or New Castle, UK. Surprise: That's really my only suggestion, although, of course, cheaper is always better.

### ✦ DRM Update

I'm sure all the DRMers out there know that a Digital Radio Mondiale transmission format change was implemented on 15 December 2003. Software version 2.0.34 is now REQUIRED to decode DRM signals. Without it you'll hear nothing.

It's interesting that the notice of the new revision from the DRM's Merlin VT advises you "...to save the new versions of the software in a different directory, so you can keep both old and new versions during the transition period." This is always a good idea during beta testing of a software package. But why is it needed for a "ready for prime time" software?

Not all DRM stations are going to change to the new format at the same time. Again according to the email, they "...anticipate a system upgrade transition period of approximately one week, so please don't worry if not all broadcasts are available immediately." That sounds a little like the English joke about changing the side of the road that traffic drives on. In order to ease in the change, cars made the change on the first day and trucks (lorries) and buses on the next day!

To download the new version you will

have to go to <http://www.drmtx.org> with the password you received with the purchase of your original DRM software. With a file size of 13221 kB, you'll also need lots of patience if you use dial-up. It took me over an hour for the download! If you don't own the DRM software you can purchase it for 60 Euros at the DRM website.

### DRM Reader Feedback

In the recent columns on DRM monitoring I wondered what factors were causing my DRM reception problems. Well, feedback from readers seems to point to propagation as the main culprit. One reader monitoring DRM from Antarctica has lots of DRM experience and has witnessed the major effect that propagation has on DRM reception. Readers in North America echo his opinion.

We may have established that propagation is the number one DRM reception killer. Regardless of DRM's goals (and marketing), it's almost expected that fading and multipath will make it very difficult to decode 1's and 0's.

However, for listeners not in the wilds of the South Pole, I still think that noise can be a major factor. Share your DRM experiences by emailing me at [johncatalano@monitoringtimes.com](mailto:johncatalano@monitoringtimes.com).

That's it for March 2004. Next time, two programs that I'm sure you'll be interested in for your monitoring or Ham shack will be under the microscope. Till then, keep looking up at the sky!

**NOTICE:** It is unlawful to buy cellular-capable scanners in the United States made after 1993, or modified for cellular coverage, unless you are an authorized government agency, cellular service provider, or engineering/service company engaged in cellular technology.

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## Yacht Boy 550PE

by Gayle Van Horn

**T**he recent release of Grundig's new YB-550PE has caught the attention of quite a few hobbyists, and deservedly so. This incredibly attractive addition to the versatile Yacht Boy line combines an AM/FM and shortwave receiver, in a lightweight, compact radio.

The YB-550PE receives all 14 international shortwave bands (shortwave tuning coverage from 1.711-29.999 MHz), AM broadcast band (520-1710 kHz), and FM broadcast band. A built-in telescopic antenna is used for shortwave and FM, and an internal ferrite bar antenna is used for the AM broadcast band. A mini plug jack on the side of the radio facilitates connection of an external FM or long wire shortwave antenna.

The many tuning aids in the YB550 are a nice feature with six different tuning methods available, including either a direct keypad frequency entry, or the up-down tuning key to band scan in 5-kHz increments. The side scroll wheel tunes medium wave AM or shortwave stations to 1-kHz increments.

Another nice tuning feature is the Memory Autoscan. Two hundred frequencies can be stored into eight pages of memory. Each page holds 25 frequencies, or you can customize your memory pages from eight to four, five, or 20. This feature proved invaluable for nightly shortwave monitoring.

You can also quickly jump from one broadcast band to another quickly by using the meter band selector button. This was helpful when comparing shortwave band conditions at various listening hours.

Frequencies are displayed in a large backlit LCD, while signal strength is indicated via a five-level graph bar. The radio's back snap-on stands proved helpful for table top or "hand-held" listening. The internal speaker provides good, loud and crisp audio. A set of ear buds are included for private listening and stereo reception in the FM mode.

### ◆ Reception a Pleasant Surprise

Just what can you hear from this portable? Plenty. In our recent test, we observed very good selectivity, with an above average dynamic range for a low end portable. Medium wave reception was remarkably good. Domestic AM band broadcasters, as well as foreign stations from Canada, Mexico and Cuba were audible with good signal strengths.

FM broadcast reception performance was equally as impressive.

My biggest surprise, however, was reception of broadcasters in the 60 and 90 meter tropical bands. While the 550-PE is definitely not a "DX machine," if we compare it to a table top receiver, our reception test in the "trops" found quite a few stations with fair to good signal strengths at levels which were certainly adequate to monitor. Band scans in the 49, 41, 31, 25, 22, 19 and 16 meter bands also indicated better than average signal strengths, perfect for general program listening.

Other features of the YB-550PE include a 12/24 built-in clock, which may be set for either format. An alarm with a snooze feature allows you to wake up to a preset station or the last one tuned, and a 5-120 minute sleep timer. An optional DC 4.5 V AC adapter is also available for purchase. Other refinements found on the side of the radio include a DX-local switch, tone button, lock switch and fine-tuning.

For shortwave, AM or FM listeners seeking an affordably priced portable, the new YB-550PE is just that. The complete product kit includes a carrying case, owners manual, *Shortwave Listening Guide* booklet, ear buds, and three AA batteries. The small 10-ounce size, ease of operation, crisp audio, and operation features should interest those seeking a terrific carry-along for travel or a portable pocket radio. The Yacht Boy 550PE is available at select national retailers, including Grove Enterprises (800-438-8155), for \$99.95. For additional information about the Yacht Boy 550PE and additional Eton products, call 1-800-872-2228, or visit <http://www.entoncorp.com>.



### Sounds Sweet – A Side-By-Side Speaker Comparison

By Bob Grove

Several listening enthusiasts have asked us our impression of a recent addition to our hobby's accessories – the Sounds Sweet speaker. No question about it, original-equipment speakers inside the cabinets of our receivers and scanners leave a great deal to be desired!

At our listening post, we installed a toggle switch between the Sounds Sweet and a typical stereo bookshelf speaker formerly sold by Grove (Grove SPK03: CSI/SPECO DMS-3P) and connected it to an ICOM R8500 wide-frequency-coverage receiver. The Grove is a small bookshelf unit measuring roughly 7 x 4 x 4 inches, while the Sounds Sweet occupies a substantial 12 x 10 x 10 inches.

### ◆ Let's Listen

Tuning in a classical music station, we weren't surprised that the bass register was better in the much-larger Sounds Sweet, and the sound had more "massiveness." But the vibrancy of upper-register harmonics of the strings was muffled compared to the Grove unit. But the Sounds Sweet isn't advertised for high-fidelity FM broadcast reception, it's intended for shortwave listening and VHF/UHF communications monitoring.

The Sounds Sweet web site is punctuated by advertising claims; let's separate the facts from the hype:

"Dense, solid, tongue and groove construction, tuned port, bass reflex speakers optimized for communications, scanners and shortwave with an EXTREMELY EFFICIENT dual cone driver." (Emphasis theirs)

*Editorial comment: We do see a tuned port, but no evidence of a bass-reflex port. The 8-inch speaker certainly does sound considerably better than the internal, original-equipment speaker, as does the Grove speaker. The Sounds Sweet does deliver more audio than the Grove at the same volume control setting.*

"Sounds Sweet speakers can be driven LOUD WITH ALL RADIOS, even handheld

transceivers and scanners!" (Emphasis theirs)

*Editorial comment: Both speakers can, assuming that the radios themselves don't deliver distortion at high volume levels.*

"Sounds Sweet communications speakers maximize intelligibility from your transceiver, receiver or portable by reproducing only the communications voice and shortwave music frequencies coming from your SSB, AM or FM communication or shortwave radio."

*Editorial comment: All of these modes utilize a reduced audio-spectrum bandwidth, typically 300-3000 Hz. Don't expect bass-thumping lows and tinkling highs.*



"NO HISS! UNCOMPROMISED communication voice and shortwave music speakers with FULL CLEAR CLEAN audio and NO HISS!" (Emphasis theirs)

*Editorial comment: If there's hiss on the signal, you're going to hear it on either speaker. That said, the Sounds Sweet rolls off its high frequencies sooner than the Grove, thus proportionately reducing high-frequency hiss much like turning down a treble tone control. But this also reduces the crispness of the sound which can reduce voice intelligibility and compromises the harmonic richness of music.*

#### ◆ The Bottom Line

Since both speakers offer considerable sound improvement over original equipment internal speakers, which is the better buy? That's a tough call. Each speaker accessory has its own benefits under varying listening conditions.

For shortwave enthusiasts who prefer the mellowness of reduced treble along with a moderate reduction in high-frequency hiss, and have the room to enjoy somewhat better bass from the larger speaker and cabinet, the big Sounds Sweet is the clear choice.

For shortwave and scanner hobbyists more interested in retaining voice and music crispness and presence without quite as much bass emphasis, especially listeners experiencing high-frequency hearing loss, we'd recommend the \$50-range typical stereo speaker.

Sounds Sweet, \$99 plus shipping; order

from their web site: <http://www.soundsweet.com> or write Sounds Sweet, 99 W Shore Dr, Carmel, NY 10512.

## Kaito KA1102 Multiband Portable

By Bob Grove

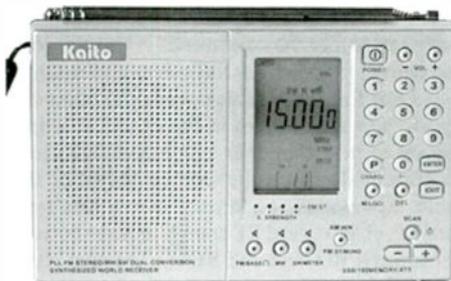
It may be too late for the gift-giving season, but the low price for this new, little gem makes it affordable anytime of the year. Kaito's KA1102 portable, multiband, dual-conversion radio offers a great deal of features and performance in a small package.

Frequency range is 70-108 MHz FM, 522-620 kHz AM, and 3-30 MHz shortwave (direct frequency entry or meter band selection).

Digital readout with nightlight illumination, SSB reception, wide/narrow selectivity, clock/alarm/on-off timer with seconds readout, scan/search for signals, direct-entry keypad, 190 memory channels, stereo FM reception (ear buds included)/recording line output, digital volume and tuning controls, DX/local sensitivity switch, even a news/music tone switch enhance the radio's performance.

Measuring 5-1/2"W x 3-1/2"H x 1"D, the half-pound receiver is powered by three AA cells (battery status indicator is displayed), or a 6-volt wall adaptor (included). A battery-charge provision allows the substitution of optional, rechargeable NiMH batteries.

An indoor wire antenna (included) may be plugged into the 1/8-inch external antenna jack. A strip of four mini-LEDs indicates relative signal strength. A protective, leatherette, drawstring pouch is provided as well.



#### ◆ Let's Listen

Initializing the radio (first power-up) allows the user to choose between 9 and 10 kHz steps for the medium wave AM band. Tabletop listening is assisted by a hinged rear flap which angles the radio comfortably upward, allowing both good viewing angle and stable support.

Medium-wave reception is accomplished via the usual internal ferrite bar, while shortwave and FM stations are brought in by a 28-inch telescoping antenna.

The internal 2-1/2 inch speaker is hardly a thunder maker, but it does a respectable job on voice and music at normal listening volume. In comparison, the ear buds produce

remarkable, room-like ambience with deep bass and crystal-clear highs on stereo FM.

Sensitivity is on par with more costly receivers. Pushbutton scanning for signals is easy, using the same buttons for single stepping or automatic search. Direct frequency entry is intuitive, with the processor inserting trailing zeroes if you ignore them.

The wide/narrow bandwidth really does make a difference reducing adjacent-frequency, medium wave and shortwave interference; it's a true filter-selectivity switch, not merely an audio tone control.

#### ◆ The Bottom Line

This is the closest thing to a "full-featured" shortwave portable for under \$100 that I can recall. Sensitivity, selectivity, digital readout, continuous shortwave-frequency coverage, keypad entry, decent audio, compact convenience, low cost – they're all there.

The Kaito KA1102 multiband portable with all accessories is \$89.95 plus shipping from Grove Enterprises (800-438-8155; <http://www-grove-ent.com>; or email [order@grove-ent.com](mailto:order@grove-ent.com))

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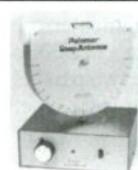
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## VHF - Slim Jim Antenna for 2 Meter Band

By D. Prabakaran

**H**ere is a 2 meter (144-146 MHz) antenna that is inexpensive and easy to build for amateur radio operators compared to other types like the ground plane vertical antenna, Yagi antenna, etc. In India, the frequency band allotted in VHF for amateur radio operation is 144-146 MHz; in the U.S. it's 144-148 MHz.

Generally, antennas work well only when placed over a good ground system. The success or failure of an antenna system often depends on whether or not it has a good RF ground. Poor grounds cause antennas to operate at less than best efficiency. In fact, it is possible to lose between 50 and 90 percent of the RF power by heating the space under the radiation lobe, instead of transmitting into the air.

This is a vertically polarized omnidirectional free space antenna which offers approximately 1.8 dB of gain. It has a radiation efficiency 50% better than a ground-plane antenna due to its low radiation angle, it is unobtrusive, and has no ground-plane radials – therefore low wind resistance and easy to erect.

This antenna is a back feed folded vertical dipole antenna for the 2 m band. The name Slim Jim comes from the slender construction. The Slim Jim vertical angle of radiation is almost parallel to ground so maximum radiation is where it is needed: straight out and all round. With all ground planes, including those with radials an entire wavelength long, the vertical angle radiation is tilted upwards at an angle of 30 degrees or more. This gives the Slim Jim a gain over a 5/8th wave of 6dB when measured parallel to the ground!

The feed is on the base, which causes no problem with the connection between the feeder and the antenna. The feeder impedance is 50 ohm. Slim Jim can be made of aluminum tubing with a diameter of 10mm or 12mm, or a 300 ohm cable. The distance between the two parallel elements is not critical and neither is the length if it is made of 10mm tubes.

The isolation between the two divided halves (halfwave and quarter wave), should be made of pertinax or teflon or a similar isolation material, which fits between the two parts. The use of a 'J' type matching stub (J integrated matching = JIM) facilitates feeding the antenna at the base, thus overcoming problems of interaction between feeder and antenna. The feed impedance is 50 ohms.

Basically, it is an end-fed folded dipole

operated vertically. The matching stub provides a low impedance feed point (50 ohms) at the base and couples to the antenna section at high impedance at one end. As with all folded dipoles, the currents in each leg are in phase, whereas in the matching stub they are in phase opposition, so little or no radiation occurs from this. Correctly matched, the VSWR (Voltage Standing Wave Ratio) will be much less than 1.5:1, and remains so across the band.

A slip sleeve made from copper can be added to the element above the gap for tuning purposes, although the average length of the gap and spacing between the elements is 3" at 72 MHz and 1" at 220 MHz. No part of the antenna should be grounded to the tower or mast. The recommended mount is the use of PVC pipe and PVC pipe "T's." Make sure the space between the tower or mast and the antenna is one "freespace" 1/4 wavelength.

Stand upright (on a railing, etc. but clear of metal water tanks, drainpipes, etc.) and fit the coaxial cable to the antenna with some alligator clips. Attach about 2 inches up from the bottom and check the VSWR. Adjust the clips up or down to get the best match (mine managed 1.2:1), mark where they are to go, remove the clips, and solder the coax directly. Use the copper sleeve, if added, for any necessary tuning.

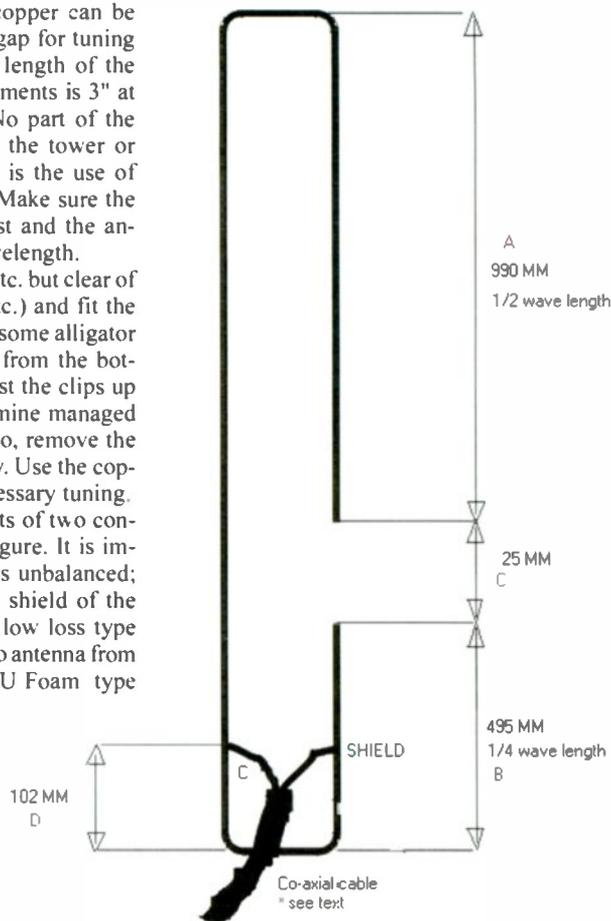
Feed line coax cable consists of two concentric wires, as shown in the figure. It is important to note that coax cable is unbalanced; no current flows on the outside shield of the cable. Always use good quality low loss type coaxial cables to feed RF energy to antenna from transmitter. RG-8/U and RG-11/U Foam type cables are good choices and preferable.

Bad connections cause loss. If you are going to solder connectors on the ends of your coax, be sure to do it right. You must have the right tools. Most CBers and Ham radio operators think they can solder connectors on to coax with their 25 Watt pencil tip soldering iron. You can't. You should use a high wattage iron, preferably over 100 watts. You must heat the connector up quick, so you don't damage the coax and connector, and the only way to do this is with a high wattage soldering iron.

For antennas mounted outside, don't forget lightning-induced damage protection. The

minimum is to never use them in weather likely to produce lightning, and disconnect and ground them when they are not in use.

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**This is your equipment page. Monitoring Times pays for projects, reviews, radio theory and hardware topics. Contact Rachel Baughn, 7540 Hwy 64 West, Brasstown, NC 28902; email editor@monitoringtimes.com.**

*Milcom continued from page 65*

Handheld Unit	Stock No	Price
Alinco DJ-X3T	SCN11	\$209.95
Alinco DJ-X10T	SCN01	\$319.95
Alinco DJ-X200T	SCN10	\$499.95
AOR AR-8200 Mk III	SCN51	\$589.95
Icom IC R-3	SCN07	\$449.95 (Call for special promotional pricing)
Icom IC R-5	SCN02	\$199.95 (Call for special promotional pricing)
Icom IC R-10	SCN04	\$349.95 (Call for special promotional pricing)
Uniden BC-250D	SCN40	\$349.95 (Optional APCO-25 card \$299.95)
Uniden BC-296D	SCN42	\$524.95 (Includes APCO-25/trunking capability)
Yaesu VR-500	SCN06	\$324.95

**Air Show Listening Tip:** If you are going to use a handheld scanner at the air show there is another purchase you should consider – an extra set of charged batteries. Murphy's law applies here and nothing is worse than having your batteries die half way through the show with no replacement.

Base/Mobile Unit	Stock No.	Price
AOR AR-3000AB	SCN26	\$1099.95
AOR AR-5000A+3B	RCV44P	Awaiting FCC certification
AOR AR-8600 Mk II	SCN11	\$889.95
Icom IC R-8500	RCV14	\$1499.95 (Call for special promotional pricing)
JRC NRD-545	RCV21DS	\$1799.95 (Must order the optional ACC11DS VHF-UHF converter at \$349.95)
Uniden BC-785D	SCN41	\$309.95 (Base/mobile) (Optional APCO-25 card \$299.95)
Uniden BC-796D	SCN43	\$524.95 (Includes APCO-25/trunking capability)
Yaesu VR-5000	RCV51	\$889.95
Computer Receivers	Stock No.	Price
Icom PCR-1000	RCV45-BON	\$399.95 (Call for special promotional pricing)
WinRadio WR-1550e	RCV47-E	\$549.95
WinRadio WR-1550i	RCV47-I	\$499.95
WinRadio WR-3150e	RCV48-E	\$1849.95
WinRadio WR-3150i-DSP	RCV48-I	\$1849.95
WinRadio WR-3500e	RCV49-E	\$2395.95
WinRadio WR-3500i-DSP	RCV49-I	\$2395.95
WinRadio WR-3700e	RCV50-E	\$2895.95
WinRadio WR-3700i-DSP	RCV50-I	\$2895.95

Finally, I would like to extend a hearty thanks to the *over 200 contributors* who took the time to share their post show reports with us during the last year. I deeply appreciate the time and effort each of you took to let us know what you were hearing.

During the 2004 season we want to hear from any of our readers who attend any of the air shows listed below. We hope you pass along any and all frequencies you monitored during the show even if they are on the list above. If you attend an air show this year, *please pass along what you hear!* You can reach me via e-mail at [larry@grove-ent.com](mailto:larry@grove-ent.com) or you can write us at: Milcom, 7540 Highway 64 West, Brasstown, NC 28902.

Until next month, 73 and good hunting, all.

**Military Jet Demonstration Teams 2004 Performance Schedule**

**Note:** Participation of the teams below at a variety of locations is still pending. Note also that should Security Levels increase beyond Threat Condition "Bravo," many military installations will not have public air shows. Consequently, demonstration schedules dates listed below are subject to change or cancellation without notice.

**Group Abbreviations:**  
 BA=USN Blue Angels SB=Canadian Snowbirds  
 TB=USAF Thunderbirds

**Base Abbreviations**  
 AB Air Base  
 ACC Air Combat Command

AFB  
 ARB  
 CFB  
 JRB  
 MCAS  
 NAF  
 NAS  
 Air Force Base  
 Air Reserve Base  
 Canadian Forces Base  
 Joint Reserve Base  
 Marine Corps Air Station  
 Naval Air Facility  
 Naval Air Station

**Dates**

Mar 13  
 Mar 20-21  
 Mar 27-28  
 Apr 3-4  
 Apr 4-5  
 Apr 17-18  
 Apr 24-25  
 May 1-2  
 May 8-9  
 May 12  
 May 14-16  
 May 15-16  
 May 18  
 May 22  
 May 22-23  
 May 23  
 May 26  
 May 29-30  
 Jun 5-6  
 Jun 9  
 Jun 12  
 Jun 12-13  
 Jun 13  
 Jun 16  
 Jun 19-20  
 Jun 23  
 Jun 24  
 Jun 25-27  
 Jun 26-27  
 Jul 1  
 Jul 3-4  
 Jul 9-10  
 Jul 10-11  
 Jul 17-18  
 Jul 21  
 Jul 24  
 Jul 24-25  
 Jul 25  
 Jul 28  
 Jul 31  
 Jul 31-Aug 1  
 Aug 1  
 Aug 4  
 Aug 7-8  
 Aug 11  
 Aug 13-15  
 Aug 14-15  
 Aug 21-22  
 Aug 25  
 Aug 28-29  
 Sep 1  
 Sep 4  
 Sep 4-6  
 Sep 11  
 Sep 11-12  
 Sep 14  
 Sep 15  
 Sep 16  
 Sep 18-19  
 Sep 19  
 Sep 25-26  
 Sep 29  
 Sep 30  
 Oct 2-3  
 Oct 3  
 Oct 9-10  
 Oct 15  
 Oct 16-17  
 Oct 23-24  
 Oct 30-31  
 Nov 6  
 Nov 6-7  
 Nov 7  
 Nov 13-14

**Group: Locations**

BA: NAF El Centro, CA  
 BA: NAS Lemoore, CA  
 BA: Tyndall AFB, FL; TB: Punta Gorda, FL  
 BA: MacDill AFB, FL  
 TB: Eglin AFB, FL  
 BA: NAS Meridian, MS; TB: San Diego Beach, CA  
 BA: MCAS Beaufort, SC; TB: March ARB, CA  
 BA/SB: Fort Lauderdale, FL; TB: Millville, NJ  
 BA: NAS Atlanta, GA; TB: Lake City, FL; SB: Vidalia, GA  
 SB: Dobbins ARB, GA  
 BA/SB: Andrews AFB, MD  
 TB: Dover AFB, DE  
 SB: Grande Valle, PQ  
 TB: Charleston AFB, SC  
 BA: NAS Kingsville, TX; SB: Summerside, PEI  
 TB: Langley AFB, VA  
 SB: Nunavut, NU  
 BA: Calverton, NY; TB: Moffett Field, CA; SB: Riviere Duloup, PQ  
 BA: Myrtle Beach, SC; TB: Maxwell AFB, AL; SB: CFB Winnipeg, MB  
 SB: Virden, MB  
 TB: Hill AFB, UT  
 BA: Bermuda  
 TB: NAS Fallon, NV; SB: CFB Moose Jaw, SK  
 SB: Hanover, ON  
 BA: Oklahoma City, OK; TB: Quonset Point, RI; SB: Sarnia, ON  
 SB: St. Isidore, PQ  
 SB: St. Georges, PQ  
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 BA: NAS Pensacola, FL; TB: Nellis AFB, NV

## PC NoteTaker™ – The next “killer app?”

**A** recent news story said, in essence, about 66 million Americans go online and, when they do, the thing they do most is send and receive email. So there's a pretty good chance that many of the people who read this column have computers and use email.

In my view (and I've been using computers since 1980), email is very, very cool. It's what computer types refer to as a “killer app,” an application that is soooooo useful that once you try it, you can't imagine how you could get along without it. Computers do a lot of useful things such as word processing, email and so forth, but there is one area in which they are weak: the ability to sketch out an idea and quickly share it with someone.

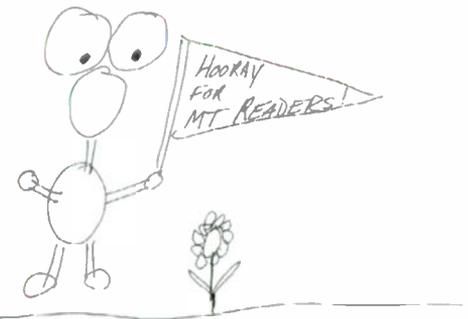
For example, suppose I was chatting one day with our good editor, Rachel Baughn, and the two of us began discussing maybe having a cartoon or something that would express our appreciation of *MT* readers. We could discuss the cartoon in words via email, or over the phone, or we could fax sketches to each other or we could make sketches and then scan them or digitally photograph them and then email the result, or we could even use digital drawing programs – but the whole thing would get kind of cumbersome after a while and not very attractive. What is *really* needed is some means of making a note or sketch and easily transmitting it.

### ♦ Take Note

And that's *precisely* where PC NoteTaker from Pegasus America comes in. It's designed to quickly capture handwritten notes and drawings and make them instantly accessible on your personal computer. And, by golly, if it doesn't do exactly what it's supposed to do!

PC NoteTaker is almost dirt simple. It consists of three elements. The first is the “base unit,” which looks for all the world like the clip off the top of a clipboard. There's a wire attached to the base unit and it plugs into a USB port on your computer. The second element is a digital pen that takes three button size batteries and a special refill. The third element is PC NoteTaker software that installs on your PC. It requires 15 MB of hard disk space; Windows 98, ME, 2000 or XP; a minimum of 32 MB of RAM, and Internet Explorer 4.0 or higher.

Once you install the software and connect the base unit to your computer, simply clip the base unit to an ordinary pad of paper and begin writing on the paper with the PC NoteTaker pen. Instantly, your handwritten note appears not just on the paper (in ballpoint ink) but also on your computer screen. My ten-year-old son, who has been using computers since before pre-school, took one look and said, “Wow, cool!” Even better,



*I created this cartoon with PC NoteTaker. It appeared instantly on the screen.*

with a bit of practice and judicious use of the software, you can create sketches in different colors.

### ♦ Custom Apps

With just a click of a button on the PC NoteTaker software, you can send your note, sketch or doodle via email, attach it to a document, and/or save it for future use. You can attach handwritten notes to applications such as Microsoft Word and Powerpoint, create “sticky” notes by dragging and dropping, and copy and paste into other programs.

Or – and this is really neat – you can even create a notes reminder that will cause the note to reappear at a specified date and time. This could be extremely handy if notes have the habit of disappearing on your desk as they do on mine. I normally start my week with a fairly clean desk, but by half-past Tuesday, the debris on my desk can be pretty severe. So when I'm in the middle of an interview, and a buddy calls, I scribble a quick reminder to call him back. The note, of course, promptly runs away and hides. But with PC NoteTaker, the note can pop up on my screen to make sure I don't forget.

### ♦ The Verdict

I think PC NoteTaker is really neat. It's a powerful tool for communicating, collaborating with others and being creative. Even if you are a “power typist” like me, it fills a unique hole in the tools that your computer offers. And if you prefer to take notes by hand . . . well, PC NoteTaker is just that much more useful. Is it the next “killer app?” It just might be.

PC NoteTaker's suggested price is about \$80. For more information, call 925-226-3490 or visit <http://www.pegasusamerica.com>.



*PC NoteTaker consists of the base unit/clip, a digital pen, and PC NoteTaker Software.*

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# What's NEW

Tell them you saw it in *Monitoring Times*

## Double Bazooka Antennas

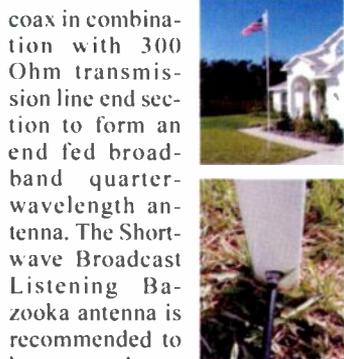
The Double Bazooka antenna design from International Antenna Corporation is a broadband half wave antenna design first conceived as a radar antenna in the early 1940s for use by the U.S. Government. It was modified for amateur radio use in the 1950s. The IAC design provides an antenna that will endure harsh elements better than homebrew designs. Its Mil-Spec quality construction is used by amateur radio volunteers and SWLs and comes in a variety of configurations.

All IAC antennas feature a SO 239, a silver plated connector having Teflon insulation and a gold plated socket. The features of the proprietary design anchor the connector in high shear UV resistant molding. The coax element is sealed in this molding. Mil-Spec heat shrink tubing, with a melting inner liner, it seals and relieves strain between the coax and the twin lead. A heat shrink cap is applied to the outermost end of the twin lead. This unique design eliminates the need for antenna matching baluns and can be fed directly with 50 Ohm coax.

IAC's newest design is the Shorty – a shortened half wave dipole 65% of the overall length of the standard Double Bazooka. Antenna construction centers around two center loaded wide spaced high Q coils that feed into 50 Ohm coax in combination with 300 Ohm transmission line end sections. The end result is a center fed broadband shortened dipole antenna. The Double Ba-

zooka Shorty antenna will handle full legal limit power with no effect to performance. All Shorty antennas will operate on other bands with the aid of an antenna tuner.

Another model of interest to MT readers is the Shortwave Broadcast Listening Bazooka antenna which also uses 50 Ohm



coax in combination with 300 Ohm transmission line end section to form an end fed broadband quarter-wavelength antenna. The Shortwave Broadcast Listening Bazooka antenna is recommended to be mounted to a secure point such as a roof peak or metal pole for optimum results. The Shortwave Broadcast Listening Bazooka antenna will cover the 13 through 120 meter shortwave bands.

The Standard Double Bazooka antenna comes configured for 17, 20, 40, 60, 80, and 160 meters and can be used in array formation. Prices range from \$116 to \$214. The Double Bazooka Shorty covers 40, 80, or 160 meters and costs from \$129 to \$229 (on sale at half that price at press time). A half-sloper model covers 20, 40, 80, or 160 meters and costs from \$100 to \$140 (20 and 40 meter models were on half price sale). The SW Broadcast Listening Bazooka covers 13 through 120 meters and costs \$99 but was on half price sale at \$49 at press time. Prices do not include shipping. IAC's version of a stealth Bazooka comes in the form of a flag pole for \$329.

International Antenna Corp., P.O. Box 121430, Clermont, FL 34712; 888-268-4214; <http://www.iacantennas.com>

## Mobile Speaker

Road noise is always a factor when it comes to clear communications reception in a vehicle. Whether your mobile listening needs are for scanner, shortwave, ham radio, CB, or professional two-way communications, the Valor Classic VS6 mobile accessory speaker will improve audio reception using noise canceling technology. A simple snap of the toggle switch reduces pulse ignition noise and background hiss. Enjoy improved audio with the rugged, 4-inch, 10-watt-rated speaker. Mount the adjustable, steel bracket to your vehicle, plug the 10-foot cord into the 1/8" (3.5 mm) external speaker jack on your radio, and you're ready to go! The Valor Noise Canceling Speaker is \$14.95 plus shipping from Grove Enterprises (<http://www.groveent.com>, call 1-800-438-8155, or write 7540 Hwy 64 West, Brasstown, NC 28902)

## 462 MHz Pager Interference Filter

Paging interference at 462 MHz is a growing problem among scanner listeners as well as two-way communicators. PAR has responded by releasing this improved notch filter featuring a factory-tuned triple cavity, providing razor-sharp, steep rejection of 462 MHz paging interference (3 dB bandwidth +/-2.5 MHz), while providing flat, virtually unattenuated response from DC through 1.3 GHz. This commercial-quality filter can be ordered with either BNC (standard) or N connectors. \$69.95 from Grove Enterprises (see above).



## Digital Voice Communications

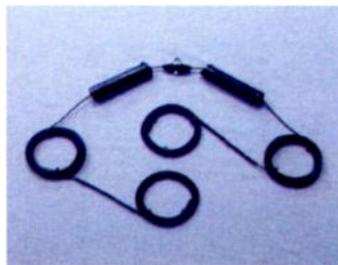
Love it or hate it, digital technology is here to stay, and amateur radio is doing its part, not only to remain on the cutting edge, but also to make new digital modes accessible to hobbyists. Drawing from the best of the analog and the digital worlds, Alinco's engineers have applied a new digital compression technique to the human voice that is compatible with narrowband 10F3 GMSK direct modulation. It uses conventional data rates and bandwidths that fit into today's existing band plans. The entire system is optimized for the audio range of the human voice to improve audio quality and bandwidth.

Alinco's new EJ-47U digital voice communications module is an option for use in the Alinco dual-band DR-620 VHF/UHF and the DR-135MKII mobile/base transceivers or in the DJ-596 and DJ-593MKII VHF/UHF Handi-Transceivers. The PC board lists for \$195.95. Transceivers are easily switched between digital and analog modes, since digital communications are only possible between transceivers using the same digital mode.

## Klingenfuss 2004 Shortwave Frequency Guide

Joerg Klingenfuss

The revised Eighth Edition of the 2004 *Klingenfuss Shortwave Frequency Guide*, has recently been released, and as with previous editions, it is a gem. This book covers the latest frequencies for utility, domestic, international and clandestine broadcast stations, compiled by an international contributing staff. Features include articles on *Digital Radio*, *Monitoring Utility Stations*, and the by-frequency listings of util-



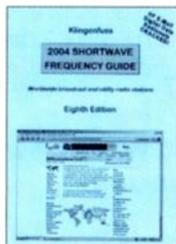
The Shorty Bazooka

# What's NEW

Tell them you saw it in Monitoring Times

ity radio stations.

Utility and broadcast stations are arranged by-frequency, and list start/end time order and location. The broadcast section includes the language, target areas and a remarks field. When using this by-frequency method, listeners can instantly narrow down identification of any station among those transmitting on a frequency at a given time. This is a great aid and quick access during a DX session



or for a program listener.

Hobbyists may also find the same frequency and format information in the by-country section, *Alphabetical List of Broadcast Stations*. This section is invaluable when focusing on a particular county to monitor.

Unfortunately, the *2004 Shortwave Frequency Guide* does not include longwave, medium wave, FM or TV. Nor does it include station info, addresses or websites – something Mr. Klingenfuss should consider for future editions.

Frequency information, as well as parallel frequencies, appear to be accurate, but as with other publications, will only remain accurate until a seasonal frequency adjustment.

My DXing sessions make use of this publication, as it complements others I use as a reference, and I would recommend it to those seeking such a reference.

For ordering information, consult Universal Radio, Inc. at <http://www.universal-radio.com>. It is available as book # 2841, \$34.95, or write to Universal Radio Inc., 6830 Americana Pkwy., Reynoldsburg, OH 43068-4113. Ordering or additional product information may be found at <http://www.klingenfuss.org>.

– by Gayle Van Horn-Freg  
Manager

## Getting Sirius over Satellite Radio

Subscribers to Sirius satellite radio who want to listen to Sirius broadcasts in their home may not always have an easy time finding a mounting location with 24-hour reception. TERK Technologies offers a 50-foot extension cable for use with the stock antenna provided with the subscriber's receiver for better access to a roof or window. However, TERK has also designed its own high-performance outdoor



antenna designed specifically for satellite radio reception in the home. The TERK SIR6 is a compact, weatherproof antenna with mounting options for wall-mount, roof-mount, or mast application.

## XM Commander

For satellite reception on the road, TERK Technologies also offers an XM satellite radio system for mobile use. XM Commander includes the Commander (digital display unit), a hide-away tuner box, low-profile micro antenna, remote controller, necessary cables, relay switch, and mounting accessories. Audio is through the car stereo using FM modulation or direct-connect RCA line-out.

The XM Commander features the only dual line XM dis-

play available on the market, direct channel entry and 30 presets. TuneSelect which finds your favorite songs, and the smallest satellite radio antenna available. Street price is around \$160 for



the complete installation (not counting the subscription to XM, of course). Check <http://www.terk.com> for local or online dealers of TERK products.

## Amateur Radio Today

The American Radio Relay League has an inexpensive 6-minute video presentation entitled *Amateur Radio Today* which is available for use as a recruiting tool and an effective way to present the good work done by radio amateurs. The video is also useful for encouraging radio amateurs to become more involved in public service.

The video is narrated by former CBS news anchorman Walter Cronkite, KB2GSD, and produced by a team led by Dave Bell, W6AQ. Video highlights include: ham radio's response on September 11, 2001; ham radio's part in helping various agencies respond to wildfires in the Western US during 2002; ham radio-in-space educational initiatives.

The presentation is avail-



able from the ARRL as a free download (<http://www.arrl.org/ARToday/>) or for \$6 on CD or

DVD (includes low and high resolution, plus low resolution with subtitles or open captioning), a VHS-format videotape, or as extended viewing "loop" videotape for public displays. Contact American Radio Relay League (ARRL), 225 Main St., Newington, CT 06111-1494; phone 1-860-594-0200.

## What's Not New?

For everything related to older scanners, keep G&G Communications on your contact list. These are the folks to see for scanner and pager repairs and used scanners and pagers. In fact, Gerry Oliver says they are selling off some of their collection on Ebay. Check the Ebay or G&G websites for current auctions of old scanners and parts – maybe you'll find a needed "parts radio" or missing radio for your own collection.

The website is a wealth of information, including a list of all known scanners (over 400), repair and modification information, and a list of older scanner and pagers Gerry is looking to buy – working or not. Contact G&G Communications, 7825 Black Street Rd., LeRoy, N.Y. 14482; Phone: 585-768-8151 / Fax: 585-768-7175; E-mail - [ggcomm@iinc.com](mailto:ggcomm@iinc.com) or <http://www.iinc.com/ggcomm/>

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 Rachel Baughn, [editor@monitoringtimes.com](mailto:editor@monitoringtimes.com)

# WXSATs Plan for the Future

In the previous two editions of this column I have introduced coverage of the long term plans to converge the two weather satellite (WXSAT) constellations of the civilian and military programs, NOAA and DMSP, into NPOESS (National Polar-orbiting Operational Environmental Satellite System). As explained briefly last month, it does not end with NPOESS; Europe's new polar system METOP (not yet launched) is to combine with NPOESS in an Initial Joint Polar-orbiting Satellite System (IJPS).

The whole long-term project – NOAA and DMSP to NPOESS and on to IJPS – would take a major feature to cover adequately. But with the significant changes planned to matters such as transmission frequencies, I believe it is important to be aware of the end goal.

Later this decade, launch and operations of the remaining POES and DMSP spacecraft will cease. The NPOESS spacecraft are scheduled for launch beginning in early 2009, by which time NOAA and the US Air Force are expected to have exhausted the satellites currently under production. Satellite operations for NPOESS will be conducted from Mission Management Centers located at NOAA's SOCC and at Schriever Air Force Base. Full operational capability of the NPOESS constellation is expected by 2013.

The first polar-orbiting Metop satellite will be operated by EUMETSAT (European Organization for the Exploitation of Meteorological Satellites). It is on schedule for launch in 2005. There will eventually be one POES, one Metop, and two DMSP satellites in four orbital planes. The first converged NPOESS satellite must be available for launch by 2008 to back-up the last launches of the current DMSP and POES satellites.

## ◆ Testbed LRIT Image

Figure 1 was processed for me by David Taylor. It is a GOES-12 visible channel 01, and Dave has re-sampled it horizontally so that the aspect ratio is 1:1 (square pixels). Dave down-

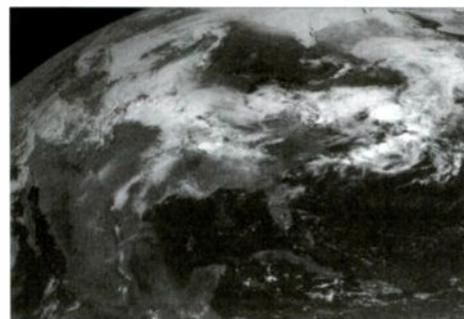


Fig 1: LRIT image from GOES-12 from David Taylor

loaded the test data from the NOAA Web site – see link below – and made a simple program to convert it into a viewable form.

“The test program uses elements from the software that I have developed for MSG-1 and which has been widely used during the trials. I view the program as a testbed, just to prove that the NOAA LRIT data is readable and see what similarities and differences exist compared to the MSG-1 LRIT data. A full program would have all the data management aspects of the existing MSG Data Manager program.”

My thanks to David for supplying me with this first LRIT image. Next month's edition should include an official NOAA LRIT image made available by Charlie Vance. <http://noaasis.noaa.gov/LRIT/htmlfiles/ltdata.html>

WEFAX (the predecessor to LRIT) will be discontinued on GOES-East in the fall/winter of 2004. For GOES-West, the time frame is spring/summer 2005.

## ◆ FengYun over Grand Canyon

Chuck Vaughn recorded a most interesting image from FengYun-1D as it passed over his location in December. It shows an enhanced image of the Grand Canyon and the surrounding area. Of particular interest is the long white streak that at first glance looks like a cloud; however, Chuck points out that it must be snow because it appeared in the image the following day, and terrain can be seen through most of it. <http://www.aag.org>

## ◆ Non-weather Satellite Transmissions

Although I do spend the majority of my satellite monitoring activities with the WXSATs, I originally set out to monitor other satellites that transmit near the 137 MHz band. My interest started with the British education and amateur radio satellites of the UoSAT series (University of Surrey, UK) that transmit very easily decoded

Satellite	Freq MHz	Launch
Transit 5B-5	136.65	1964
Solrad 7B	137.80	1969.
ERS-15 (a.k.a. Secor-7)	136.44	1966.
Ov 5-3	136.26	1967.
ISIS-1	136.41	1969.
S69-4	137.41	1969.
Timation-2 (a.k.a. OPS 7613 P/L 1)	137.38	1969
Nimbus-4	136.50	1970.
Shinsei	136.695	1971.
NOAA-9	136.77	1984.
NOAA-11	137.77	1988
Orbcomm (various)	137.20 - 137.80	

scientific data. From Larry Van Horn's book on satellite frequencies, *Communications Satellites*, I progressed to explore the (then) large number of older satellites still transmitting in the 136 - 138 MHz band. If you have a scanner, give a listen to some of the satellites listed in the table below.

My thanks to Mike Kenny of Melbourne, Australia, for providing a list, of which these are just a selection.

## ◆ Current WXSAT status and Frequencies

### APT:

NOAA-12 and -15 trans. APT on 137.50 MHz  
NOAA-17 transmits APT on 137.62 MHz.

APT - automatic picture transmission: an unusual form of signal modulation in which the original picture is sampled in real-time into individual lines containing brightness information (cloud is white and sea is dark) and this is amplitude modulated on to a 2.4kHz carrier. This modulated carrier is then frequency modulated on to the final 137 MHz band radio carrier to which we tune our receivers. The receiver extracts the 2.4 kHz (sub)-carrier for later processing and display. The signal can be heard because 2.4 kHz is within our audio range.

Note: In previous years there have been additional APT satellites called Meteors, operated by the Soviet Union. No more of these launches are planned, but co-operative projects such as Meteor-3M are operational, but do not transmit APT.

### HRPT/CHRPT:

NOAA-12 and NOAA-16 transmit HRPT on 1698.0 MHz  
NOAA-14 and NOAA-17 transmit HRPT on 1707.0 MHz  
NOAA-15 transmits HRPT on 1702.5 MHz  
FengYun-1C and FengYun-1D transmit CHRPT on 1700.4 MHz

HRPT is a digital signal containing the full resolution (1.1km) data stream and therefore requires the higher (1700 MHz) band. NOAA satellites transmit five channels of data; the Chinese satellites transmit 10 channels.

### Geostationary WXSATs:

GOES-10 (west) and GOES-12 (east) use 1691 MHz for WEFAX. GOES-12 is currently transmitting LRIT data at 45 minutes past each hour.

### Notes

Sounds like musical tones.

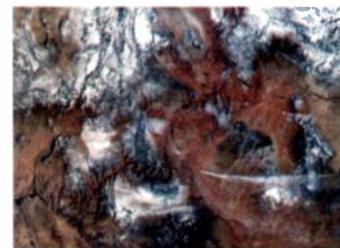


Fig 2: Fengyun-1D from December 16, 2003 Grand Canyon from Chuck Vaughn

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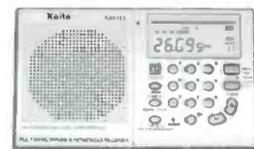
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*If history repeats itself, and the unexpected always happens,  
how incapable must Man be of learning from experience.*  
— George Bernard Shaw (1856 - 1950)

## Interoperability: Being Responsible

By Larry Van Horn, MT Assistant Editor

It always seems to take a major disaster to highlight radio incompatibility issues that plague this nation's public safety community. This was dramatically highlighted on September 11, 2001, during the terrorist attacks in New York, Washington, and Western Pennsylvania. The battle cry of the public safety officials involved in these disasters was they could not communicate with any other agencies due to a lack of radio compatibility.

More than a decade ago the Association of Public-Safety Communications Officials Project-25 (P-25) protocol established one digital standard to help ensure that communications gear, regardless of equipment manufacturer, would be interoperable for police, fire and other emergency responders at all levels of government. As we wind the clock forward since the 9/11 disaster we have seen a heavier emphasis on rolling out Project 25-compliant systems city-wide, county-wide, state-wide and nationwide under the mantle of homeland security.

However, despite this heavy interest and the promise of agencies being able to communicate with each other using the P-25 protocol, we still see new digital systems in portions of this country switching to non-P-25 compliant communications systems. Are the taxpayers of these jurisdictions being well served and their taxes well spent? In a word, no!

### New Realities Require New Strategies

Movement toward interoperability appears to be moving smoothly on the federal level. The Federal Emergency Management Agency recently announced that the government's wireless efforts are being consolidated into Project SafeCom to ensure that all emergency workers have access to interoperable equipment based on the P-25 standard. The Defense Department has adopted a P-25 compliance policy for land mobile radio systems as have a number of federal agencies, most recently the National Fire Association.

Secretary of Homeland Security Tom Ridge announced in March 2003, that nearly \$600 million in taxpayer funds has been made available to states and U.S. territories to better assist state and local public safety and law enforcement personnel to help them prevent and respond to terrorism. Interoperable radio communications equipment is eligible for the funding as long as they are P-25 Phase I compliant.

Yet in Pennsylvania, where Ridge was governor prior to moving to the DHS cabinet position, he oversaw the procurement of the state's Open Skies 800 MHz trunk system, a non-P25 compliant system.

State and local governments themselves can also share the blame for the lack of interoperable systems. In February 2003, the National Task Force on Interoperability (NTFI) released a 104-page report that detailed why public-safety agencies are facing interoperability problems. One of the top five reasons cited was lack of coordination and cooperation in state and local governments.

"State and locals have the attitude that 'what's mine is mine.' They want their own systems. There's not just one thing holding back P25. It's the will to cooperate, the politics, available spectrum and money," said one NTFI official.

NTFI highlighted the fact that agencies are naturally reluctant to give up management and control of their communications systems. It suggests that public officials can consider sharing costs and benefits with other jurisdictions or look at sharing infrastructure such as radio towers.

The bottom line, said NTFI, is that public-safety agencies must change the way they do business, which means sometimes giving up

control of their communications systems.

So which public safety agencies in the United States aren't on the P-25 bandwagon? Who cannot talk to the Feds and other vital agencies on their radio systems in times of disaster or when their citizens are under attack?

### The Non P-25 Honor Roll

Agency  
Oakland Public Safety, CA  
Lakewood Public Safety, CO  
Coral Gables Public Safety, FL  
Hillsborough County Public Safety, FL  
Henry County Public Safety, GA  
State of Iowa  
Evansville/Vanderburgh County  
Public Safety, IN  
Terre Haute Public Safety, IN  
Vigo County, IN  
Pointe Coupee Parish Public Safety, LA  
St Martin Parish Public Safety, LA  
St Tammany Parish Public Safety, LA  
Allegan County, MI  
Livonia Public Safety, MI  
Oakland County, MI  
Harrison County/Biloxi/Gulfport  
Public Safety, MS  
Noxubee County, MS  
Warren County Public Safety, MS

Johnston County Public Safety, NC  
Albuquerque Public Safety, NM  
North Las Vegas City, NV  
Onondaga County Public Safety, NY  
Cleveland City Public Safety, OH  
Springfield, OH  
Oklahoma City Public Safety, OK  
Cumberland County, OA  
Lancaster County, PA  
Pennsylvania Statewide  
Clarksville Public Safety, TN  
Memphis Power & Light, TN  
Memphis Public Safety, TN  
Shelby County Public Safety, TN  
Corpus Christi City Public Safety, TX  
DFW Airport Public Safety, TX  
Live Oak City, TX  
Montgomery County Public Safety, TX  
San Antonio/Bexar County, TX  
City of Milwaukee, WI

### Non P25 System in Use

AEGIS Regular  
AEGIS Regular  
ProVoice Regular  
ProVoice Wide Area  
ProVoice Wide Area  
ProVoice Regular  
ProVoice Wide Area  
ProVoice Regular  
ProVoice Regular  
ProVoice Regular  
ProVoice Regular  
AEGIS Regular  
MA/Com OpenSky Regular  
ProVoice Regular  
ProVoice Regular  
Motorola Type II Smartzone  
ASTRO - VSELP  
ProVoice Regular  
ProVoice Wide Area  
ProVoice Regular  
AEGIS Wide Area Mixed  
Motorola Type II ASTRO VSELP  
ProVoice Regular  
ProVoice Regular  
MA/Com Regular OpenSky  
MA/Com Regular OpenSky  
MA/Com Regular OpenSky  
ProVoice Wide Area  
Motorola Type II ASTRO VSELP  
Motorola Type II ASTRO VSELP  
AEGIS Wide Area  
AEGIS Wide Area  
ProVoice Regular  
ProVoice Regular  
ProVoice Regular  
ProVoice Wide Area  
MA/Com OpenSky Regular

Meanwhile, those pushing for more rapid rollouts of APCO-25 networks hope it doesn't take another major disaster to highlight these deployment hurdles.

*We learn from history that we do not learn from history*

— Georg Friedrich Wilhelm Hegel

*This page is open to thoughtful opinions on radio-related topics. Views expressed on this page do not necessarily reflect the opinion of Monitoring Times or Grove Enterprises.*

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